AN EXCLUSIVE INTERVIEW WITH PROF. İSMAİL DEMİR – UNDERSECRETARY FOR DEFENSE INDUSTRIES

DEFENCE TURKEY

VOLUME 11 ISSUE 74 YEAR 2017
ISSN 1306 5998

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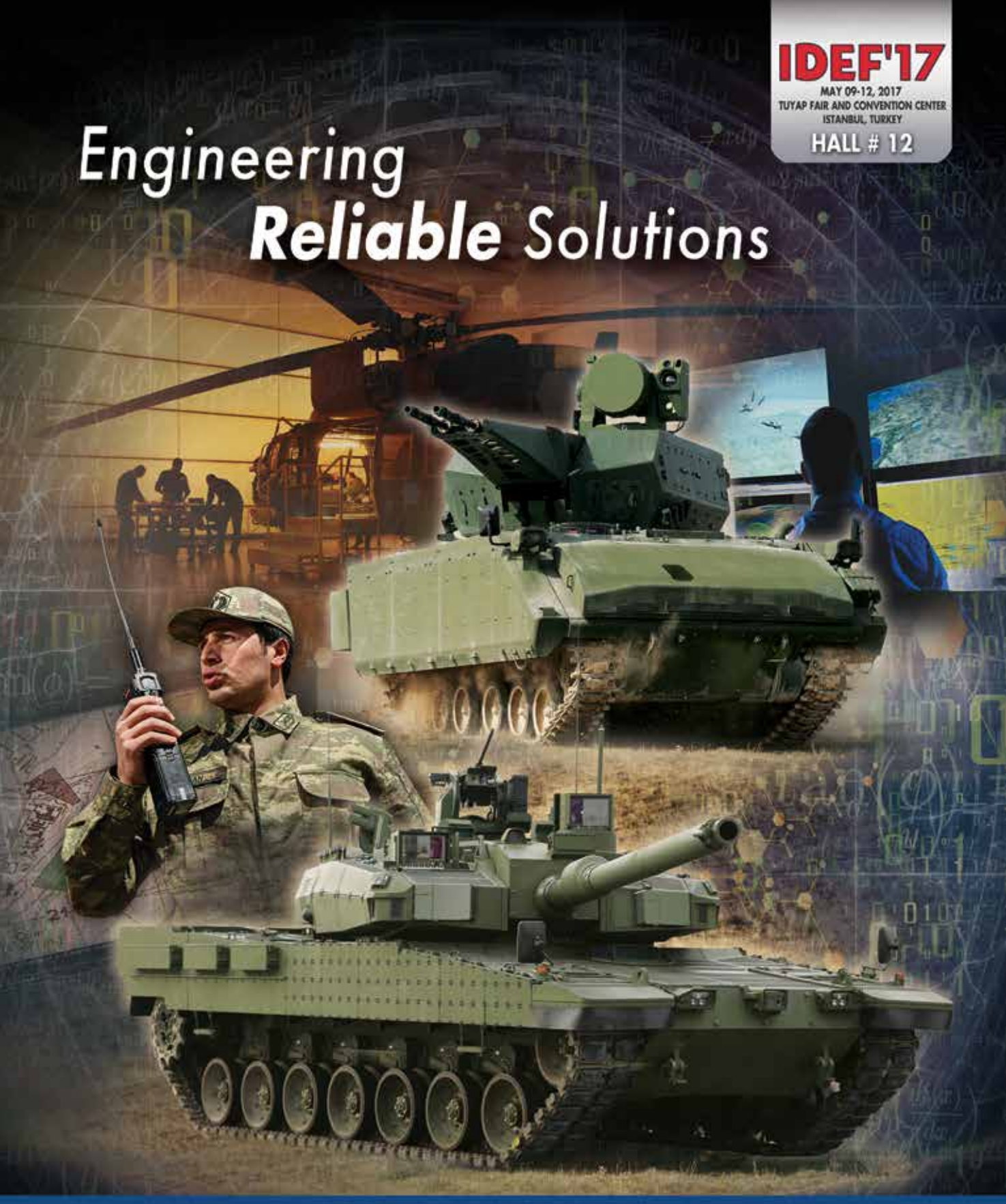

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ASELSAN is a Turkish Armed Forces Foundation company.

DEFENCE TURKEY

VOLUME: 11 • ISSUE: 74 • YEAR: 2017

ISSN 1306 5998

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Görsel Grup Basim Tanitim Tasarim
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Basım Tarihi
Nisan - Mayıs 2017

Yayın Türü
Süreli

İMGE Co.

IDEF 2017 Gathers Defense Professionals from all Over the World...

Ayşe Evers
Publisher & Editor in Chief

Developing capabilities, original-design systems and products, the Turkish Defense Industry has recently carved out a different and significant place for itself among international platforms within the framework of participation in multinational projects, in joint programs and in the collaboration carried out with leading firms in the global defense industry. Significant developments in the R&D activities in the direction of the goals of the Undersecretariat for Defense Industries have enabled Turkish firms to open up to the world with a bold and new marketing vision harboring a new enthusiasm. With this dynamic vision, all parties of the defense industry have been taking part in major projects as a competitor or as a business partner within a common synergy together with the developed defense industries of the world in recent years, which is a big source of pride for all of us. IDEF fairs also reveal Turkey's vision which brings together developed defense industries and procurement authorities of the regional countries to a common platform, creating different cooperation possibilities.

IDEF 2017, organized to take place on May 9-12, 2017, under the auspices of the Presidency of the Republic of Turkey, hosted by the Ministry of National Defense and under the management and responsibility of Turkish Armed Forces Foundation (TAFF), is the only and unrivaled Exhibition in its field in Turkey and also among the top five defense industry exhibitions in the world with respect to the number of exhibitors. Moreover, the IDEF 2017 Exhibition is on track to becoming one of the preeminent defense industry exhibitions in the world with the cooperation opportunities to be provided to the exhibitors through the visiting delegations and meeting offices.

At this year's IDEF 2017, it is expected that nearly 800 companies from over 50 countries will exhibit their cutting-edge products, materials and systems manufactured in the fields of defense, security, maritime and aerospace. Apart from the companies directly related to the defense industry, a large number of companies from indirectly related industrial branches will participate in the Fair.

IDEF 2017 hosts the world's leading high level procurement authorities in the field of defense. It is expected that over 100 delegations from more than 70 countries and international organizations will participate in IDEF 2017 which is one of the defense industry exhibitions that hosts the highest number of official delegations in the world.

We hope that the IDEF 2017 Exhibition will be very successful for all parties concerned.

Enjoy this issue.. ■

SSM - Breaking down Barriers, Building National Strength in Technology & Export Infrastructures, Promoting Side Sectors, Utilizing Expertise for the Future & Independence of Turkey

In an exclusive interview, Prof. İsmail Demir, Undersecretary for Defense Industries SSM provides insight into activities focused on encouraging new enterprises, channeling them according to integration and requirements, seeking possibilities for foreign capital and technology contribution, guiding enterprises and making plans for state participation; re-organizing and integrating existing national industry to satisfy defense industry requirements

Defence Turkey: Dear Mr. Undersecretary, first of all we would like to thank you for your time. The Defense Industry Strategy Report for 2017 – 2021 was recently published by the SSM. What strategies will stand out during the next quinquennium such as R&D, what are the priority areas?

According to the published strategy report, we have concentrated on areas such as the broadening of the industry and the eco-system, execution of exports and sustainability and logistical support in line with certain programs. We have to focus on advanced technology and gaining technological independence. The breakdown of our systems is important for us, enhancing the local content rate and diminishing foreign dependency in critical technologies will be regarded as one of our objectives.

Defence Turkey: Will you be concentrating on brand new ground-breaking technologies such as robotic technologies and industry 4.0?

The smart systems or the unmanned autonomous systems are very trendy in the defense industry recently. Therefore, we are aware that integrated mechanical electronic software is in the ear of entire sectors. So, the technologies that would boost its efficiency in the theatre, reduce risks through technological superiority and that bring advantages in the field need to stand out, rather than the number of operational activities. The programs referred to as conventional technology which we currently do not possess technologically, foreign dependency - areas in which the local content rate is low, will be on our agenda in the upcoming period as well. Development of engine, transmission and power-pack systems in various classes that are amongst Turkey's primary requirements and their utilization will be a part of our most essential areas in the next period as well.

Defence Turkey: Similarly, the Defense Industry Strategic Plan on Exports has also been published quite recently. What are the new activities and strategies envisaged to this end?

The Defense Industry is one of the sectors with the greatest potential in respect to exports, but we cannot fully benefit from opportunities until we adequately fulfill our potential. What do we need to do in order to benefit more from this potential? We need to keep up the pace with high-tech technology on global scale, attend international exhibitions and our companies need to promote their capabilities better. As the Undersecretariat for Defense Industries, representing the state, we need to enable all support to all of our companies conducting export activities, without exception. There are certain exhibitions abroad that we ensure national participation under the coordination of the Undersecretariat for Defense Industries, we also are closely monitoring and encouraging the promotion activities and participation of our defense industry companies in worldwide exhibitions which we do not officially attend as the procurement authority. The growth and development of our defense industry are of particular concern to us. Therefore, we will intend to press ahead on export activities with the same appetite and determination; however, it is not easy to instantly get result the outputs of these efforts, especially in this sector. We rely on the fact that we will be striding out in respect to exports as we continue to demonstrate our indigenous products and technologies in the high profile fairs of the world, presenting the outstanding features of our products and the concrete field performance of our products which have proved themselves in theatre to the procurement authorities efficiently.

We have the IDEF 2017 defense industry exhibition, which we will be hosting. The event showcases our unique products and technologies on stage. Throughout this exhibition we will be conducting both G2G and G2B level official negotiations with many globally renowned companies, procurement authorities and with official delegations attending upon special invitation. Our companies will be executing bilateral negotiations similarly with the official delegations and companies abroad as well. We aim to build up an atmosphere in which effective cooperation is built and trade will stand out during the exhibition. Thanks to the interest shown toward our unique products and the interest shown to us, we will be able to closely analyze the export potential of the Turkish Defense Industry in the upcoming period.

Defence Turkey: Could you please inform us on the recent developments regarding the export credit mechanism?

We still lack an automatic mechanism that could be turned into an official implementation. It is possible to form a credit mechanism according to the requirement and content of the program, and we implemented this before. Our credit request was approved as part of a project we accomplished with Pakistan and we received a positive reaction in this sense. When we have the chance to gather our statesmen together on various platforms, it seems that they are leaning towards this mechanism. Discussions on necessary regulations in respect to rendering this mechanism systematic seems to ever appear on the agenda.

Defence Turkey: The negotiations conducted for the procurement of the S-400 Long Range Air Defense and Missile Systems are active and the final decision has not been made yet. Could you please assess the latest status within this scope?

There is a misperception in the public eye regarding this issue and primarily we have to correct it. As the public authorities, we have even underlined the following fact and we continue to emphasize it. As Turkey, we are developing our indigenous Air and Missile Defense systems in an understanding of a national, multi-layered and multi-staged concept. We have initiated the building of our multi-layered and multi-staged

air and missile defense umbrella with increasing altitude and ranges consisting of the antiaircraft systems to "Korkut" Self-Propelled Air Defence Gun System and "Hisar-A" and "Hisar-O" Low and Medium Altitude Air Defense Missile Systems. We aim to utilize the experiences and know-how gained especially within the scope of Hisar-A and Hisar-O Low and Medium Altitude Air Defense Missile systems in our Long Range Air and Missile defense systems which constitute in another stage. Our journey on developing the Indigenous Air and Missile Defense System are going-on. Besides, we have declared the following point; while we continue to develop the Long Range Air and Missile Defense Systems through indigenous and local resources, if there are any companies or countries that aspire to cooperate with us, we are available for cooperation, to utilize their requests and we constantly underscored key areas in which we could team up and we carried out our negotiations with the relevant parties. Several country names came to the forefront as we conducted these negotiations. Russia has also been included in the countries that we contacted with in the recent period. We are speaking of the procurement of a system, instead debating about whether or not we made a definitive agreement here, we are discussing the potential of collaboration which would support our existing achievements. Russia has been one of these countries. Since the development of our indigenous systems will be consuming a certain amount of time, we are evaluating all the options comprising the off-the-shelf procurement option as we try to figure out how promptly we could cater to the urgent requirements of the Turkish Armed Forces and we are negotiating not merely with Russian delegations but also with France and the Unites States as well. The negotiations with the Chinese currently continue on a low profile. Public opinion regarded the negotiations conducted with Russia as follows; Turkey and Russia, have signed the definitive agreement and will be procuring the S-400 Air and Missile Defense Systems. We definitely do not adopt the understanding of "we accomplished the tender within this program, signed the contract, made the off-the-shelf procurement, fulfilled our request and we are concluding this program", not at all. Instead, we are pondering on the method in which we will be able to proceed with the understanding of a concept enabling us a broader perspective.

Defence Turkey: It seems that the S-400 Air and Missile Defense System is a quite effective system particularly towards Air Breathing Targets, yet when we discuss of Ballistic Missile Air Defense we move onto another stage and we have to evaluate this within a far-reaching perspective. Within this scope, which type of a strategy will we pursue toward adopting measures against such threats as we also develop our independent systems?

We imply this, as we refer to a multi-layered and multi-staged systems; Long Range and Advanced Air and Defense Systems exist in the next stage of the Low and Medium Altitude Air and Missile Defense Systems. The capabilities of these systems should not be limited to their capacity against entirely Air Breathing Targets or Ballistic Missile threats.

The technologies that need proper interception capabilities alter according to the range and class of ballistic missile threats. An array of key factors such as fast reaction time, more accurate detection etc. step-up according to the classes of the ballistic missiles with longer ranges and their parameters such as terminal phases, velocity, etc. A system capable of intercepting the threat at a higher altitude similar with the American THAAD system is in question here. As Turkey, we initially launched to develop the Hisar-A Low Altitude Air Defense Systems. Where Hisar-A is a system intercepting Air Breathing Targets at a range of 16 km, Hisar-O Medium Altitude Air Defense System is capable of intercepting targets at a range of 25 km. If we define these efforts as a journey, then we need to proceed by increasing our accomplishments stage by stage.

Defence Turkey: Dear Undersecretary, there are multi-national projects in development stages which will provide interception capability against BM threats as well as Air Breathing Targets, enabling joint participation such as MEADS. What is Turkey's approach on participating in such programs?

Following the cancellation of the Turkish Long Range Air and Missile Defense System tender, there have been certain changes in the MEADS program too; there has been a new structuring. They would like to negotiate with us in that stage as well. As we have always stressed, our doors are open to everyone and we conducted an array of negotiations in order to become familiarized with the system to this end. We always put our cards on table and are open to new models and suggestions of allied willing to accomplish a sincere cooperation on the MEADS program or on further subjects. We will present our counter offer to the other party and we can proceed together if we reach an agreement. Our approach to this subject is clear.

Defence Turkey: It seems that Turkey attained a crucial milestone with the recent announcement of Roketsan's development of the BORA TBM with 280 km range? What are your assessments on the advantages to be acquired by this capability?

We regard this achievement as an important step in respect to Turkey's deep-learning and implementation of critical technologies. Turkey is crossing the critical threshold as guide control and reaction propulsion systems constitute the implementation area of certain technologies. We have reached a desired range as of now.

Defence Turkey: The PDR (Preliminary Design Review) stage has been initiated within the scope of TF-X program, how will the following process proceed?

We launched a tender for a process comprising the PDR stage. PDR stage defines a process in which the design emerges and matures. Our greatest ambition is to accomplish the PDR Stage on-time. Upon accomplishment of this stage, all details of the aircraft will be revealed without putting a question mark in anyone's mind. We are expecting to finalized the PDR stage by the end of 2019 or at the beginning of 2020.Then we will have the CDR (Critical Design Review) stage ahead and a long path towards the prototype production. The tender has been launched and the main contract is only comprised of the PDR stage for now. I believe that we will be able find out crucial inputs in this activity that is focused on design. You may address the question as to why we did not prefer a contract that included the prototype manufacturing as well. As an inexperienced country in this field, we deemed it more convenient to sort the program into phases in order to both reduce the risks and to monitor the contractor company's performance better, and thus proceeding by staging the process in accordance with the performance of the company. As you know, a Foreign Cooperation Partner (YFI) to conduct technical cooperation has been selected at this stage. We decided to proceed by enhancing the acquired capabilities as part of the TF-X program.

We are not in doubt that we will unveil the first prototype in 2023; once we have identified the basic parameters of the aircraft, we have operational requirements, then we will gradually introduce evolutionary processes that will fulfill these requirements stage by stage. The acquirement of additional capabilities and retrofits are aimed for the following stages: regarding the software, hardware and various aero-dynamic

structural components of the aircraft, which is to be acquired after the identification of the main parameters as well as with the F-35 JSF program. We plan to clearly define our operational conditions in the initial stage and then build a fully operational Fighter Jet by proceeding stage by stage.

Defence Turkey: When is the engine selection planned to take place as part of the program?

We will be frequently discussing the criteria on the engine selection within the year ahead. All parties of decision makers mutually agreed on a twin-engine aircraft last year. Similar to platform development, engine development also consists of various stages. We are delighted about the integration of the unique engine to our Indigenous Fighter Jet, but this may sound a bit assertive. Therefore, throughout the development process of the aircraft, the selection of a certain engine already proved itself and whether or not to use this type of an engine throughout the prototype stage, are still being discussed.

We have specific options in this stage; it may be possible to combine two concepts. This implies that when we select the engine we may be able to integrate it at the prototype phase, we may conduct the process with the same company by outlining the following stage and combining it with the unique engine development phase during the prototype stage. Such a strategy may also come up on the agenda.

Defence Turkey: Dear Undersecretary, will the approach for completely domestic participation continue in the production of the critical technologies, especially within the scope of the TF-X program? Or do you aim to cooperate with foreign companies through joint development, joint production models regarding certain technologies, as also seen in the main program?

We aim to attain the critical technology entirely with home production modality. We learned the hard way that obstacles emerged when the sub-systems and critical technologies are not developed through local resources. We experienced in the past and present that we may confront various problems and restrictions in the procurement of the technologies due to external dependency. Mostly, this disadvantage is being utilized as type of repression. Within this scope, during the development stage, it may be possible to procure identified components or systems from the parties with which we have good cooperation with or from parties willing to cooperate, but we will not give up our ultimate goals of home production. Even though we have quite good cooperation for the time being, we may not know how they will proceed in the future. We will particularly focus on the indigenization of critical technologies and will pave the way for a basis for the activities to this end.

Defence Turkey: Have there been any discussions about including different countries in this program, and to possibly turn the program into a multi-national one? Is a different picture emerging throughout the PDR stage and what type of infrastructure activities are occurring that may relate to this?

We have a positive stance regarding this issue. The financing of complex and complicated programs like this one is quite

high, then again, we are aware of the fact that there are a limited number of countries all over the world attempting to conduct such a major program. We need to approach the issue from this perspective. In case a chance for very long term cooperation is possible and if the countries with which we have long-standing cooperation are interested in the program, we may consider their participation. We have no prejudice in this respect.

Defence Turkey: It was recently declared by our Ministry of National Defense that the serial production process as part of the Altay MBT program would be concluded in May. What type of a resolution awaits us in the upcoming period? Will it be a consortium model that has applications and reduces the risks? Or will you be proceeding over an existing model with a single main contractor with the best bid and production capability? What are your assessments?

The evaluation process continues for the time being. We submitted the proposals for the serial production process from the company that conducted the development, evaluated it and request them to revise their proposal. We conducted another negotiation, revised all parameters and went through a quite long bargaining process. Yet, we also need to submit the delivery of the technical data package which is amongst the obligations to be fulfilled by the company at this stage. As also mentioned by our Minister of National Defense, we will reach a decision within a month. It is difficult to mention the content of the decision at this stage because we reached a certain point as a result of these negotiations and we have to take the final steps regarding the output of these efforts; the negotiations are on their due course and it would not be proper for me to declare anything now. In this respect, I will kindly ask you to wait a bit longer.

Defence Turkey: Will there be any statements on the launch of the serial production during IDEF?

There may be a statement on the launch of the tender for the serial production but there will be no declaration on the final decision reached.

Defence Turkey: Taking the urgent requirements of Turkey into consideration, how will the serial production process, first delivery and annual production schedule will be planned as part of the Altay MBT program?

We have a request for a lot of 250 MBT for the first phase of mass production. Our official contacts with the Turkish General Staff and the Land Forces Command continue to this end as the requirements of Turkey are not limited with merely 250 MBT. If they notify us on their rather long term requirements, we may be able to take further steps easily regarding the tender process. When the number of ordered tanks are increased, the companies or the company selected will be able to draft an effective-cost plan with a clearer future vision. As a result of the relatively lower costs due to the increase in the order quantity, this will also trigger firms offering more advantageous offers.

Altay Main Battle Tanks

MTU - EuroPowerpack

Defence Turkey: Dear Undersecretary, one of the most controversial points throughout the serial production process of Altay MBT has been the subject of engines and transmissions procured from foreign countries. With the recent license restrictions frequently appearing on the agenda, has there been a negative impact on the program during the serial production process? What are your comments on this issue?

There are no such risks for the time being. There seems to be no restrictions as a result of the negotiations conducted with the company. Yet, even as we launch the serial production, the procure of these engines will take at least 2- 3 years. Also, we have existing engine development programs for this that we can relaunch. We endeavor to adopt all the related measures. There is a waiting period related with the of these engines and transmissions but there appears to be no problem on the horizon regarding the license restrictions for now. The restrictions discussed by the public opinion are rather those that are connected with daily life or regarding programs of smaller scales. As the volume of the programs increase, we expect both the countries and companies to think more thoroughly.

Defence Turkey: The contract on the Power-pack Development Project has been terminated due to the Foreign Technical Support Provider Company's failure to overcome the license restrictions and to fulfill its commitments. Could you please assess the recent developments within this scope? These license restriction issues with Europe frequently appear on the agenda. Is it possible to proceed with countries with experience in this area that are willing to cooperate with us, such as Ukraine, Japan and South Korea? Recently, Ukraine made a serious offer to this end. What would you like to say in this regard?

Our main contractor companies competing within the scope of the power-pack development program tender submitted its bid with the foreign technical support provider company. These main contractor companies have committed to us on which foreign technical support provider they would cooperation with as they made their proposals for the tender. Following the conclusion of the tender, the activities would be launched upon the contract made with the technical support provider. Yet, the technical support provider company did not fulfil its commitments during this stage. The companies, they negotiated with in the sequel could not keep their side of the bargain either and some of them encounter the obstacle of the license restrictions of their governments. We went through all these situations a year and a half ago. During the elapsed time, the awarded party, main contractor conducted official negotiations with various countries or parties and even reached a certain point. But at that point we coped with a higher cost and the request of an extended time frame. They claimed that they could not find any foreigner technical support provider, they did not state that they would withdraw from the tender, they told us that they could not fulfill the precondition, that they still may achieve it with modified costs as the conditions altered. It is not legally possible for us to fulfill such request within a tendered program. We launched a tender, the competition process was accomplished and then the awarded party request to amend the provisions such as costs as well as program schedule. Even if we approach this offer admissible we could not approve it legally. Although the tender has been annulled the contract, the awarded party has already agreed the foreign technical support provider company. We have no risks in that sense. Regarding your question considering Ukraine, we have signed a comprehensive MoU with Ukraine; one of the clause of this MoU comprising the cooperation to be built-up on the engine and transmission technologies. Let it not be perceived as if we are purchasing engines from Ukraine.

Defence Turkey: Could there be a new model through a new tender or through the consortium of local companies in the upcoming period?

It could go either way. We are already maintaining own engine project; even though the power categories are different we have an existing power-pack project. At this point we assess the capabilities of the company executing the program, if we manage to achieve the acquisition of a capability towards the development of a power-pack system for the Main Battle Tank by increasing the power category further, then we can proceed from this point. Launching a new tender may be another option too. We will assess this option by negotiating with the company. Actually, we are willing to create a consortium, a cooperation model by gathering the various existing capabilities and resources in Turkey. Surely, this will be at the disposal of our private companies, we cannot force them but we can give advice to them according to our approach.

Defence Turkey: The Main Contractor is going through a severe financing problem in the A 400M multi-national program and as a result critical delays are faced during the deliveries to the partner countries. The financial resource problem continues despite the additional resources provided in 2010 and this hampers the sustainability of the program. Besides all of these obstacles, Turkey recently delivered its fourth aircraft. Where do you see the future of the program, delays in the deliveries and Turkey's business share in the program?

In this multi-national program, various partner countries exist in apart from Turkey. OCCAR conducting the program on behalf of the partner countries also executes the cooperation's with the main contractor. The given company shares its financial status with the partner countries and we pay attention to their requests but this does not mean that these countries would be

renouncing their requirements. None of the countries have the positive attitude to create a new fund when they observe a financial gap in this program. Then again, I do not think that any of the partners would wish the failure of the program. High level, official meetings are being held between the parties. The overall attitude here is that the main contractor should be recover lost time more seriously, if the company needs to relieve itself, the company is expected to fulfil its commitments for the future on aspects such as the product delivery, logistical or spare part support. We can say that the attitude of the partners considering this subject is very clear.

Defence Turkey: Dear Undersecretary, how are the developments proceeding regarding the delivery of the aircraft replacing our aircraft which was crashed two years ago?

We recently took delivery of our 4th aircraft. The aforementioned procurement will be accomplished in the upcoming period, there are no problems considering that issue.

Defence Turkey: Dear Undersecretary, important progress was achieved regarding the export of the Atak Helicopter to Pakistan but it is frequently discussed in the public eye that the procurement could not be concluded due to financial reasons. Could you please elaborate the recent status of the negotiations between the parties to this end?

The understanding that the failure to accomplish the sale of the "Atak" helicopter to Pakistan was due to financial problems is not a very accurate judgment. The delay of the program due to the rejection of the requests of a financial support is not in question. We are waiting for the Pakistani party to make a decision on the procurement of the "Atak" helicopter, We are taking all the steps and actions necessary toward obtaining financing at points with financing expectation, we are generating solutions in this respect.

MILGEM Vessel

Defence Turkey: In which direction are the activities launched for the indigenization of the turreted gun and Electro-Optical Roconnaissance,surveillance and targeting system within the scope of the Atak Helicopter proceeding?

There are important developments regarding the electro-optical reconnaissance,surveillance and targeting camera systems. These optical camera systems bear great importance for our UAV systems, surveillance and reconnaissance aircrafts and helicopter platforms. Soon we will be able to give the good news about our products. Aselsan has important steps on this subject; shortly we will provide the news about them as well. The development of the turreted gun will be a long-term activity but our studies are on their due course.

CATS - Elecro-optical reconnaissance, surveillance and targeting camera

Defence Turkey: The firing tests as part of the Armed Hürkuş-C program have been successfully accomplished very recently. How are the negotiations proceeding for the procurement of these aircrafts with the Land Forces Command? Also, you made a statement that the first armed Hürkuş can be operational in June. Could you please elaborate on this issue?

Hürkuş has been designed as the New Generation Basic Trainer Aircraft. However, these aircrafts are capable of conducting close air support missions when armed, currently in our country and in the world. Within the scope of such requirements, we exert utmost efforts to accelerate the process anticipated for the configuration of Hürkuş-C Light Attack Aircraft. We outfitted to armed one of the two aircrafts being used as test aircrafts and rapidly passed it to the field. The attitude of TAI is crucial at this point, they too made certain commitments to us, to accelerate the process. While we conduct the serial production of the Hürkuş-B which is the Military Trainer Aircraft of the Turkish Air Forces, we will be enabling the production of the armed

Hürkuş-C configuration. We have been conducting negotiations with the Land Forces Command in order to shape their clear request regarding the ordered and program schedule. There will be a certain number of aircraft orders placed within this scope. But before these orders become apparent, we strive to immediately establish the serial production line by conducting the required set up a substructure, and to enable the rapid completion of both our Land Forces Command's Armed Hürkuş-C Light Attach Aircrafts and our Air Forces Command's Hürkuş-B New Generation Trainer Aircrafts to on the serial production line. Noticing the urgent requirements of Turkey, main contractor must act quickly, this is very important for us.

Defence Turkey: When is the final resolution on the Milgem 5-8 "I-class frigate" program expected to be given? Could you please evaluate the latest status?

The envelopes have been opened in the tender and our colleagues are continuing to consider the proposals. The construction activities of the 5th MILGEM ship have been launched at the Istanbul Shipyard Command; 6th, 7th and 8th ships will be built and outfitting by the private sector shipyards, but the tender will be comprising a total of 4 vessels. Although the 5th ship is to be constructed at the Istanbul Shipyard Command, the procurement process will be conducted again by our private sector shipyard which won the tender. There are surely certain grey areas at this point but we believe that we will clarify them in time as well.

Defence Turkey: What are the latest developments regarding the program on the Akıncı UAV with 1500 kg payload capacity? Do you plan to proceed in line with a model based on a single main contractor? Or will a model in which existing capabilities and assets be utilized?

Currently we are evaluating the existing capabilities and encouraging the companies to negotiate with each other. Launching a tender and making a selection through competition is possible and we also envisage that a consortium model in which the companies could support each other, thus combining capabilities as a part of this program. Currently we are at a very early stage to tell what the result would be. We continue to classify and evaluate the capabilities, we know what to do and we know one's own mind. In my opinion a cooperation or consortium model would be more effective at this point.

Defence Turkey: Lastly, is there any message you would like to convey to the readers of Defence Turkey?

I would like to convey the following message to all readers focusing on the Defense Industry and to our shareholders. We have an array of companies enthusiastic about accessing the Defense Industry sector, these companies should not lose their contact with us and they should never give way to despair. We occasionally received complaints of our companies. Especially, small scaled companies may feel blocked and they were desperate about this. Here we are striving to establish a sector in which our companies could extend to the widest base as possible. One of our greatest goals is to reflect Turkey's richness onto the defense industry, because each capability that we cannot find out or fail to gain for our sector will be Turkey's lacking. We are aspire to achieve all capabilities in Turkey in the field, in a highly important and national arena such as the Defense Industry. We should have no deficiencies on this subject. In this respect, the companies should always be in touch with us regarding the issues they consider they have deficiencies. Our doors are constantly open to them in this sense, they should never feel left out as we endeavor to build certain incentive mechanisms. They should constantly keep in touch for us, moreover we are willing to listen them if they suggest an incentive mechanism or in the event that they have requests. I believe that the defense industry should be conducted with the spirit of national mobilization. In this period that we've been going through together, we have the chancing conditions to analyze this point clearly.

In Turkey's struggle for 'freedom and future', we do not utter these words simply as a mere motto, we are building the future and this can only be achieved through independence. We must have the power to reach independence.

Defence Turkey: Thanks very much again for your time.

Mrs. Ayşe Evers - Editor in Chief at Defence Turkey Magazine met with Prof. İsmail Demir - Undersecretary for Defense Industries in Headquarter of SSM

Ambitious Growth Strategy for TAI and Stakeholders, Anticipating Revenue of $1.9 Billion in 2017

In an in-depth interview, TAI President & CEO –Temel Kotil, Ph. D. talks with Defence Turkey Magazine about TAI's long list of successful projects, experience and vision for the future

Defence Turkey: Dear Mr. Kotil, first of all we would like to thank you for your time. In the last quarter of 2016 you were appointed as the President & CEO of Turkish Aerospace Industries, Inc. (TAI) of which you were a board member. As a professional of this sector, what are your assessments regarding the Turkish Defense and Aerospace Industry since the time of your assignment?

Before I provide my assessment I would like to underline a certain point. The publication of magazines focusing on defense began in the 1970s. The reason that I became an aircraft engineer in 1979 is due to these magazines. The emergence of these sectoral magazines is a result of the establishment of Turkish Aircraft Industries Corporation (TUSAS) by the Deputy Prime Minister of that time Mr. Necmettin Erbakan in 1973. The establishment of TAI as per the related law and the boom of Turkish industry along with the subsequent publication of such magazines through sponsorships are the initial motivators of the youth at that time, to select careers in aviation.

We signed an agreement with the Aeronautics Faculty of Istanbul Technical University last week. The students of Istanbul Technical University will be designing a two-seater aircraft within 24 months with our support. This aircraft will be certified by the European Aviation Safety Agency (EASA), manufactured and will make its maiden flight within two years. I wanted to share this good news with you as well.

I was coached as an aircraft engineer, in other words as an aviator, and was educated within the expertise and scholarship of TAI. At that time, within the scope of the off-set liabilities of the F-16 program, approximately 400 students were sent abroad for educational purposes. I was one of the students sent abroad with this scholarship. The prime purpose as part of this program was to gain insight into aircraft design and then we would return home following the completion of our PhD studies and aircraft design programs. Yet, the course of events did not evolve as anticipated. I returned to Turkey in 1991 and started my academic career at the Istanbul Technical University. After working there, I lived in America for a while and I was appointed as the President & CEO of Turkish Airlines.

Throughout my 13 year career at Turkish Airlines, I recognized that the postponement of departure time of more than 15 minutes was considered a delay. In such a work environment, one must operate efficiently and act quickly. Since my assignment at TAI as the CEO, I have been exerting great effort toward conducting related activities here as well. “15 minutes” is a significant amount of time in Commercial Aviation, but it does not make sense in Military Aviation and I would like to revise this mindset as I find it quite odd. Punctuality is the soul of business and in order to thrive we need to attach importance to this point, the same amount of importance given by any airline. I encourage my staff to this end as well.

Defence Turkey: It seems that the total sales turnover and export figures of the Turkish Defense Industry made no progress past two years. Within this context, at the speech you gave at the Ostim Defense and Aviation Cluster’s General Assembly, you clarified TAI’s consolidated budget for 2017 as $1.9 billion. How will TAI be shaped in the short run in 2017 with this new term that was launched with your appointment?

Our turnover was $1.3 billion with the contribution of our affiliate companies last year and we anticipated reaching $1.9 billion with stakeholders in 2017. Our budget for 2016 was achieved simply as TAI (without our affiliates) at $1 billion, and we drew up our budget estimate for 2017 as $1.6 billion. We are discussing an increase of 67 percent. TAI’s Aerostructure Group conducts sales over $ 500 million to giant international companies such as Lockheed Martin, Boeing and Airbus. TAI has acquired this revenue merely through the aero structural parts we manufactured for the leaders of the aviation industry. If we provided such services to these companies with our own indigenous designs, we would be able to acquire ten times the aforementioned amount and we would now be discussing of a figure of $ 5 billion.

The increase in the budget estimate that we identified for 2017 is due to the acceleration of the serial production of our indigenous products. The budget of the Korean Aerospace Industry (KAI) and Israel Aerospace Industry (IAI) companies remains in the band of $ 3 billion. Yet it is still not enough for our targets. The Italian Leonardo Group had recorded turnover at around $12 billion. When I initiated this assignment, I committed to our Minister of National Defense that we will be able to achieve a turnover figure of $10 billion in next decade. So we have to reach such figures and therefore we should possess our own indigenous products. Otherwise we won’t be able achieve the aforementioned turnover figures, by merely working with companies such as Boeing and Airbus. We are pursuing the accomplishment of our indigenous products in line with this objective.

Defence Turkey: Dear Mr. Kotil, as you also mentioned above, within next decade TAI positioned to be able to create a value of $10 billion. What type of a vision comprising organic and inorganic growth do you intend to put forth to reach such an achievement?

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Yes, we have this goal for the next decade. Surely, it is not easy to reach such figures and the path to achievement is through the penetration of overseas markets. While maintaining our activities to this end, we do not focus on thriving by the acquisition of our local companies, which provide services to us, but by accessing markets abroad and in cooperation with these companies, creating added value. Therefore, with this inorganic growth understanding, we do not aspire to purchase any local companies, but rather, we will grow by means of acquisition of companies abroad. We share these views with our Ministry of National Defense and Undersecretariat for Defense Industries (SSM). We recently purchased a German-based company in Germany. We will be expanding this company further by exerting more effort into it. We aim to transform this company, which conducts manufacturing, into engineering. I would also like to point out that TAI should not be limited to Ankara, it should strengthen its existence in Istanbul as well. Our manufacturing activities will always remain fundamentally in Ankara as we have key facilities in Ankara. But we will have facilities providing manufacturing services to our company in various provinces of Turkey as well. Istanbul is becoming our engineering center. I would like to express that the most prominent staff of our company are the technicians and our engineers. I remain at the end of this chain. Therefore, we strive to create a happy and peaceful environment for our technicians and engineers.

Upon the decision that we adopted at our last board meeting, we secured a 2000 m2 indoor area at Istanbul Teknopark. It will be immediately occupied in July 2017. At that time, our 250 engineers will be launching their activities at Istanbul Teknopark in order to support our team there. Consequently, the center and production activities of TAI will be in Ankara. You will witness TAI with sub-industry extended around Turkey and producing parts and components when required all over the world. With our intellectual and engineering activities, we will be active in Istanbul and all around Turkey and even in various cities in the world.

Defence Turkey: Turkey's turnover in defense and aerospace industries is approximately at the level of 1%; TAI is manufacturing indigenous parts for the OEMs in this scope but it seems that this production is not reflected in the export figures at the desired level. What type of strategies should Turkey develop in order to enhance this share and render our indigenous products into a global exportable brand?

Our most valuable promotion is through the importance given to the defense and aerospace industry by our statesmen especially by our Dear President. We recently hosted the general manager of a European company which is ten times bigger than our company and he said to us as we were sending him off: "We envy you; we don't receive the interest shown to TAI and its executives in our country". This reminds us that we attract the attention of all segments of our society from our statesmen to our citizens and youth and we are truly aware of this point. Anything given such an amount of interest would surely grow. Our community claims to have their focus on the defense industry; the youth of Turkey and from abroad are eager to work with us. We see the enthusiasm in their eyes and sense it closely. There really is great interest towards this sector in this country. Turkey will mark an era with technicians, design engineers and skilled engineers in the near future. We invite them to come not only to Ankara but also to Istanbul, Gaziantep and Kayseri as well as our geographical reach expands. We do not need grand facilities to accomplish these achievements. For instance, we will be able to assign the design of a project to our office in Eskişehir, and when a greater more complex design is required, we will appoint the project to our office in Istanbul.

One of the best advantages of our country is its affordability. I would like to underscore that in America, Europe, the Far East and even in China, the human labor cost associated with advanced technology is far too expensive compared to our country.

Now, if we get back to the actual question, how will we ever achieve this? We can exemplify the case as follows. As you know, Turkey is a worldwide recognized and notable brand in the textile sector. We ask, how did our country achieve this? Turkey has been a contract manufacturer over the years. The technicians, weavers and experts always earned regular wages. If Turkey did not conduct contract manufacturing in that period and preferred to work as a brand instead, the workers would again earn the same wages. In contract manufacturing, the employees earn the same salaries but the bosses cannot make money the products are not branded. With the experience and know-how accumulated over the years, Turkey became a critical power in this sector, manufacturing prices have fallen, and today our brands have emerged. If Turkey is still a brand in textiles at this moment with the work force shifting to India, Indonesia, China, it is due to the strength of the brands.

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As TAI, we design aircrafts through high technology but concurrently we have to minimize production costs in order to become competitive in the global market. The turnover of Boeing and Airbus companies is nearly 50 times that of our turnover and this surely offers diverse opportunities along the way. It may sound quite assertive but currently if we assume whole work packages ordered by Boeing and Airbus, we would become the world's greatest defense company. Ultimately, we could not accomplish them all but we are able to take charge in more projects by reducing our costs. For instance, in the meetings we recently had with Airbus and Boeing companies, we made an offer to the parties that we would be further reducing our prices, stating that we would reduce the costs by 30 percent. We have not yet determined where to cut our costs, but we will cut costs down to the bottom. You will see TAI as the world's most affordable low-cost manufacturing company. This is one of the ways to be ambitious, we will compete with ourselves now.

Defence Turkey: Dear Mr. Kotil, activities were conducted recently for the public offering of TAI but the process could not be finalized. Will there be an acceleration in this process related to the public offering of TAI now with your assignment? What are your assessments on this issue?

It would not be appropriate for me to comment on this issue as an executive as the subject is related to the shareholders. In the existing structure as a private company, the Turkish Armed Forces Foundation holds a 55% share of the company, around 45% of our shares belong to the Undersecretariat for Defense Industries, and a minor amount of our shares is held by the Turkish Aviation Association. We have the status of a private company since our major shareholder is the Turkish Armed Forces Foundation; therefore, there are no obstacles in managing this company as a private company. If our company is privatized, like Turkish Airlines, there will be no changes in our daily routine work. It would not be proper to make any further comments.

Defence Turkey: Dear Mr. Kotil, you discussed the latest developments in respect to the acquisition of a German-based company, in line with the inorganic growth strategy and added that you will be purchasing new companies within the scope of this strategy. Will the company acquisition be conducted with western companies or are the innovative companies located in the East on your agenda?

All business and social activities of Turkey are conducted with Western as well as Eastern countries are close cooperation with the western countries. Turkey has to cooperate with both western and eastern countries as well as the Nordic countries. Especially Ukraine and Russia, there are critical technologies.

Defence Turkey: Will there be any surprises in 2017 as part of your inorganic growth strategy?

As I mentioned previously, we are expanding the structure in Germany. We will be employing engineers in that company focused on manufacturing and then extending it. My agenda will be focusing particularly on this issue in the upcoming weeks. Technology companies need to put their roots down and spread into the world. We are integrating the systems and 60% - 70% of these are composed of components; we are integrating these systems to rotating and fixed-wing platforms or to the unmanned air vehicles. We are willing to manufacture at home but the process will take time, therefore we need to procure them from abroad. Thus, we have to manufacture this component abroad and that's why it's wise to own a company there. Therefore, we will exist in United States, France and Britain as well as China and in Korea. But as Eastern countries are still in the development stage and as their approach is based on competition, the perception of interoperability is currently lacking. Western countries are more content, and the gates are opened more easily. So, we will be regularly located in the West.

Defence Turkey: Dear Mr. Kotil, Turkey was involved in Multi-National programs such as F-35 JSF and A400M and TAI has been assuming important responsibilities as part of these programs, having a significant business share. Yet, if we take an overall look we observe that the share is below the sufficient level. How should Turkey become more effective and secure major roles in these joint programs? Could new joint programs be developed in the upcoming period through the new models to be established under the leadership of TAI? Do you have such a dream?

We recently participated in the Defense and Security Exhibition in Malaysia and held important business meetings there. Various Official delegations were intently interested in the ANKA Medium Altitude Long Endurance (MALE) UAV, New Generation Basic Trainer " Hürkuş" and "T129 ATAK" Attack and Tactical Reconnaissance Helicopter. During the course of the exhibition, I offered a suggestion to a few companies to build a single-aisle aircraft with a 200 seat capacity. There is a great opportunity here. Boeing sold 10,000 737 series aircrafts. A year ago, I received the 10 thousandth aircraft myself as the President

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of Turkish Airlines; but in terms of design we are speaking of an aircraft of the 1960s. Similarly, the design of Airbus' A320 series aircraft belongs to 1970s. Therefore, there is a requirement for a newly designed aircraft. Boeing is planning to design a new aircraft and we made our proposal to the company to this end. There is a request for a single-aisle passenger aircraft, so TAI will be seeking a new opportunity here. We have a limited budget and power to achieve this within existing circumstances, but if the conditions allow, we would like to be involved in the process through a partnership model with the approval of our board.

We have an essential business share within the scope of A400M project. Almost 300-400 of our engineers are working for this program. Our team working in this program acquired significant technological knowledge. When you are involved in these projects, you get the chance to team up with skilled staff and countries that own technology such as Italy, England, France, Spain and Germany. Working in these types of joint programs also abolish prejudice. I would like to underline that this program is important in respect to the fact that it gathers skills and know-how from Europe and our country, and promotes the adoption of the interoperability approach.

Defence Turkey: Dear Mr. Kotil, you assumed a very critical role in the TF-X Indigenous Fighter Jet Development Program which is considered to be one of the most important programs of Turkey. Design activities are being conducted over a model created by the joint design groups with the BAE Systems which was selected as the Foreign Cooperation Partner. We also see the establishment of a close cooperation on behalf of the governments of both companies as part of this program. Could you please elaborate the current status and the business models identified for the upcoming period within the framework of the established project model?

We refer to this program as Turkish Fighter (TF) and exclude the X at the end of its title. We committed in the course of the signature ceremony, attended by the British Prime Minister and Turkish Prime Minister, to achieve the best fighter jet in the world. And how will we accomplish this?

We have signed a quadrennial contract with BAE Systems, and following this period we will be signing an additional contract extending 8 years. Our current agenda comprises this 4-year period. In accordance with this contract, all the architectural design of the aircraft will be completed during the Preliminary Design Review (PDR) phase. Here, throughout this 4 year long process which will be conducted over paper, we are willing to accomplish the outstanding PDR process on global scale. There are no obstacles as BAE Systems will be dispatching additional staff. We also have skilled staff in certain areas. Yet we lack the staff experienced in the development stages of a supersonic fighter jet. But there are a lot of qualified human resources that have gained experience in the design of Fighter Jets on the global scale. We are prepared to hire the skilled staff, construct a new plant for them and the new building is to be occupied in the 3rd quarter of 2018, a facility where 2700 engineers will be working. Moreover, we allocated a facility at our premises for those currently working at ODTÜ Teknokent and will be relocating them to our premises at the end of April. Therefore, we are able to design the optimal Fighter and can accomplish the unrivalled PDR throughout quadrennial program schedule as well as the preliminary design. If we fulfil this commitment, Germany, Spain, England and France will require novel Fighter Jets, apart from just Italy. If we achieve the optimal design within quadrennial phase, we can find a partner for this program as well. In this way, Turkey would not have to single-handedly fund the entire financial budget. We would be able to achieve the development of an outstanding Fighter Jet on a global scale with partners through shared know-how.

Defence Turkey: Mr. Kotil, it is stated that in order to achieve a large-scaled and complicated program such as TF-X, a leader team devoted to the program as well as executives, engineers, technicians and staff would be required. We know that you are preparing for an intensive talent search both domestically and through the modality of reverse brain drain from abroad in this respect. What type of a preparations have been made to this end? Could you please share your related strategies with our magazine?

It is known as the Gypsy team and consist of around 100-200 skilled staff that take charge exclusively in the major Fighter Programs on a global scale. They migrate to other programs upon completion of existing projects. We aspire to be involved with this team as the F-35 JSF program is over. There are no existing major programs in western countries as well as South Korea that are exclusively striving to develop its 4.5 – 5th new generation fighter jet program. I would like to point out that there are a few Turkish Engineers among these names. If we have the ear of this team in the PDR phase, this team would join us. We are speaking of a core staff composed of all nations who were involved in the development stages of all the magnificent Fighter Jets of the world such as F-35 JSF and F-22 Raptor. On the other hand, there are many experts abroad assigned at Boeing and Airbus and they get in contact with us to be involved in these giant program. America, China and Russia possess indigenous fighter jets all over the world. It is a comprehensive and challenging program, but we are aware of how to manage it. My primary duty, and that of TAI, is to set up an effective eco-system and to enable the world's best designers to join us. Money is not everything; these skilled staff indulge in designing and I believe wholeheartedly that we could achieve it.

Defence Turkey: By launching the reverse brain drain method in the last period, TAI has performed bilateral discussions with various experts competent

in their branches of expertise abroad. It is not easy to persuade individuals who are working abroad with grand resources and facilities to come to Turkey, and that's why we could not achieve the desired level in that period. Specific to TF-X, which modality should be adopted that could attract and persuade these qualified individuals to work in this program while also keeping sustainability in mind?

From the start, we all must rely on what we do as TAI. We have to reflect this mentality throughout our entire operations. Turkish Airlines is peaking with the support of our prime minister and president as well as the ownership of Turkish Airlines by the community. We have the same process here as well. I would like to exemplify this; a successful youth colleague agreed our proposal even though the salary was below the figure he earned in America as he is eager to be involved in this program. Thus, we do not have to offer the same conditions to those who will be working with us. TAI must prove to itself and to the world, with this motto: "We are becoming the greatest platform manufacturer in the world".

Defence Turkey: Dear Mr. Kotil, you were the head of a very prominent brand, Turkish Airlines, in commercial aviation for a long time. You are very well aware of the customers' criteria and now you are on the other side of the table. In this perspective, what will be the responsibilities of all the shareholders in the eco-system within this development program in order to render the Turkish Regional Aircraft Project a brand on an international scale and to create demand? Can we claim that TAI's efficiency in this program will increase more with your appointment and your experience in Commercial Aviation?

TAI or another companies, have to manage programs through their own capital to ensure sustainable development. It is not correct to execute major projects through state-funded resources. There is an opportunity in respect to the passenger aircraft. It seems that

designs are ageing for Boeing and Airbus aircraft. The Japanese built an aircraft named MRJ which also comprises new engine technology. Nowadays, the single-aisle aircrafts of Boeing and Airbus enable up to 14% fuel savings with high-tech engine technologies.

The Japanese took advantage of an opportunity with the newly designed airplane. But the aforesaid airplane is very small, currently I am not sure of the actual sales figures but I do not think that very many of these airplanes were sold. Even a composite unique airplane with a new generation engine cannot be sold on a global scale. Therefore, Turkey must build an aircraft which could be sold on the market. Could TAI develop and manufacture a single-aisle aircraft with the capacity of 150-200 seat, unaided? There's no capacity to do that now. Even if we achieve it, we may confront a problem during certification and marketing activities. Market conditions are evolving with each passing day as the aircraft designs of Boeing and Airbus are very old and these companies will have to re-design future aircrafts in the near future. In this case, we will team up with a strong partner and develop and manufacture an aircraft or we will be involved in the start-up design phase developed by either Boeing or Airbus and get a high percentage of the work-share from these programs. The Regional Aircraft Project is vital for Turkey, we have not been assigned such a task yet but we will fulfil it in the event we are appointed.

The most important point I want to underline here is that a company must stand on its own assets and produce the cheapest prices with the best technicians and engineers. There is nothing that we can't achieve with time and optimal human resources.

Defence Turkey: The structural integration activities are being conducted in an accelerated manner within the scope of the Hürkuş-B serial production program. Additionally, recently the LUMTAS missile integrated Armed Hürkuş-C has accomplished its launching demonstration in Konya with the participation of our Minister of National Defense and Land Forces Commander. In which direction are the negotiations proceeding for the serial production agreement and technical requirements between the two parties?

The Request for Proposal document was issued on 7 April 2017 by the Undersecretariat for Defense Industries (SSM) within the scope of the Next Generation Light Attack/Armed Reconnaissance Aircraft Hürkuş procurement project and we continue our activities for submitting our bid. The Hürkuş-C contract is expected to be signed in May 2017. As part of this project, the aim is to procure a total of 32 aircrafts consisting of 8 initial configuration, 12 full configuration and 12 optional aircrafts.

Defence Turkey: In regard to the export activities of the T129 ATAK helicopters, it seems that various countries are closely interested, Pakistan being in the first place. Can we expect new

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developments in the foreign sales of this platform, which has proven itself in the operational field, in the upcoming period?

The accomplishment of especially the initial export to the attack helicopter market is quite a long process. The self-actualization of the platform, its logistic support and the feedback from the existing user bear great importance within this context. Since its selection by the Turkish Armed Forces, there is a high amount of interest in the T129 ATAK Helicopter from overseas markets as well. The amount of this interest increased especially after the completion of deliveries and the self-actualization of the delivered helicopters in theatre.

As you also mentioned, following the recent high performance of our helicopters in high altitude and high temperature conditions, the gulf countries and Asian countries, Pakistan in particular have shown great interest.

As you know, last summer, the T129 ATAK Helicopter was intensely and severely tested in the challenging temperature and geographical conditions of Pakistan. Our helicopter did not embarrass us and conducted all types of challenging tasks under extreme temperatures over 50 degrees Celsius. It filled us with pride with the high performance it demonstrated even in the Himalayan Mountains and passed all the tests successfully. Our negotiations with the public authorities of Pakistan on all levels positively continue to this end.

Defence Turkey: Mr. Kotil, the deliveries will be launched this year within the scope of ANKA-S program. On the other hand, the Request for Proposal considering the "Akıncı" UAV program with a payload capacity of over 1 ton is planned to be issued in the second half of this year. Could you please inform us on the preparations you have been conducting to this end?

We prepared a very comprehensive reply to the Request for Information document issued by the SSM regarding the same project last year. Our important suggestions in respect to the cost-benefit considering the technical specifications within the Request for Proposal that was issued by the SSM. With the knowledge we acquired through the ANKA projects, we do not foresee any risks concerning the establishment of a technical solution that can fulfil all specifications stipulated by the Request for Information document. Regarding the engine, we continue to work on alternative suppliers and engine types by taking the export license restrictions into consideration. We have a high level of readiness for the management of a project of such a scale with the multiple subcontractors and supplier chains. With the publication of the RFP and the clarification of the technical specifications, we will be preparing our bid that is comprised of the competitive technical solution that completely fulfils the specifications and submitting it to the SSM.

Defence Turkey: One of the most important programs you have been conducting as TAI is the Indigenous Light Helicopter Program. Could you please inform us about the latest status of this program? How many prototypes are planned to be manufactured as part of the program? What are your comments on the request that will be created by a helicopter of this class at home and abroad and on the added value it would bring to our country?

Within the scope of the Indigenous Light Helicopter Development Program, we are currently conducting the critical Preliminary Design Review activities. As part of the program for the development and production of two T625 Helicopter prototypes, in addition to the hull design and developed avionic systems, the design and production of the systems bearing critical importance such as transmission, rotor, dynamic parts and landing gear are completely conducted through the utilization of domestic facilities and capabilities.

As also underlined by our Minister of National Defense Mr.Fikri Işık during his visit to TAI, we endeavor to accomplish the maiden flight of the T625 Helicopter on 6 September 2018 at 06:00 at the premises of TAI.

With the help of these helicopters developed to fulfill the requirements of military and civil users, numerous tasks such as personnel transportation, search and rescue operations, border security operations, medical transportation, VIP transportation, forestry, firefighting and offshore transportation could be executed. Thanks to its superior performance and multi-role functions, we are expected to export it to international markets as well as cater to the requirements of our procurement authorities.

Regarding the maiden flight of the T625 Helicopter, we will be expecting orders from the Turkish Authorities under the leadership of the Undersecretariat for Defense Industries for mass production. In the upcoming period, when the civil and military user requirements are considered, we envision that the requirement for helicopters in the 6 ton category will be around 250 - 300.


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Defence Turkey: GÖKTÜRK-1 satellite was launched successfully in a ceremony attended by our President in December 2016. It is expected that the acceptance tests will be completed and it will become fully operational soon. Mr. Kotil, what should TAI do to reach a structure that develops, manufactures and tests its own satellites, taking into account the added value of products used in the field of space, especially when evaluating new satellites. What are the expectations and predictions in this context when we evaluate the strengths and weaknesses?

First of all, I would like to express that the experience, know-how and infrastructure of TAI are capable of successfully carrying out all satellite projects that our country requires for military and civilian purposes and satellite projects of foreign countries having the potential for business cooperation meeting international space standards.

TAI, with its completed indigenous projects such as Göktürk-2, Göktürk-3 (Phase-I) has attained significant experience, capabilities and infrastructures. Our company has the capacity to produce the satellites that our country will need in the future and has demonstrated this with the success of projects that it has conducted. The consolidation of our experience with these satellites and with new satellite projects is also an important part of our agenda. Today, we are aiming to develop critical satellite equipment or software, which are not produced domestically, with local resources so that these gains can be further promoted. To this end, comprehensive studies are being carried out in our country, also with the involvement of TAI, in order to indigenize the critical subsystems.

TAI, acting as the Main Contractor and System Integrator in satellite projects, has the experience, infrastructure and personnel that can lead our country's space industry and we are willing to fulfill all these tasks. We develop ourselves every day to be one of the important players in this field.

When evaluated for the export of space products, TAI has the accumulation of capabilities to also achieve in the space arena, just as it has obtained its international position in aerospace/aviation. In this sense, we consider that Turkey has important export potential in space systems which have very high added value for Turkey and as TAI, with this responsibility, many activities aimed at achieving significant export success in the field of our country's space systems are simultaneously carried out at home and abroad.

Defence Turkey: As part of the Utility Helicopter Program, the first prototype has recently been dispatched to Turkey for the avionic integration activities. What is your readiness condition and how are the investments for the overall project proceeding in this context? Could you please inform us about the program schedule?

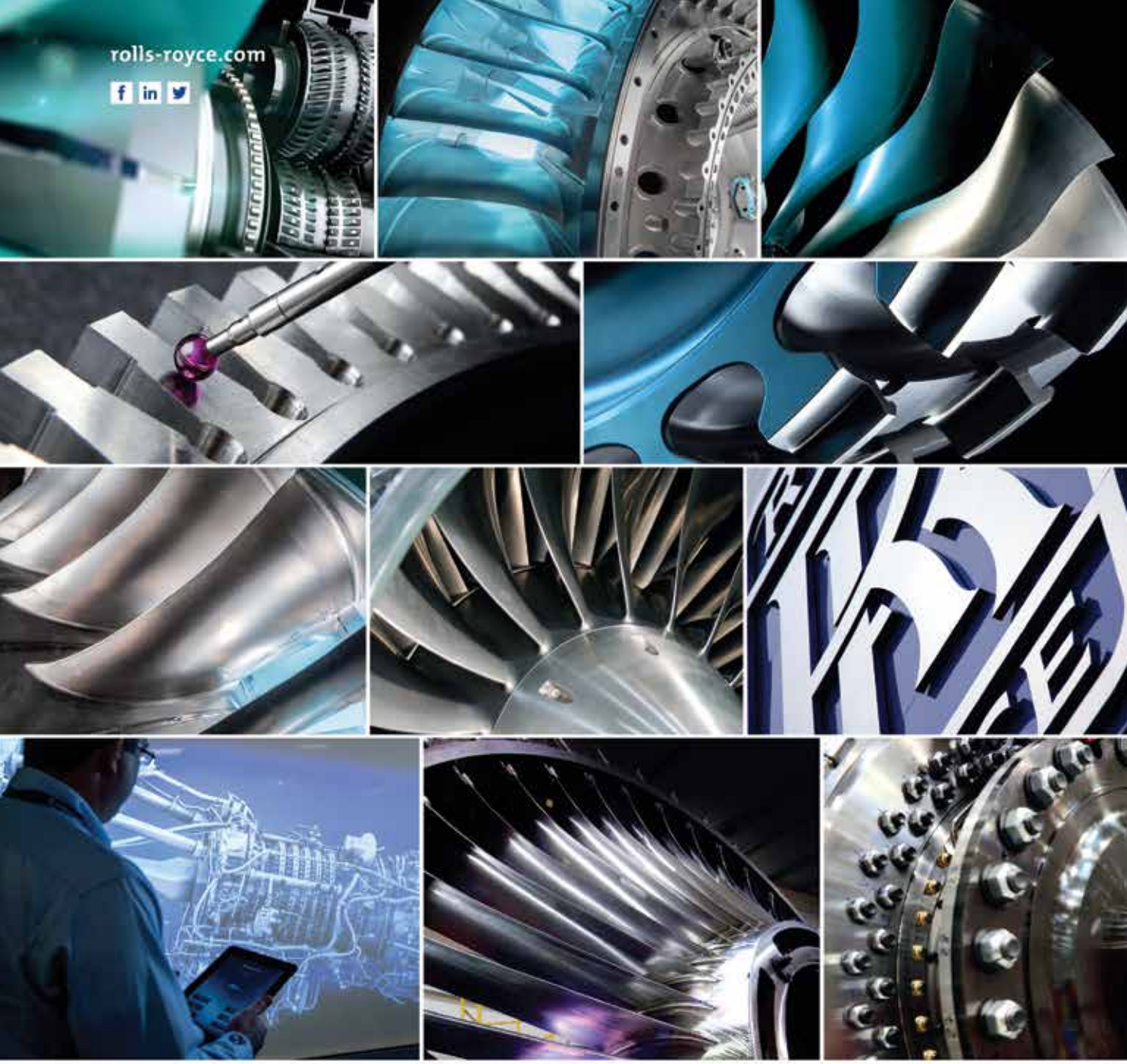
As the main contractor, we will be conducting the production of all parts of T70 helicopters such as the cabin, cockpit, tail cone, horizontal and vertical tail, main and tail rotary palls, final configuration operations, tests and integrated logistical support within the scope of the project; Aselsan will execute the development and integration of the basic avionics and the development of the helicopter cockpit with Sikorsky (IMAS); TEI will assume the production of T700 engine; Alp Aviation will be in charge of manufacturing and installation of the landing gear, dynamic parts and production of the detailed parts of the gearbox.

Within this context, during the next era, we will be manufacturing 109 T70 Helicopters at our facilities. This is a significant figure and crucial achievement. We aim to accomplish the initial delivery as part of the program in 2021.

Defence Turkey: The first aircraft has recently been dispatch to Italy for the certification tests within the scope of the Meltem-3 program. Moreover, the prototype phase has been finalized as part of the C-130 "Erciyes" Program and the serial modernization of the aircrafts has been launched. Could you please inform us on the current status of both programs and their delivery schedules?

Within the framework of the Meltem-3 Program in which operates as the subcontractor of the Leonardo Company, the modification of the first aircraft has been completed at our facilities and the aircraft has been dispatch to Italy. The certification tests under the responsibility of Leonardo are on-going in Italy. The modification activities of the other 5 aircrafts continue in Ankara under our responsibility. The SSM is striving to finalize negotiations with Leonardo for the delivery program.

In respect the C-130 Erciyes program, the modification of the first serial aircraft has been completed at our facilities following the two prototypes and it has been prepared for acceptance. The second serial aircraft will be at the acceptance phase in advance of summer. The modernization of three serial aircrafts continues at the Kayseri 2nd Air Logistics Command and they are planned to be delivered prior to year's end



Güçlü bir gelecek

On yıldır Türk Silahlı Kuvvetleri'nin uçaklarına güç veren Rolls-Royce, bu sayede Türkiye'de kuvvetli ve yeni filolar hizmete girdikçe daha da büyüyüp kuvvetlenen bir ortaklık tesis etmiştir. Yeni A400M nakliye uçağı filosuna Rolls-Royce ve EPI ortaklarımız tarafından geliştirilen TP400 turboprop motorları güç verirken, T129 ATAK helikopterlerinde ise LHTEC ile ortaklığımız aracılığıyla geliştirilen CTS800 motorları kullanılmaktadır. Ayrıca Türkiye pazarıyla ilgili engin deneyimlerimizden faydalanarak, Türkiye'nin milli helikopter ve savaş uçağı programlarına en iyi çözümleri geliştirmek için Türk hükümeti ve sanayisiyle yakın bir şekilde çalışıyoruz. Ortaklarıyla birlikte ileri teknolojilerin geliştirilmesi konusunda kendisini kanıtlamış olan Rolls-Royce, Türk Silahlı Kuvvetleri ve Türk havacılık sanayisinin yeni imkan ve kabiliyetlerine de güç vermeye devam edecektir.

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Aselsan - Turning Knowledge into Power and Trust

Aselsan, Turkey's largest defense electronics company is a national source of pride and a true powerhouse with a capability/ product portfolio that comprises communication and information technologies, radar and electronic warfare, electro-optics, avionics, unmanned systems, land, naval and weapon systems, air defense and missile systems, command and control systems, transportation, security, traffic, automation and medical systems.

Aselsan exports Turkey's indigenous products and invests in international markets through various cooperation models with local partners and is listed as one of the top 100 defense companies of the world. Together with their highly-qualified engineering staff, and with more than 5000 employees combined, the company's commitment to innovation is evident as 6% of the company's annual income is allocated for self-financed research and development activities.

Aselsan will exhibit approximately 300 state-of-the-art products and systems throughout the exhibition, at the largest stand area at that has ever been set-up at the IDEF fair, surpassing the size of any previously designed paces, spanning an exhibition area of 4161 m² indoor area and 740 m² outdoor area, with a total exhibition area of 4901 m².

Expect to see the following impressive products from Aselsan at Hall Number 12

Avionics designed for Hürkuş-B Trainer Aircraft, Touchscreen Cockpit for "Özgün" Helicopter, Upgrades for Mi-17 Helicopter, SARPER, Turkey's first Synthetic Aperture Radar system, Wireless SARP,Electromagnetic Launcher (EML), Long-Range Weapon Locating Radar (WLR),Light Weight Torpedoes (LWT), Anti-Tank Missile Launching System,ASYA (Tactical Mobile Support) and the new Generation Smart Cockpit Solution for TF-X.

The New Generation Smart Cockpit Solution for TF-X and Next Generation Fighter Aircrafts

Within the scope of ongoing avionics programs, Aselsan has designed and manufactured multiple size digital cockpit displays to improve pilots' operation capability in all kinds of environments by providing precise and eloquent flight data, sensor videos, digital map and tactical symbologies. Display systems are designed to operate with indigenously developed mission computers. By this means, modern digital cockpits featuring Mission and Flight Management capabilities with sensor and weapon management have been developed.

Aselsan reveal "The New Generation Smart Cockpit Solution", the latest designed Integrated Display System specifically developed for the new generation fighter aircraft. The new display system incorporates both mission computer and the display features in a single unit. As smart display, the system is capable of showing video and data from different sensors and merges with graphics on large area touchscreen display in different configurations to provide situational awareness in all phases of flight.

The "New Generation Smart Cockpit Solution" provides ease to pilots with the ability to select mission pages such as primary flight display, cockpit management data and digital map through display or control panel. The system features an Operational Flight Program (OFP) that operates the mission functions and totally compliant to the platform requirements. Besides, the said OFP also controls the complete set

of display and mission functions, data management and sub-systems those interface with the smart cockpit. The "New Generation Smart Cockpit Solution" provides many advanced features such as three-dimensional audio, synthetic vision and automatic voice recognition.

In this manner, Aselsan latest design "New Generation Smart Cockpit Solution is targeted to be the most requested cockpit display system for advanced airborne platforms and also for the next generation fighter aircrafts including Turkish Indigenous Fighter Aircraft Program.

Aselsan Avionics Designed for the Hürkuş-B

For the New Generation Basic Trainer Aircraft Hürkuş-B, Central Control Computer (CCC), Graphics Multi-Function Display (GMFD-68), Intercommunication System (ICS-300) and Aselsan Navigation System (ANS-511) have been indigenously developed by Aselsan. In addition to the MXF-484 V/UHF Airborne Radio, MXF-243A Remote Control Unit and AN/APX-123 IFF Transponder

that are provided by Aselsan, Digital Map and Operational Flight Program (OFP) are also developed by Aselsan within the scope of the program.

On aircraft, there are two CCCs working redundantly, providing the ability to control avionic systems from single source and reducing pilot's workload during the flight with its advanced processing capability and interfaces providing platform information to the pilot. CCC, having high performance and storage capability, interface diversity, modular hardware and software design, can be easily integrated into various airborne platforms.

Hürkuş-B Aircraft utilizes six GMFD-68 in total, three on front and three on the back cockpit. GMFD-68 displays information prepared by CCC to pilot. Each GMFD-68 works independently and any page can be reached from any display. GMFD-68 is an advanced display system, with its internal graphics generation and processing capability, eliminating the need for external symbol generation and allowing display of flight, engine, digital map, simulated weapon, simulated radar or a number of other functions. GMFD-68 displays Primary Flight Display (PFD) data obtained directly from equipment on the aircraft.

Aselsan's Cost Effective Solution for Mi-17 Helicopters

Aselsan has proven its integration ability for air platforms and has become a notable company for modernization of third country platforms, completing helicopter and aircraft modernization projects for approximately 500 aircraft in the Turkish Armed Forces inventory. Aselsan is utilizing its capabilities by taking an active role in the cost-effective solutions developed in the modernization of the Mi-series helicopters, up to 10,000 worldwide, especially in the Gulf countries and Turkish Republics. Within this scope one Mi-17 helicopter was modernized and delivered to the end user with Aselsan indigenous products, for only demonstration purposes. According to client requirements, Aselsan indigenously developed the following products to increase the helicopter's mission ability; Multi-Function Displays, Keyboard Display Unit, Inertial Navigation System, Mission Computer, Digital Moving Map System, Internal Communication System, V / UHF and HF Radios have been integrated to the platform. After the modernization for the demonstration, it is expected that the upgrade activities of other Mi-series helicopters in the inventory of the country concerned will be initiated in a short span of time.

"SARPER" Synthetic Aperture Radar (SAR) System is Ultimately Combat Proven with "Anka" UAV

Integration and qualification tests of SARPER, Turkey's first Synthetic Aperture Radar system developed by Aselsan as a reconnaissance and surveillance payload for airborne platforms, were successfully

SARPER Synthetic Aperture Radar (SAR) System

completed in 2016 on ANKA Unmanned Air Vehicle. The serial production of SARPER, which is fully operational on ANKA, is going-on. SARPER is capable of generating high resolution radar images and detecting moving objects day and night, even under adverse weather conditions such as rain, snow, fog and smoke.

SARPER features include; Stripmap Mode for wide area imaging, Spotlight Mode for high resolution imaging, GMTI (Ground Moving Target Indicator) Mode for moving object detection, Sea Search Mode for detecting targets on sea surface and ISAR (Inverse SAR) Mode for imaging targets on sea surface.

At the same time, the development of a new generation lightweight SAR system, which is named m-SAR, can be integrated to Tactical Unmanned Air Vehicles as well as other airborne platforms has been started in order to fulfill the tactical reconnaissance and surveillance requirements of Turkish Armed Forces. m-SAR will feature advanced capabilities such as Dismount Moving Target Indication (DMTI) and Coherent Change Detection (CCD).

Aselsan's Touchscreen Cockpit for the "Özgün" Indigenous Helicopter

The "Özgün" Indigenous Helicopter Program is the first indigenous helicopter development program for Turkey. The program is the development of dual use Light Utility Helicopters for both military and civil programs where Aselsan was awarded to be the main Avionics Integrator to develop the main Avionics Systems. This indigenous and futuristic cockpit is composed of two 8'x20' size and two 8'x10' size displays in total of four smart displays, to reduce pilot workload, maximize flight safety and ease the integration for future expansions.

Aselsan will also develop a new civil certified Flight Management System (FMS) during this program which will meet the standards of European Aviation Safety Agency (EASA) and Turkish Directorate General of Civil Aviation (SHGM). The newly developed FMS will allow the civil and military variants of "Özgün" Helicopter to fly in all civil airspace around world with Performance Based Navigation up to RNP 0.3 (Required Navigation Performance 0.3) level.

"Özgün" Cockpit has been developed indigenously and is complaint to civil aviation standards and will be certified. This certified cockpit and Flight Management System, Primary Flight Displays and Digital Moving Map software will allow Aselsan to easily integrate this architecture to both rotorcrafts and fixed wing aircrafts. This similarity aims for the easy adaptation of pilots to new platforms through short-term training.

The civil variant of the "Özgün" Helicopter will be certified by European Aviation Safety Agency (EASA) and Turkish Directorate General of Civil Aviation (SHGM). The Military variant of the "Özgün" Helicopter will be certified by the Turkish Undersecretariat for Defense Industries (SSM).

Aselsan Unveils Wireless SARP System

Aselsan introduced a new version of the SARP system: Wireless SARP. Thanks to its new wireless communication capability, the operator can control the system while staying away from dangerous zones.

Aselsan and its subsidiary IGG Aselsan Integrated Systems, located in the United Arab Emirates (UAE), have jointly developed a new unit, called Interface Adapter Unit (IAU), which enables all Aselsan Remote Controlled Weapon Systems (RCWS) to be controlled wirelessly. IAU has been integrated with the SARP system and firing trials have been conducted with participation of a delegation composed of various

Wireless SARP System

TÜRKİYE İÇİN GELİŞMİŞ HAVA SAVUNMA SİSTEMİ.

YENİ TEHDİTLERE KARŞI.

21'inci yüzyıl füze tehditleri her zaman tek başına veya sadece tek bir yönden saldırmazlar. İşte bu yüzden MEADS, manevra kabiliyetli 360 derece savunmayı PAC-3 MSE Füzesi ile birleştirmektedir. Açık mimari ve tak-ve-savaş kabiliyetleriyle MEADS, Türk savunmasını daha çok genişletmek için varolan milli kaynakları kolayca entegre eder. Ortaklıkla üretilen MEADS, kanıtlanmış, modern, maliyet etkin bir hava ve füze savunması sağlar.

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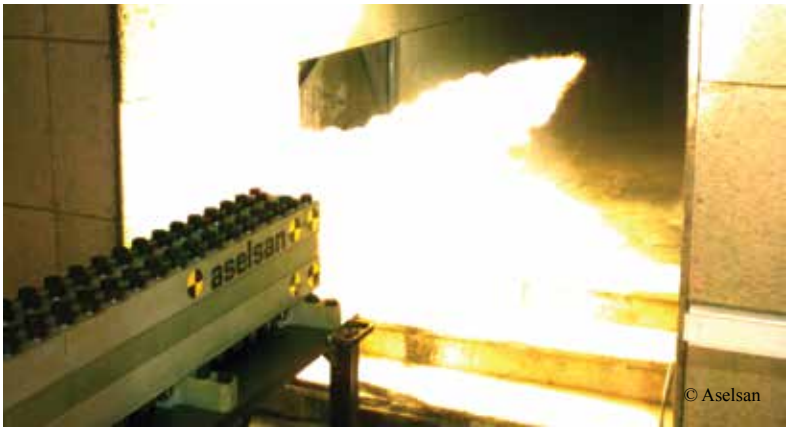
users. System abilities such as secure, encrypted, jamming free communication, high performance in target tracking, hitting accuracy and easy-to-use user interface brings the system to the forefront among other competitors. The SARP system can be integrated on different platforms including but not limited to armored vehicles, fixed platforms in critical facilities, main battle tanks and unmanned ground vehicles. The combat proven SARP system is actively in service of Turkish and several friendly countries' end users.



Aselsan Electromagnetic Launcher

Aselsan Electromagnetic Launcher is Six Times Faster than the Speed of Sound

Aselsan carried out an R&D Project on development of Electromagnetic Launcher (EML) successfully since 2014 with the objective of gaining electromagnetic launch system technology. In the light of these studies, the first results of a developed prototype of the Electromagnetic Gun System (known as Railgun) has been received. Aselsan proved its experience and claim in this area with first live firing tests that were conducted successfully between 26th and 29th of December 2016.

Thanks to its higher muzzle energy and 2000-2500 m/s projectile speed, thus effective range greater than 300 km, the Electromagnetic Gun System is also evaluated to be an air defense system that is highly effective against modern air threats. The Electromagnetic Gun System which brings significant technological advantages to battlefield, also ensures Multi-Mission Capability by means of developments in smart ammunition technologies.

General Specifications of Electromagnetic Launcher:

- Long - range weapon technology with high-power electromagnetic energy
- Low cost mission effectiveness against current threats
  - Lower unit cost
  - Lower handling cost
- Multi-Mission Capability
  - Naval Surface Fire Support
  - Surface Warfare
  - Air Defense
  - Aircraft or Satellite Launcher
- High Platform Reliability (no chemical explosives)

Long-Range Weapon Locating Radar (WLR)

The "Serhat" Counter Mortar Radar, the winner of 2013 TESID Innovative Product Grand Prize, the first indigenous weapon locating radar system with patented advanced radar techniques can detect and accurately calculate point of impact and origin of enemy mortars fired behind hills or mountains in all extreme environmental conditions. Development, qualification and manufacturing of many "Serhat" radars was completed and delivered to Turkish Land Forces which are deployed mostly along the south-east border. Because of the increase in terrorist attacks with weapons which have effective ranges higher than mortar rounds in the last couple of years, it became a necessity to develop and produce new Weapon Locating Radar Systems to cope with these threats. Aselsan WLR detects enemy mortars, artilleries, and rocket launchers from long distances; accurately calculates point of impact and origin using state of the art technology. AESA (Active Electronic Scanning Antenna) and DBF (Digital Beam Forming) architecture of ASELSAN WLR supports electronic scan and terrain following features. WLR can generate early warning messages for friendly troops located in the vicinity of the calculated impact point by detecting long range enemy artilleries and rocket launchers in advance; hence reducing the number of casualties.

Aselsan Reveals Lightweight Torpedo

Anti-Submarine (ASW) torpedoes, also known as Light Weight Torpedoes (LWT), have similarities with TORK Anti-Torpedo Torpedo. Aselsan directed existing infrastructure capabilities and knowledge gained during anti-torpedo torpedo (TORK) to develop anti-submarine warfare (ASW) torpedo used in surface ships.

Aselsan LWT will have the capability to be launched from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surface ships and be released from ASW helicopters or Marine Petrol Aircrafts (MPA's). The indigenous propulsion sub-system developed during the TORK project, that has stable cruising capability at all speeds, provide superiority to LWT. LWT is expected to have strong counter-countermeasure capabilities against torpedo countermeasures, due to Aselsan's expertise in this field.

LWT will have the capability of acoustic communication link with HIZIR–LFAS (Low Frequency Active Sonar) system to be updated with target parameters during cruising, searching and approaching phases.

Anti-Tank Missile Launching System

The development of an Anti-Tank Missile Launching System solution, addressing the market request at home and overseas for defense against armored main battle tanks, was initiated in 2014 within the scope of an internally financed project. The system, which was developed as a result of over 20 years of deep expertise in design and development of gun/rocket/missile launching systems, provides high effectivity against ground targets in day/night and adverse weather conditions.

The Aselsan Anti-Tank Missile Launching System is a fully automated, remotely controlled and stabilized Weapon Platform carrying 4 Anti-Tank Guided Missiles (Hellfire, Javelin, Kornet-E, Omtas etc.). The Weapon Platform can be customized in order to carry the number of missiles required by the client. Alongside the 4 Anti-Tank Guided missiles, the System can be configured to carry a 25mm automatic cannon, 12.7 or 7.62 mm machine gun for self-protection.

The System is light weight, low volume and suitable for integration with a variety of existing or new armored high mobility fighting vehicles, considerably upgrading their lethality. It allows the system to be operated from inside the vehicle with a high degree of precision to protect the gunner and/or commander from being exposed.

In the development phase of the System, the subunits that were qualified and under production for other weapon systems have been tailored in order to ensure minimum logistics and life cycle cost. The System will be integrated onto the vehicle produced by Otokar and also exhibited in IDEF 2017 in Otokar stand.

"ASYA"- Aselsan Tactical Mobile Supporter

Aselsan has introduced the new addition to its wearable technologies product line. ASYA is a new product designed to fulfill all operational requirements integrated with the CENKER system.

Designed according to requirements of Special Forces, Infantry and Gendarmes, Aselsan's indigenous product ASYA (Turkish Abbreviation for Tactical Mobile Support) assists its user during tasks like marching, running, climbing and leaping, thus enabling increased performance and stamina in the long run. With high movement capability and increased user adaptability, ASYA performs rapid motions with minimal resistance while intervening at critical moments to enhance user performance. ASYA was developed with national capabilities and abilities, with support from Turkish universities, ASYA with its lightness and high strength, is ready to serve in all extreme conditions. ASYA, along with the sister project CENKER, takes the Turkish security forces a step ahead.

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Smart Technologies, Integrated Solutions

TÜBİTAK - An Important Player in Turkey's Technology Management Eco-System

In an exclusive interview, Prof. A. Arif Ergin, President of TÜBİTAK discusses their critical role in adding strategic and economic value to Turkey, entering regional markets through industry integration and the wealth of opportunity that abounds through generous financial support programs

Defence Turkey: How do you assess the efficiency and added value of your institutes such as TÜBİTAK MAM, TÜBİTAK BİLGEM, TÜBİTAK SPACE, TÜBİTAK SAGE, institutes that technologically contribute to the defense industry?

TÜBİTAK is an institution which has adopted a mission to conduct R&D studies in order to fulfil the existing and near future security and defense related requirements of the Defense Industry.

The projects executed within this framework are of a pioneering nature and confidential projects on a national level that are not accomplished by the private sector because many of these projects may not be commercially preferred by the private sector or they are projects of such content that the private sector lacks the capability or the capacity required to accomplish them.

While conducting such studies, TÜBİTAK adopted the principle of supporting the development of our industry through involvement in activities that are within the scope of the business packages where it is feasible to require the support of the industry. At the same time, introducing technologies and innovative products to stakeholder defense institutions, developed by TÜBİTAK with its new vision, TÜBİTAK conducts integrated activities with our industry through the utilization of technology transfer methods which enable the long-term sustainability of solutions introduced in the market and creates added value in the economy.

Within this scope, in addition to fulfilling Turkey's urgent requirements, it is regarded that our institution plays a critical role in adding strategic and economic value to our country by entering regional markets through industry integration.

As mentioned in your question, the TÜBİTAK central organization and its institutes provide significant added value to the defense industry as they conduct studies based on R&D. Of great importance are the areas in the defense industry in which we have a high rate of foreign dependency. In the upcoming period TÜBİTAK UME will begin conducting our country's scientific metrology studies, specializing in the production of prototypes of navigation based strategic products. In addition, you will see TÜBİTAK's participation in the measurement and quality assessment activities of domestically produced materials for high-power laser resistant optics.

Amongst the primary objectives of the TÜBİTAK MAM Chemical Technology Institute is the development of the chemicals and equipment required by our defense industry. The institute carries out studies for particular products such as explosives, gas holding systems, advanced polymeric materials for defensive purposes and energetic materials.

TÜBİTAK MAM GE was established with the support of our Ministry of Development. At our "Center for the

Development of Food Analysis Kits", the objective is the production of the materials that could be utilized at MoD Food Laboratories. These materials consist of the following:

- Rapid and field-usable unique device and kit systems
- Biological agents (pathogens)
- Chemical toxic substances (toxins, pesticide, etc.)
- Heavy metals
- Genetically Modified Organisms

Attempts at food terrorism, especially targeted toward executives and decision makers globally, constantly remains at the forefront of the world. The most important motive for food contamination attacks are that they often do not have an immediate effect and is not time dependent. The Food Institute has the knowledge and experience to develop a diagnostic system in our country that can provide fast, precise and reliable routine detection of food containing chemical agents before consumption.

Studies are being conducted toward the development of a local small, portable sensor system through the utilization of the national infrastructure and intellectual power. The indigenous production of this system will also enable the fulfilment of an essential component of national security.

TÜBİTAK's research and development institute, that specializes in the defense industry, TÜBİTAK SAGE, has experience that surpasses 45 years in the development of both system level and sub system level products/ projects in line with the vision to reduce foreign dependency within the defense industry. The main goal of this institute is to conduct applied research and technological development, thus contributing to the establishment and development of a national defense industry based on scientific and technological principles at home.

TÜBİTAK SAGE has been a pioneering institution in Turkey that develops successful systems and sub systems that turn into products, due to its R&D capability in the fields of missiles, rocket and ammunition in the defense industry. The variants of the Precise Guidance Kit (HGK), Penetrator Bomb (NEB) and Stand-off-Missile (SOM) developed by TÜBİTAK SAGE in 2015 and 2016 have been serially produced by our defense industry and they are in the inventory of the Turkish Air Forces Command and have been effectively utilized for internal security and the operations of Euphrates Shield. The mass production of five unique products designed by TÜBİTAK SAGE are scheduled for launch in 2017 and are to be delivered to the Turkish Air Forces Command.

These developed indigenous products with high added value (i.e. 2500 – 7000 USD/kg) will facilitate our country's accomplishment of its Defense Industry export goal. With brimming overseas market opportunities, it empowers our manufacturing companies while reducing Turkey's foreign dependency.

With the activities it conducts, particularly by enhancing its human resources competency through R&D, TÜBİTAK SAGE triggers new developments and enables the growth of our Defense Industry companies with unique products while also enabling the development of subcontractor companies that will manufacture the numerous nationalized critical sub components.

The RASAT and Göktürk-2 satellites developed by TÜBİTAK SPACE and their various communication components, electronic warfare and encryption

systems developed by TÜBİTAK BİLGEM are of particular importance to mention here. I believe that the high technology content and development level of the products are of significance, a value-add contribution to our defense industry. Moreover, considering the fact that most of these systems are currently being exported and nearly all of them have high export potential, this level of added value increases further. Besides, these systems that are developed through very humble budgets and by a limited number of researchers constitute another important indicator of the efficiency of the TÜBİTAK Institutes and Centers.

Defence Turkey: It seems that despite the annual increase in the share allocated by the government to R&D, with the equity capital resources in the defense industry in Turkey the resources allocated are currently below the desired level. Could you please evaluate the current status regarding the promotions, incentives and investments transferred to the universities, institutes, Main Contractors, SMEs and Sub-Contractors, as well as your strategies for the upcoming period?

The TÜBİTAK Research Support Programs Directorate (ARDEB) conducts activities to promote, direct, support and monitor the R&D activities containing scientific, technological and innovative approaches in the academic arena within the scope of Turkey's overall science and technology policies. Project proposals in all scientific areas are accepted including social sciences. ARDEB provides non-repayable support to the projects of academicians, researchers working in the private sector as well as the public sector through 7 different research programs.

The objectives and contents of these support programs:

-1001 - Scientific and Technologic Research Projects Funding Program: The objective of this program are to support projects in compliance with the scientific principles to generate new information, to make scientific analysis or toward solving technological problems. The funding

cap per project is 360 thousand TL (est. $ 100K). The duration of the project is a maximum of 36 months.

-1002 - Short Term R&D Funding Program: This program's objective is to provide support to the urgent, short term, low budget research and development projects to be conducted in the universities, research hospitals and research institutes/stations. The cap per project is 30 thousand TL (est. $ 8K). The duration of the project is a maximum of 12 months.

-1003 - Priority Subjects R&D Funding Program: The objective of this program is to support and coordinate the R&D projects related to the priority areas which will be identified within the National Science Technology and Innovation Strategy, which are result-oriented, having traceable targets, and to supervise the dynamics of the related science/technology areas and that are conducted in the country. The funding cap per project is 2.5 million TL. (est. $ 700K). The duration of the project is a maximum of 36 months.

-1007 - Public Institutions Research Funding Program: This program aims to fulfil the requirements of the public institutions or to resolve the problems that may be covered through R&D. There is no funding cap per project as the special limits are identified with the proposals. The duration of the project is a maximum of 48 months.

-3001 – Start up R&D Projects Funding Program: The objective of this program is to expand the R&D project preparation and execution culture, to fund R&D projects that will be presented by university researchers, public institutions/ associations or private associations who have not been assigned as executives in other projects funded by ARDEB. The funding cap per project is 60 thousand TL. (est. $ 16K). The duration of the project is a maximum of 24 months.

-3501 - Career Advancement Program: This program aims to encourage scientists with doctorate degrees who have just started their careers by granting them project funds. It is a program with the purpose of promoting the academic careers of young researchers who will assume academic leadership in the 21st century by funding their studies. The program also intends to both boost our country's scientific proficiency but to also increase the role of science in our development. The funding cap per project is 225 thousand TL (est. $ 62K). The duration of the project is a maximum of 36 months.

As a result, the new funding programs, promotion activities and improved processes, a significant increase was observed in the number of project applications. The applications received, from all around Turkey, and the number of projects proposed to ARDEB increased significantly in the last two years. This year the number of project applications has reached 7,813.

We encourage our country to become more competitive and we encourage the researchers in our country to prepare R&D proposals with our newly developed programs, creating domestic and novel products. Moreover, with the Project Performance Award result-oriented projects are eligible for up to 100,000 (est. $ 27 K) TL in proportion with performance.

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programs, the aim has been to achieve improvements in the quality and quantity of the projects. One of these improvements is the increase of the institutional share granted to the universities, up to 50% according to the performance of the universities. This has already started a competition between universities as they will place more importance on scientific research.

The Request for Proposals are being actively called for in Turkey's priority areas within the framework of the "1003 - Priority Subjects R&D Funding Program". Since its entry into force in 2012, requests for proposals have been issued in Boron Technologies, Energy, Information Technologies, Food/ Field Crops, Automotive, Medical Devices, Hydrogen and Fuel Battery Technologies, Solar Power, Food/Food Reliability, Membrane Technologies, Energy Efficiency, Biomaterials, Mobile Communication Technologies, Vaccine, Medical Diagnosis Kits, Medicine, Biomedical Equipment, Graphene, Human Brain, Health and Water Saving Technologies.

The project fund targeted to develop R&D and Technology has been increasing significantly in the last fifteen years in Turkey. This is a recognized and an affirmed fact at home and abroad. In this respect, significant achievement was obtained in the number of projects, the number of researchers and the development of research infrastructure.

TUBITAK's technology and product development projects for the defense industry intensified and gained importance since 2006. To this end, the Göktürk-2 project was funded, enabling our country to gain capabilities in space and defense. Regarding information technology,

the Real-Time Operating System project was funded and finalized successfully. With this product, an important and critical technology for the nationalization of numerous systems or platforms required by real time operating systems was acquired.

Then again, the development of technologies with high added value as an outcome of R&D funds, the increase in the number of projects and their promotion to local and overseas markets is a crucial point as it becomes difficult to maintain the sustainability of research and development activities if there is no assurance of financial contribution.

It is a well-known fact that the development activities, in developed countries, concerning technology and products that add value in the defense & space industry, are a result of governmental grants. In this way, countries gain important achievements in political, strategic and social areas as much as in technological and economic areas. In order to take a pioneering role on a regional and global scale, developing an indigenous defense industry and unique technology has to be our indispensable goal.

	2014	2015	2016
University	322.541.572	405.922.363	293.435.263
Public Sector	7.436.577	12.021.630	9.126.005
Private Sector	74.540.956	100.357.508	97.673.987
TÜBİTAK Central Organization and Institutes	89.355.990	132.320.817	249.725.004
Other (Retired)	0	814.222	0
Total	493.875.095	651.436.540	649.960.259

Amounts Allocated to the Projects according to Year (TL)

In order to reach this goal, successful navigation through political and administrative regulations, the R&D and technology and industry development eco-system has to operate in harmony. Scientific and technological attainment developed with TÜBİTAK's incentives are intended to cultivate original products and processes through innovation.

TÜBİTAK performs an important function in the technology management eco-system of Turkey. We are a critical and essential piece of the mechanism and we are aware of the importance and impact of our task within this context. Therefore, our objective is to contribute to Turkey's development, to increase our country's social progress, to contribute to its economic growth and the manufacturing of products with a high value add benefit. We accomplish through our activities that generate advancements in scientific and technological knowledge and in cooperation with universities, institutes, private companies and major industry associations. It is known that developed countries maintain their superiority and their ability due to their fundamental dominance in R&D and technology.

In the current situation, we see that the SMEs, universities and institutes are mostly under the main contractor in defense industry projects. Main contractors, in some cases look after one's own benefit such as financial profits rather than the R&D or quality aspects. Therefore, the most important component in enhancing the contributions of SMEs, universities and institutes is to efficiently contract these institutions in defense projects, first hand from the Undersecretariat for Defense Industries (SSM).

The critical and primary issues should be conducted within a concrete program by the SSM. Secondary topics should be designed under the programs involving all stakeholders (Main Contractors, Sub-Contractors, institutes, SMEs and universities) who are able to make applications for these projects. Thus, paving the way for all actors to be involved

in defense projects. The subjects or products requiring critical and intensive R&D should be assigned at least to 2 or 3 sub-contractors simultaneously. The product of the best sub-contractor should be utilized. The fact that competition could create essential synergy should not be ignored and successful results should be awarded with notable amounts. The main contractors must take system-level work and be responsible for system integration, installation, integration of subcomponents, production and testing. The main contractor may also be able to take on R&D if desired, but work that requires R&D should not be a burden left on the main contractor. Another unique and effective activity of the SSM is that it prefers technology transfer instead of procuring systems regarding critical technologies that need to be acquired (i.e. Air Defense System, TX, TF-X and GEO satellite communication programs). Especially in this critical period that our country is going through, the technology transfer should be extremely prioritized and conducted in a planned manner. Technology transfer should be completed under the coordination of the SSM, then again it may be a rigorous task for the SSM to execute such responsibility in an efficient manner single-handed. Diversified technical teams may be organized to conduct R&D activities and to identify the main contractors for the production phase, determining who the main sub-contractors are, that those that are in charge of the main systems. TÜBİTAK and its institutes can oversee the organization and coordination of the team that is to conduct R&D activities. All of these activities have to be completed in a time sensitive manner; also of consideration is the availability of a broad data repository of researchers and sub-contractors, and in this sense TÜBİTAK can assume critical tasks.

It is splendid that we have incentives but their failure to provide the desired level of momentum is an issue that requires further discussion. The attractiveness of the incentive figures, the subjects to be funded and assessment criteria should be revised. Is the project or the product of the company receiving the stimulus package and completing the project being used in the field, what should be done for it to be utilized, these points must be carefully scrutinized. Moreover, how does an SME receiving the incentive preserve sustainability after the accomplishment of the programs? could it endure in the business world? Or, does it have to alter its business strategy? I would like to underline that these issues should be pursued with great sensitivity.

The granting programs TÜBİTAK (Scientific and Technological Research Council of Turkey) TEYDEB (Technology and Innovation

Support Programs) include the allocation of resources to private sector R&D, the development of cooperation between firms themselves or with universities and research institutions, the transformation of scientific and technological know-how, which is considered to be the most important sources of transforming economic development into social benefits. Increasing resources assigned to innovation based on R&D is promoted through incentives.

The R&D activities and grants compatible with the EU's strategic objectives have set a policy focused on increasing the welfare of Turkey. In line with such a policy, the objective is to raise the share of R&D expenses within the Gross Domestic Product (GDP) to 3% and the share of the private sector's R&D expenses to 70% by 2023. Developing industrial research and technologies, supporting, encouraging and monitoring innovation and developing university - industry relations, focused on increasing our country's economic and social welfare are amongst TÜBİTAK's main functions.

Conducting the management of a total of 13 support programs, TEYDEB maintains its position as the center of R&D, innovation and entrepreneurship funding requirements of the private sector, from the individual entrepreneurs to SMEs and to our major companies.

Regarding the funds granted and support programs designated for the defense industry:

1501 - Industrial R&D Projects Granting Program: This is TEYDEB's main support program. The Program enables application throughout the year to all sector companies with projects in all subjects and provides a 60% grant for 36 months to approved projects. There are no budgetary limits.

1507 is a similar program, with more defined limits, is a program developed for the requirements of the SMEs. The SME R&D Startup Support Program; SMEs from all sectors are funded up to 50 thousand TL (est. $ 14K) for the first five projects (2 of them with the condition of establishing partnerships) with the grant rate of 75%, funded for 18 months.


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Through the 1511 program, The Primary Subjects Research Technologies Development and Innovation Programs Funding Program, funds of 75% are granted to SMEs and 60% to major companies are provided to projects aligning with the request for proposals in determined thematic areas required in our country. Projects in line with the request for proposals issued within the scope of the program can be submitted.

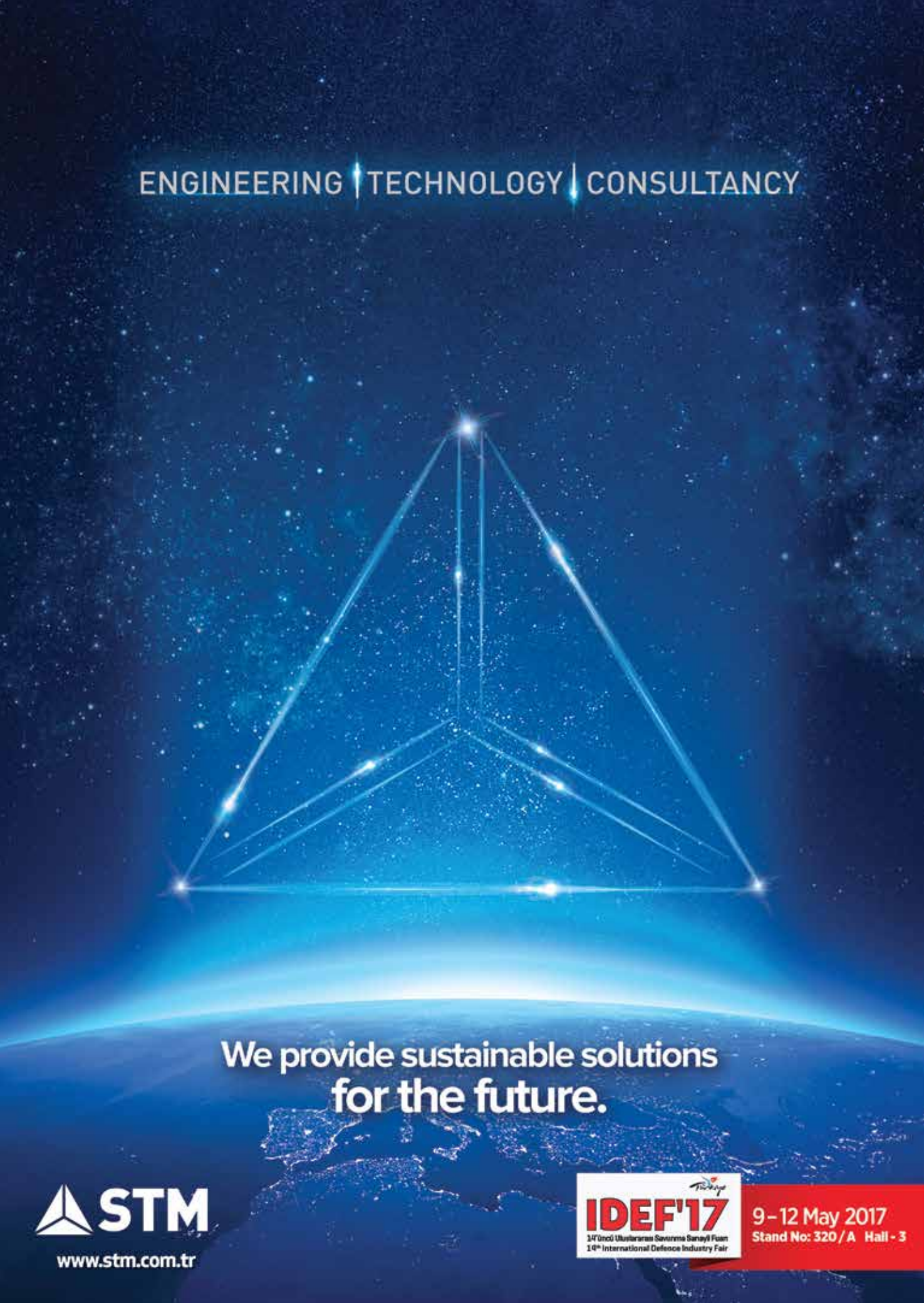
With the aim of our industry's participation in projects with international partners such as EUREKA, EUROSTARS and ERA-NET, the 1509 - International Industry R&D Projects Funding Program provides funds to major companies located in our country. The rate of support in this program are within the following ranges: 75% to SMEs, 60% to major companies.

Within the scope of the aforementioned programs, between 2008 and 2017, a total of 846 project applications regarding the defense industry were submitted. 509 of them resulted in funding approval and a total of approximately 25 Million TL (est. $ 6.94 Million) (in fixed prices of 2017) were allocated to these projects.

Defence Turkey: We know that reverse brain drain has a considerable place on your agenda. Our companies have made individual attempts to obtain qualified leader staff, composed of individuals who are experts in their fields and to assign them to significant projects, yet the desired level of efficiency could not yet be achieved. What kind of strategy do you have for the more effective and efficient management of these initiatives under the leadership of TÜBİTAK, in a centralized structure?

We have been designing innovative mechanisms to seize the internationalization processes experienced in research and innovation, facilitating the access of the Turkish research and innovation actors to the know-how accumulated in abroad. In this sense, we aim to use critical competencies gained abroad, especially that of the Turkish diaspora, leveraging the knowledge and skills they've acquired. Local cooperation on research and innovation through the diaspora is as important as the reverse brain drain and it is becoming more visible on the agendas of leading economies as well as the economies of developing countries.

Through the new mechanism it created, TÜBİTAK provides cooperation opportunities in subjects required by the competent Turkish and foreign researchers and professionals abroad and the public and private sector research institutions operating in our country. Without any limits on subjects, the Turkish associations can apply to TÜBİTAK and receive funds for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local cooperation projects to be conducted with the researchers abroad with whom they wish to realize joint activities, generating joint solutions for the identified research problems, accessing critical data, know-how and competencies and executing research activities on strategic issues. Within the scope of the projects, the Turkish or foreign researchers living abroad can pay short term visits to the applicant association in Turkey and conduct their studies there without the requirement of fully returning to Turkey, and at the same time, short term study visits can be conducted at the target association abroad from Turkey.

The Turkish scientists in foreign countries are becoming more involved in TÜBİTAK's evaluation processes and we enable their sharing of the most updated technological information in their research areas by inviting them to the panels in Turkey. Through such cooperation, the Turkish scientists abroad seize the opportunity to follow the most contemporary developments occurring in Turkey in respect to the Turkish Research field and a landscape is being established for them to keep their relations with their Turkish colleagues fresh and for their return to Turkey.

TÜBİTAK approaches this issue with precision, as great importance is attached to it within the National Science, Technology and Innovation Strategy for the years 2011- 2016. To this end, with the aim of introducing the European and Nationally Supported Fund Opportunities offered to the researchers who will be returning to Turkey from abroad, with United States being in the first place and thus increasing the reverse brain drain, the Destination Turkey Workshops have been conducted since 2010. 25 different events in 12 different cities in the United States, Canada and Europe have been held up to this point. The Turkish and foreign researchers executing their research in the identified regions and wishing to conduct research in Turkey attended the workshops. Within this scope, 2,855 scientists have been informed one-on-one and it is believed that many scientists, far beyond this figure, have been reached through the awareness created. As part of the Destination Turkey Workshops, the gathering and negotiation of the scientists with the executives of the hosting universities and industrial associations in Turkey and information exchange has been enabled. Detailed information has been presented on the latest developments in Turkey's Research field and on the many grants that are available for our researchers while and after returning to Turkey throughout the workshops. After sharing the success stories of the researchers who have returned Turkey, by benefiting from these programs, the researchers conducting research activities in the United States have taken the opportunity to negotiate with the representatives of the universities and industrial associations overall Turkey.

The cities in which we organized the events are as follows: In United States: Boston, Ann Arbor, New York, Los Angeles, Washington, Houston, Raleigh, Atlanta, Chicago, San Francisco. In Canada: Waterloo. In Europe: Berlin

Defence Turkey: Within the scope of the establishment of a technology bank for the least developed countries, as a result of the understanding reached with the United Nations, the decision was made to establish the technology bank in Gebze in 2017. When do you expect the host country agreement to be signed with the UN? Could you also elaborate on the acquisitions this technology bank would bring to the least developed countries?

Technology Bank program will play an important role primarily in the sharing of the technologies produced by developed countries with the least developed countries and the establishment of cooperation that would benefit both parties.

When the program is launched, a 'requirement analysis' is planned to be conducted regarding the least developed countries and activities will be identified in line with these requirements during the first stage. In this way, the Least Developed Countries will be informed on their technical and capacity requirements with the inclusion of Science, Technology and Innovation issues. At the same time, this will create a system that provides more structure and access to information, which is of great importance.

In this direction, providing consultancy and training in the development and implementation of the science and technology policies in the least developed countries, and establishment of the required management system and structures are amongst the activities of the Technology Bank.

Another task of this bank is enabling the access of the scientists in the least developed countries to scientific articles and research published in the world and execution of joint (academic) research with the developed countries on subjects required by the Least Developed Countries.

One of the greatest obstacles facing the development of the technology and innovation in the Least Developed Countries are the high intellectual property rights and patent costs. One of Technology Bank's main priorities is mediating for the introduction of the patent and intellectual property rights owned by the developed countries to the least developed countries in more affordable conditions. Ultimately, the most important advantage of the Technology Bank for the least developed countries will be in the direction of diminishing the major differences in the development levels between two parties.

Within the framework of the Technology Bank program, the negotiations for the host country agreement are planned to be launched in May during a visit to be paid by the United Nations (UN) to our country and the completion of the negotiations and signing of the agreement are aimed to take place within 2017.

One of the main objectives to be reached through the Technology Bank is enabling the follow up of related literature in order to facilitate the academic studies of the researchers of the Least

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Developed Countries (LDC). To this end, making the online academic resources to LDCs free of charges is planned. In addition, another undertaking will be the facilitation of the communication and cooperation opportunities of the researchers of the LDCs both among themselves and between the other researchers in the world through the academic networks. To pursue these goals, the bank aims to cooperate with various national and international science academies so that the LDC researchers can benefit from the existing scholarships and funding programs.

In addition to increasing the research quality in the LDCs, another important objective of the Technology Bank is strengthening the national intellectual property capacity of the LDCs and therefore enabling the execution of the technology transfer fully based on voluntary and mutual understanding principles. Then again, the importance of informing the LDCs on their technical and capacity requirements and their inclusion to the international system in a more structural manner is monitored by the Technology Bank and activities concerning this point will be prioritized.

Defence Turkey: A Science and Technology Cooperation Protocol was signed between King Abdulaziz City for Science and Technology (KACST) in Saudi Arabia and TÜBİTAK in the recent period. What are your remarks on the latest status of this cooperation protocol signed with KACST directing Saudi Arabia's science and the advantages expected from this cooperation?

Currently we are successfully conducting joint projects with Saudi Arabia that we initiated as TÜBİTAK and these projects are extremely advantageous for both countries. We regard especially our installation of the scientific metrology institute in Saudi Arabia and its successful integration to the international metrology system will be contributing more to the development of both military and commercial and cooperation with both Saudi Arabia and other Gulf Countries.

Similarly, concerning the cooperation protocol, we will be holding a workshop with the representatives of KACST as soon as possible to clarify the activities that we will be conducting between our institutions. Initially we plan to launch joint projects between our institutions. Workshops will be held, with our experts on thematic areas such as defense and space being in the first place, energy, industry, communication, life quality.

The cooperation agreements signed and projects executed by our Institutes and KACST are as follows:

Cooperation between TÜBİTAK MAM EE and KACST initiated with the "Collaboration and Technology Transfer Project for Static Var Compensation (SVC) Systems" project signed on 01 June 2011 and 4 projects on energy have been successfully accomplished with KACST so far. As a result of these projects, an inflow of 8,129,400 $ to our economy was achieved. Besides, with the help of these projects and cooperation, Turkey reached the position of a technology exporting country. Negotiations on the development of Central Solar Inverters for Solar Stations are being held with TÜBİTAK MAM Energy Institute and KACST National Center for Solar Energy Technology. Launching activities such as monitoring the coastal waters and off-shore jointly through scientific methods and an ecosystem understanding approach, detection and management of the current status of the offshore and seacoasts are planned by TÜBİTAK MAM Environment and Cleaner Production Institute and Saudi Arabia's institution related to marine research. As marine research is quite challenging, compelling and costly, the joint utilization of the existing devices, equipment and vessel infrastructure is quite essential.

Moreover, a Cooperation Protocol on Science and Technology was signed with Saudi Arabia on 30 September 2016. With the signing of the protocol, the first solid step towards the joint request for proposal considering the joint projects between TÜBİTAK and KACST was taken. In this respect, during the visits paid by our Institution to various cities of Saudi Arabia in February 2017, both parties agreed to identify primary subjects and prepare a joint request for proposal. Within this scope, technical visits for the cooperation of the institute and institutions will be organized shortly and then the primary subjects will be identified and a request for proposal is planned in order to support the major projects with high budgets to which the actors of industry and academy could apply jointly.

As is known, there are Research Institutes related with various areas of competency under the auspices of the KACST and Institutes of TÜBİTAK cooperate with them. For instance, within the scope of the 'Time and Frequency Measurement and Calibration

Laboratory System Installation Project', the laboratory installation of the Mecca Clock Tower was accomplished by TÜBİTAK National Metrology Institute (UME) and the continuation of the consultancy and training services as part of the project for 2 years is planned. Moreover, TÜBİTAK MAM intends to conduct geologic hazard (seismic, landslide) analysis in Saudi Arabia. On the other hand, a request related with the installation of e-identity infrastructure developed by TÜBİTAK BİLGEM was received from Saudi Arabia. Activities concerning the joint surveillance of the seacoast and offshore through scientific methods and with the approach of ecosystem understanding, detection of the existing status of the sea and coast waters and its management are planned to be launched by our Environment and Cleaner Production Institute and Saudi Arabia's institution related to marine research.

Defence Turkey: The "Turkish Trade Center" which is the first Organized Industrial Zone and Business Incubator investment in a foreign country was inaugurated in Chicago, United States. Which advantages will this center bring to the investors wishing to penetrate the American market and companies working with the growth strategy based on innovation? Could you please elaborate on the existing structure and the activities planned to be conducted in the upcoming period?

TÜBİTAK Marmara Teknokent established a consortium in 2016 with the partnership of 18 technoparks in order to build an international business incubation center and an application was made benefiting from the KOSGEB (Small and Medium Industry Development Organization) funds. This application for the funds was not approved, so we persevered in our efforts with different partnerships and facilities. We made a cooperation with the Kocaeli Güzeller Organized Industrial Zone within the scope of the Turkish Trade Center (TTC) opened in Chicago and signed a protocol to occupy a 1000 m2 area within a space of 16,000 m2 as a business incubator center. In order to conduct the Business Incubator Center, a partnership agreement was made with Gebze Organized Industry Teknopark, İstanbul University Teknopark and Namık Kemal University Teknopark. In January 2017, we organized a visit to the United States with the participation of 15 companies and 17 company representatives. We visited Chicago, Las Vegas and San Francisco. In addition to the Business Incubator Center, we met numerous businessmen and investors and visited one of the world's most well-known fairs the CES 2017. Moreover, we visited leading institutions and associations such as the Illinois Science and Technology Park, Argonne National Laboratory, Mhub, Plug&Play Technology Center, Google and Jabil.

During our official visit, we developed cooperation with the MHUB which used to be the additional manufacturing facility of Motorola and currently active as Fablab and enabled the utilization of the MHUB infrastructure by our incubator companies throughout the test, analysis and/or prototype building phases.

We drew up an acceleration program for the business incubators with the TTC experts. Once again, we drafted cultural and scientific activities under the roof of the business incubator center. We launched a joint activity again with the TTC experts in order to hold 'Business Day' organizations in which the entrepreneurs would be able to seize the opportunity to gather with businessmen.

In the future, we envisage the opening of business incubators within the TTCs which will launch their operations in America as part of their collaboration. In addition to United States, we are striving to open Business Incubator Centers at certain locations in Europe in the upcoming period.

Defence Turkey: TÜRKSAT 6A Indigenous Communication Satellite activities are being executed under your leadership. Could you please inform us on the R&D studies conducted for particularly gaining critical technologies within this program as well as on the latest status of the program?

TÜRKSAT 6A Indigenous Communication Satellite is being supported within the scope of the legislation of 1007 Program by TÜBİTAK KAMAG and the budget of the project is being co-funded by TÜBİTAK, Ministry of Transportation, Maritime and Communication and TÜRKSAT A.Ş. The management of the project is assumed by TÜBİTAK Space Institute while Aselsan, TAI and CTech bear the responsibility of the sub work package. Numerous equipment and systems to be developed domestically for the first time exist in the project. The satellite management unit, power conditioning units, attitude and orbit control systems, electrical propulsion system, platform and cabling design, telemetry and tele-command systems and Ku-Band systems are some of the satellite components to be developed domestically. In this project, which is the most comprehensive R&D project with the highest budget in our country, we are conducting our activities despite the difficulties that our country endured recently. In light of this information, the activities regarding TÜRKSAT 6A satellite are planned to be completed by the end of 2020.

TÜRKSAT 6A Communication Satellite project is the greatest project conducted in field of Space in Turkey up until today. The developed satellite platform is planned to provide services for the future satellite communication requirements of Turkey. Within the scope of the critical technologies developed by TÜBİTAK Space, the following equipment and sub-systems are being developed: As part of the ground stationary orbit satellite requirements "Task Computer", "Power Distribution and Organization Units", "Reaction Wheels" and "Sun and Star Sensors" for maintaining the attitude control of the satellite, "Electric Propulsion Sub System" enabling the satellite maneuvers. Moreover, TAI conducts the structural, thermal and cabling sub systems, Aselsan executes the communication payloads

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and CTech accomplishes the sub systems required for tele-command / telemetry communication. Within the scope of these sub systems, equipment such as receptors, signal flashers, switching blocks and antennas are being designed in a way that holds critical technologies.

Four separate models in system level are being developed as part of the Project. Intensive activities are being carried out as part of the initially developed models; the electrical electronic satellite model and thermal structural model. Integration of the electrical electronic satellite model will be starting on 15 April 2017 and the production activities regarding the thermal structural model are going-on. The engineering model integration, which will be very similar to the flight model, will be launched thereafter. The launch of the flight model, which is considered to be the end-product, is planned to go into orbit in 2020.

Defence Turkey: TÜBİTAK BİLGEM assumed a critical role in the development of the mission computer of the aircraft as part of the T-FX program. What are your comments on the project team established to this end and on the latest status of the activities conducted?

Avionic systems based on advanced level integrated modular avionic architecture started to be used in modern air platform systems as they are scalable, and as they enable technology retrofit and diminish the life cycle costs. The advanced avionic architecture in the 5th Generation Modern Fighter Jets such as F-35/JSF enables the effective utilization of decision support and mission systems through the real time central sensor and data fusion used for increasing the operation and mission performance.

Within the scope of the Indigenous Fighter Jet (TF-X) development program, since 2015, TÜBİTAK BİLGEM has been contributing to the design activities executed for the avionic architecture and systems with its team that has expertise in avionic software and hardware, radar, electro-optical systems and electronic warfare.

TÜBİTAK BİLGEM will be assuming the main responsibility in the Integrated Processing Unit (IPU) technology development project providing advanced modular avionic technologies to the Indigenous Fighter Jet. The IPU unique mission computer to be developed by TÜBİTAK BİLGEM is in a sense a super computer which will be the brain of the Indigenous Fighter Jet.

The IPU mission computer containing multi-core processors, high performance graphic processors and digital signal processors will be designed and developed through indigenous and local resources as part of this program. The interchangeable cards are placed within a rack mechanic structure as modules. GZiS, our avionic operating system developed by TÜBİTAK BİLGEM will be integrated with the IPU by adding new features.

Since the IPU unique mission computer will be running the process of the data received from sensors such as the radar and electro-optics of the aircraft through its data processing capability, it will be beyond a standard mission computer. All avionic functions, signal and data processing functions related with the communication, electronic warfare, radar and mission management will be capable of functioning over the hardware modules integrated with each other as software.

Another novelty in the critical technology is the re-configurability of the IPU mission computer in-flight. This feature will enable more allocation of the IPU hardware modules to the avionic software specific to the task during the execution of various missions such as surveillance and electronic warfare.

The functional integration of the Indigenous Fighter Jet's mission systems increases efficiency and effectiveness, yet high speed and reliable network infrastructure is required. Within the context of the IPU project, the high speed deterministic avionic network technology will be domestically designed and developed.

Our expert avionics team from TÜBİTAK BİLGEM has been working on the identification of the fifth-generation fighter jet avionic architecture and IPU mission computer, coalescing with TAI's Project Team for almost two years. The contract negotiations for the development of the IPU mission computer are being conducted with TAI. Within this period, until the signing of the contract, TÜBİTAK BİLGEM has built a project team through its own resources composed of 20 engineers and has launched the activities for the development of certain critical technologies of the program. 23 teammates currently are charged with on the Real Time Operating System (RTOS) which will establish the software infrastructure of the Mission Computer. Soon this number will reach 28 staff and it will increase further in time. The fruit of our team's efforts of over ten years - the RTOS was integrated to the Digital Flight Control Computer (DFCC) of the Hürkuş Aircraft at the Demirkuş Testing Environment. The following phase of this project is its certification of airworthiness over Hürkuş-B and outfitting with mass production of Hürkuş Aircrafts. This will be an important step on our way to TF-X program. Our other integration activity, similar to DFCC, is being executed over the SARP Stabilized Advanced Remote Weapon Platform and I would like to underline that this study is about to be completed as well.

Defence Turkey: What kind of technological advantages will this Indigenous Mission Computer bring to the end-user? It is one of the critical technologies of the T-FX program, please share some details.

With its high technology, this IPU indigenous mission computer will play crucial roles in fulfilling the future operation and mission requirements of the Indigenous Fighter Jet. The sensor data coming through the high speed avionic network of the mission systems such as radar, electronic warfare, communication, electro-optical monitoring, targeting and weapon systems of the Indigenous Fighter Jet will be centrally processed and integrated at the IPU computer. Then this integrated data formed

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will be conveyed into reliable and accurate information and transmitted to the pilot. Thus, the lighten pilot's work-load consist of controlling the aircraft and examining the data arriving separately will be reduced, thus this process will assistance the pilot to focus his main battle missions. Due to the high speed, reliable, high capacity and integrated modular avionic based IPU indigenous mission computer, detecting the hazard and responding period will be minimized and thus the superiority will be achieved against hostile units.

The Mission Computer will fuse the data obtained from non-aircraft sources through wireless data links and its high performance data processing capability, providing pilots a high level of situational awareness as the aircraft is able to see threats before they are visibly seen. The architecture of the Mission Computer will be configured in accordance with the flight phases and enable the utilization of the computer sources at an optimum level and also enable system recovery in cases of breakdown. The software architecture of the Mission Computer will enable the retrofit of ageing hardware components without being changed or with minimum change.

Defence Turkey: Could you please inform us on the latest status of the Electro Magnetic Weapon "Sapan" which was developed by TÜBİTAK Institutes and demonstrated recently, the 35 mm Airburst Ammunition developed with the cooperation between Mechanical and Chemical Industry Corporation and Aselsan, 122 mm ROKEM to be utilized against the Missile and Mortar Projectile, Precision Guidance Kits, Wing Assisted Guidance Kits (KGK), Stand-off-Missile (SOM), SOM-J, Penetrator Bomb (NEB) programs and the projects for the development of the new versions of KGK and NEB?

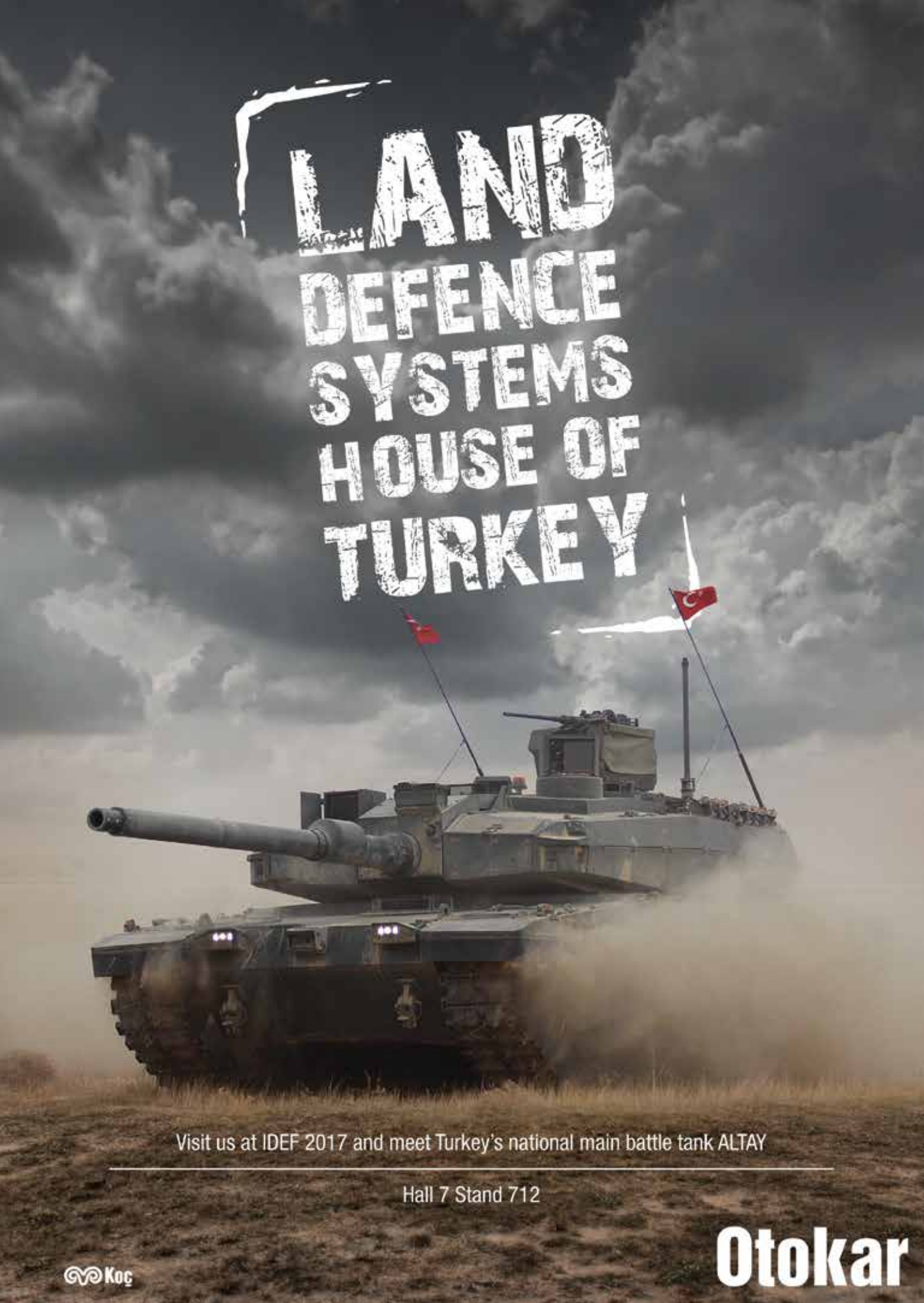
Within the scope of the numerous projects it conducts, especially with an accumulation of knowledge and qualified personnel in developing smart munitions for the air platforms, TÜBİTAK SAGE has developed unique munitions in various classes and delivered it to the service of Turkish Armed Forces (TAF).

Precision Guidance Kit-3 (HGK-3)

From the Guidance Kits family, Precision Guidance Kit-1 (HGK-1) ammunition was developed by TÜBİTAK SAGE and the serial production of this kit was completed by Aselsan. The HGK-1s entered into the inventory are being utilized effectively by the TAF in intrastate and cross-border operations. At this point, the activities considering the integration of the laser seeker also designed by TÜBİTAK SAGE which will gain Precision Guidance Kits the attack capability against the mobile targets continue simultaneously. Moreover, the development and firing test activities of the Precision Guidance Kit-3 (HGK-3) and Precision Guidance Kit-4 (HGK-4) with smaller warheads and which enable single and multiple firing from F-16 fighter jets are being conducted by TÜBİTAK SAGE.

The ground and flight tests of the Wing-Assisted Guidance Kit (KGK-1) developed by TÜBİTAK SAGE have been accomplished and the ammunition has been certified for the F-4 and F-16 Fighter Jets. The launched production activities of the ammunition developed through the KGK Low Scale Initial Production Project are proceeding. KGK-1s are expected to be delivered to the Turkish Air Forces in the short term. With the completion of these R&D studies regarding such ammunition, each of which will be acquired in Turkey, the outpour of crucial amounts of resources abroad will be cut off and more importantly with these weapon systems that are backbreaking to procure, the ammunition requirements of the Turkish Armed Forces will be ensured. The guidance capability will be a part of the conventional ammunition of the Turkish Armed Forces and our country will be relieved from the limitations in this field thanks to unique systems.

Wing Assisted Guidance Kits (KGK)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Through the Penetrator Bomb (NEB) Development Project, attack capacity against overprotected targets has been gained and a major part of the serial production of NEB has been completed. With the sequential penetrating warhead technology, NEB is a notable bunker penetrator ammunition in the world also with great export potential. Additionally, TÜBİTAK SAGE is incorporating its bunker penetrator bombs family with a novel product and will own the intellectual property rights. With the SARB-83 ammunition developed over the hull of the MK-83, the Fighters will be able to carry multiple small penetrator ammunition and this will reinforce the striking power of the Turkish Air Forces.

One of the most important ammunition recently developed by TÜBİTAK SAGE is the Stand-Off-Missile (SOM). One of the best in the world in its class, SOM provides the Turkish Air Forces with the capacity to destroy targets with high precision from a distance of 250 km. The serial production activities continue for this ammunition produced by Roketsan, and it has entered the TAF inventory. The Integration modification phase for the SOM-J Missile, export variant of SOM enabling firing from weapon bay of F-35 JSF, continue at full speed. To this end, the Design Update Stage has been accomplished and the product integration and qualification stage have been initiated.

Within the scope of the 35 mm Airburst Core Complex Development Project (ParM) developed with the cooperation of Aselsan, TÜBİTAK SAGE and MKEK, TÜBİTAK SAGE has accomplished the product and production line qualification stage and fulfilled all its contractual obligations.

Elimination of the threats confronted by our country, which are mostly developed by the terrorist attacks, particularly airborne destruction of missiles, namely Katyusha that fell over Kilis city and its surroundings, became a primary subject and in line with the directives of our Minister of National Defense Mr. Fikri Işık. Following the ParM Project, TÜBİTAK SAGE launched the development studies of the 35 mm airburst ammunition core complex (ROKEM) which is active against the aforementioned missile. Through the tests that verify analyses and efficiency calculations, development studies of the core complex were finalized successfully.

Stand-off-Missile (SOM)

Defence Turkey: The Indigenous Air Traffic Control Simulator (atcTRsim) jointly developed by TÜBİTAK BİLGEM and State Airports Administration (DHMİ) Air Navigation Department ATM R&D Engineering launched its operations. Will Turkey's foreign dependency in this area decrease with the launch of this system developed by TÜBİTAK BİLGEM and installed by Havelsan? Which capabilities will this system bring?

One of DHMİ's important R&D projects, namely the Air Traffic Controller Training Simulator (atcTRsim) was developed with the cooperation of DHMİ and TÜBİTAK and installed at the Esenboğa Airport Training and Simulation Facilities by Havelsan and has initiated its activities as Turkey's first Indigenous Air Traffic Controller Training Simulator.

The Proximity/Field Control Radar Simulator has the capacity of simultaneous eight controller operation positions composed of planning and implementation and eight virtual pilot positions capacity. Aerodrome Control Simulator has a 360-degree backlit tower environment and also the capacity of eight virtual pilot positions.

In order to prepare the exercises to be used in the training, components enabling the data access to the system and readiness of the exercises were developed. These components consist of airport, air space, procedure, air vehicle, metrology, exercise planning and airstrip organization vehicles. Moreover, Performance Evaluation Tool allows for the evaluation of the achievements and performance of the controller candidates who are assigned to the Proximity/field Control and Aerodrome Control units. This tool prepares scenarios that run over the system. The capabilities of the user trainees and their implementation of operational procedures can be measured, tracking user development over time.

The three-dimensional models of the new airports and modifications over the air space could be easily applied to the atcTRsim designed in an expandable structure. With the launch of the system, the DHMİ Directorate has at least doubled its training capacity for the Air Traffic Controllers.

In addition to the basic air traffic controller training, the atcTRsim system can be utilized in giving advanced level air traffic controller training when required, in their readiness in emergency cases, in giving operation trainings in cases of structural changes in the air space and emergence of new operation techniques and during the execution of the Air Traffic Management activities. This will eliminate our country's foreign dependency in this field.

Defence Turkey: Within the scope of the development of the local railway signalization systems activities conducted by TÜBİTAK with the Turkish

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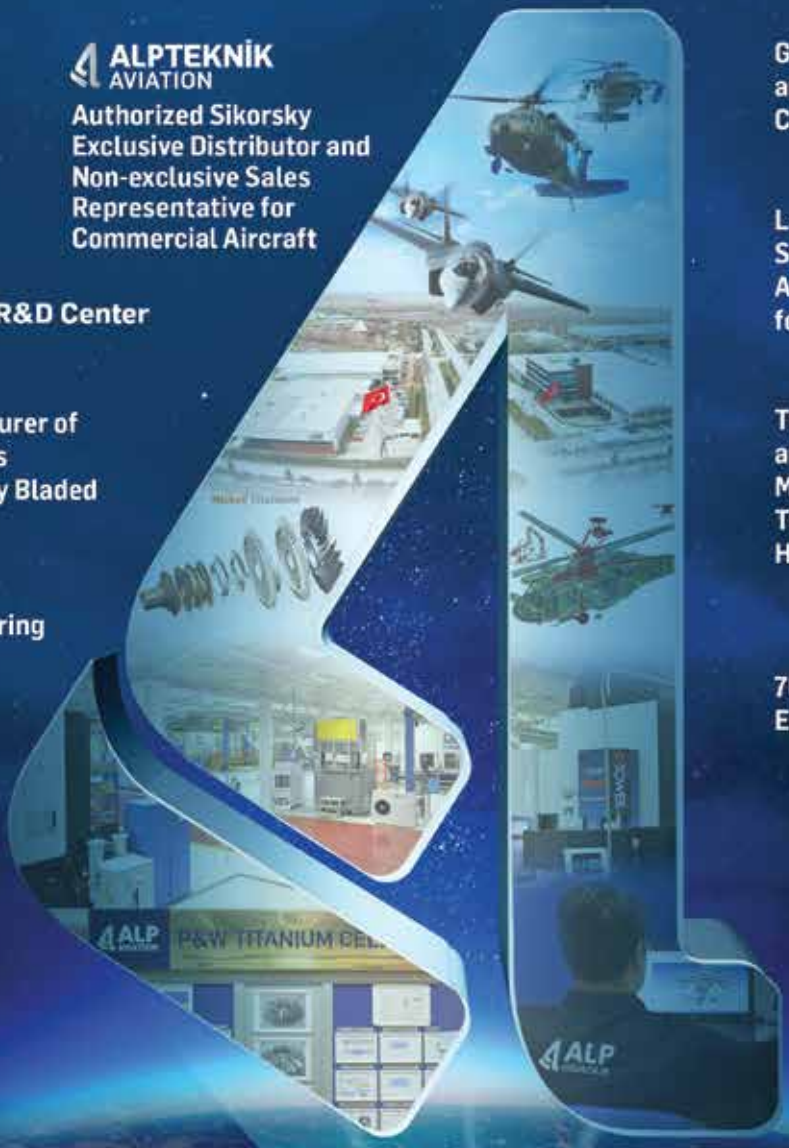

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State Railways (TCDD), Ankara YHT Railway Station has been equipped with the signalization systems manufactured by TÜBİTAK BİLGEM and launched its operations. What are your expectations regarding this area and the impact of your studies in decreasing foreign dependency?

As known, an important part of the Turkish railway system is that it still lacks signalization systems and a significant portion of which have expired their lifetime. Signalization systems is the most critical component of secure operation of the railway traffic. Because of the deficiencies in this area, activities were launched under the partnership of TCDD and TÜBİTAK BİLGEM. As a result of these activities, we achieved domestic development of interlocking systems and traffic control center, which are the most critical components of the railway signalization.

These systems that we developed are activated in the Ankara YHT Railway Station and the manufacturing and installation activities spanning a total of 500 km long railway are being conducted as well. Additionally, we are negotiating with TCDD on certain new projects.

We attach great importance to the local development of these critical security systems, which were fully provided with foreign dependency. We are pleased that the TÜBİTAK systems are popular in Turkish Railways.

Defence Turkey: Dear Prof. Arif Ergin, will TÜBİTAK place itself on a global scale within the next decades?

National sovereignty and independence of a country; is equal to its assertiveness as well as its success and impact in the 'international' arena. Moreover, the prestige of a country in science and technology is measured with the quantity and power of the countries cooperating or wishing to cooperate or open to cooperate. The global economic relations and work share are directly related to the scientific and technological competencies and capabilities of nations. Nowadays, international cooperation in such areas is inevitable and it started to assume a determining role in the establishment of future economic and commercial relations with high added value based on research and innovation.

International studies with joint authors started to appear almost as a scientific pre-condition. For instance, approximately 60% of the scientific publishing of Science magazine are composed of international studies formed by researchers from at least two different countries. Considering that this rate remained below 20% in 1992, it's possible to observe the level of progress with the speed of internationalization in high impact academic research.

Increasing cooperation in international industry in addition to international academic cooperation is an effective way to access the most advanced technologies and markets in a way to allow higher added value in the long run, in addition to attracting foreign investments to our country. These types of cooperative approaches also bear importance in respect to reaching information in advance, information that is related to industrial standards and regulations, and this can create a competitive advantage. The research and innovation projects of our companies facilitates effective access to new markets by supporting the cooperation with customers, suppliers or international shareholders in rival positions in target markets and increases their export potential. Therefore, the aim here is to design international cooperation not only with academic purposes but also for industrial institutions, promoting research and development activities regarding advanced technologies, products and services that will increase the competitive power in world markets.

In the current international state of affairs, as no country has the power to struggle with the issues such as climate change, food and energy security or global migration alone, international cooperation in science, technology and innovation areas become inevitable. In order to produce solutions for global issues and to make scientific advancements, it is essential to benefit from scientific methods, resources, research funding facilities and researchers all over the world, we must go beyond our borders.

As TÜBİTAK, in order to gain strength and influence in the rapidly globalizing research and innovation processes, we are accomplishing activities that are turning our country into a conjunction point for global R&D and innovation cooperation networks. In line with this target, we are closely following opportunities for global cooperation, developing participation strategies, conducting 'science diplomacy' activities that contribute extensively to our competitive capacity, designing innovative mechanisms and introducing them to the benefit of Turkey's Research Field.

Defence Turkey: Thank you for your valuable contributions.

Ms. Ayşe Evers - Editor in Chief of Defence Turkey Magazine; Prof. A. Arif Ergin- President of TÜBİTAK; Mr. Cem Akalın - Managing Editor of Defence Turkey Magazine

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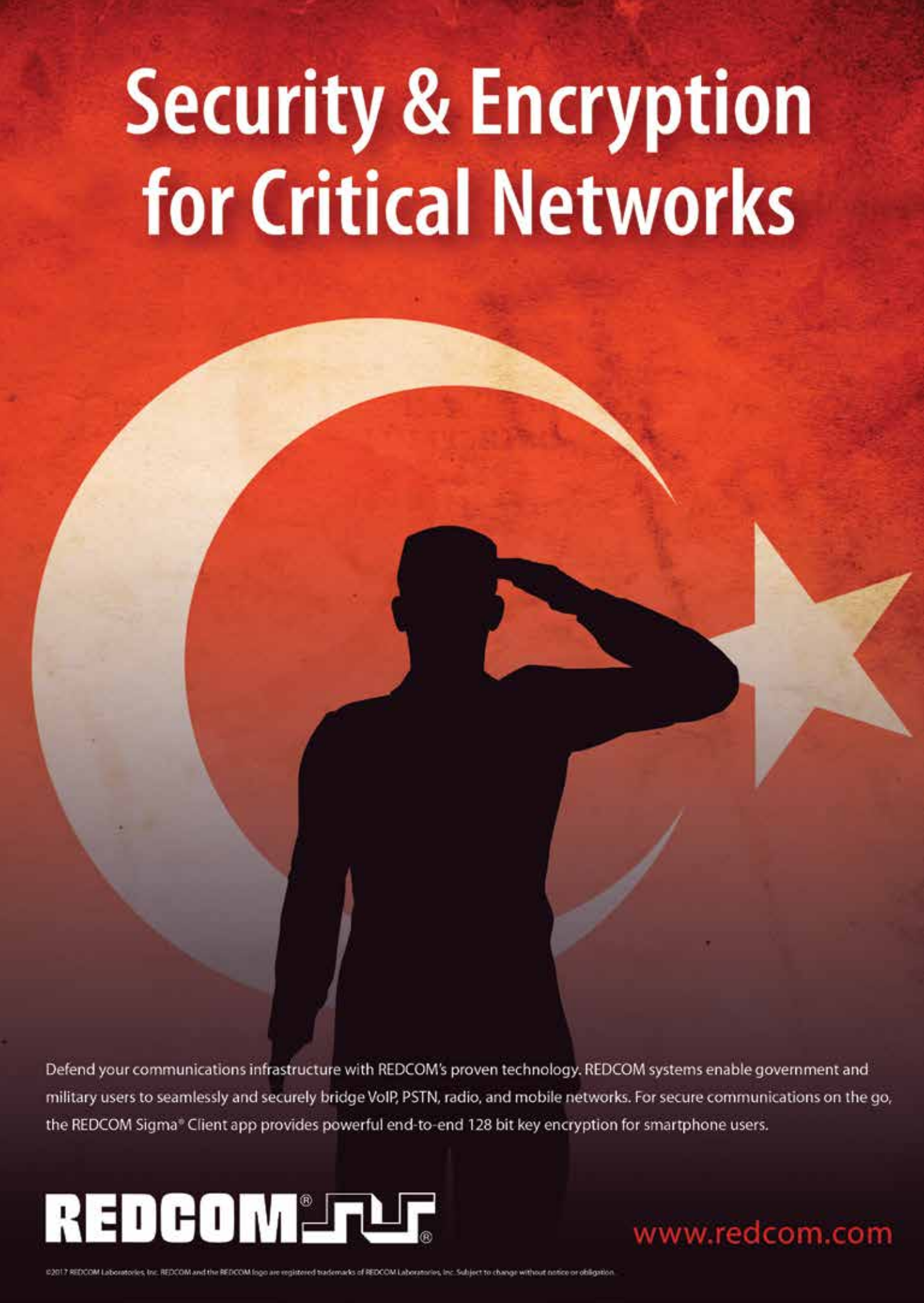

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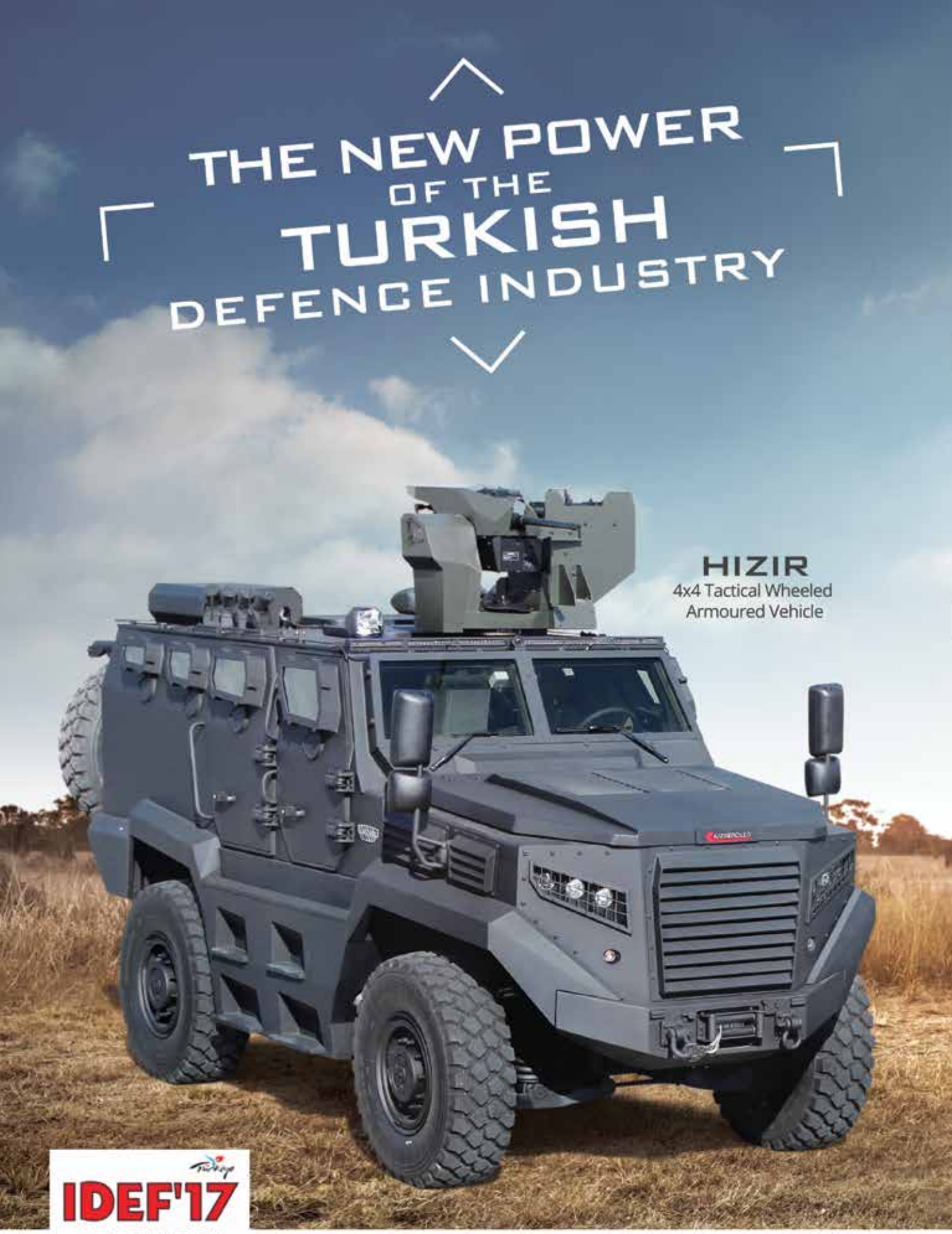

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FNSS - The World's Notable Turkish Partner in Innovative Products

FNSS showcases the future of Land Platforms at IDEF' 17.Continuing to expand its product family with innovative products, FNSS is launching new vehicles and displaying the latest development with its new platforms at IDEF 2017

The eyes of the industry will be focused on FNSS as they display their cutting-edge products, KAPLAN-30, the PARS III 8x8 and PARS III 6x6 Tactical Wheeled Armoured Vehicles, the PARS SCOUT 6x6 Special Purpose Tactical Wheeled Armoured Vehicle, the ACV Modernization, and the TEBER-30 Two-Man Turret. Following the initial launch of its design concept in Indonesia, the KAPLAN MT Medium Weight Tank prototype will be showcased for the first time in this event.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, summarised the progress FNSS has made thus far as follows: "In line with the strategic plan we laid out five years ago, we acted proactively by investing in the technologies and capabilities required by both the Turkish Armed Forces and armies around the world. The result was our family of tracked armoured combat vehicles from 15 to 30 tons, capable of responding to different requirements; our family of wheeled armoured vehicles from 4x4 to 8x8; and our family of armoured engineering vehicles that comprises the SAMUR and KUNDUZ. In addition to these already existing families, we are

now preparing to introduce the KAPLAN MT Modern Medium Weight Tank and the ZAHA Amphibious Armoured Assault Vehicle. Furthermore, we also meet our customers' weapon-related needs through our manned and unmanned turrets equipped with 25, 30 and 40 mm weapons. Today, with its wide-ranging product family, and the effectiveness and technology that characterises its products, FNSS stands as one of the world's leading land platform manufacturers."

Concerning the future, Mr.Kurt also gave the following clues indicating a larger FNSS: "In recent times, FNSS took part in various projects involving the design and serial production of the PARS 4x4, KAPLAN 15, ACV 30 and ZAHA vehicles in Turkey. Overseas, it also achieved a new and significant export success with the PARS 6x6 and PARS 8x8. All these accomplishments will, within a period of one or two years, take the company's annual turnover to the region of $500 million. Under our new strategic plan, our goal for the upcoming period is to reach a turnover of $1 billion. We will achieve this both with our current product family and the new platforms we will be introducing to this family. Over the past years, FNSS have shown itself to be a company capable of laying out the right strategies and becoming successful by implementing them. There is no doubt in my mind that the company will once again do the same within the period covered by our new strategic plan."

Kurt's concluding remarks were concerning FNSS' customers – the company's raison d'être: "FNSS is a company which has handled each one of its business endeavours with great diligence and attention since the day it was founded. We add value to our customers, starting all the way from the tender process. And even when we are not the one to win a tender, we know that FNSS' inputs and approaches have the effect of improving the tender's schedule, budget and quality parameters. FNSS is the Turkish Armed Forces' largest supplier in terms all the different parameters, such as the number and types of vehicles in inventory. Moreover, FNSS has always ensured the continuity of its contacts with the foreign countries it is doing business with. Even after the initial contracts are executed, it continues to forge new deals and to maintain its presence in that country through integrated logistic support activities. We are working on joint developments projects for the AV8 in Malaysia and the KAPLAN MT in Indonesia. In Saudi Arabia, we are operating a state facility with our local partner. FNSS offers its overseas clients the best solution for armed forces, as well as the most suitable collaboration models for local defence industries. The prime reason why we are looking to the future with confidence is the satisfaction of our customers. I can confidently state that in the coming period, we will continue to keep customer satisfaction at the highest level."

Mr. K. Nail Kurt - General Manager & CEO of FNSS

The PARS Product Family Passes the Torch to the Third Generation

The development of the PARS product family is a true reflection of the innovative side of FNSS. General Manager and CEO of FNSS, Mr. K. Nail Kurt, “In a rather crowded market with many products, the PARS product family successfully stands out with its innovative features. The vehicle is used both in Asia and the Middle East, which demonstrates its ability to adapt to different environmental conditions and technical requirements. With the PARS III, FNSS clearly demonstrates that it will continue to develop this vehicle family, and that it will continue to provide users with the most up-to-date solutions at all times.”

The PARS III 8x8 and PARS III 6x6 will be showcased for the first time in the IDEF 2017 exhibition, boasting the highest wheel navigation and lowest turn radius of their classes. The two-seat driver’s cabin at the front of the vehicles offers a 180° horizontal field of vision and a high level of driving safety and comfort. Thanks to their armour systems with modular designs, the hulls of the vehicles can be brought up to the specific level of protection required by the user. The hull shape, underbelly structure, base plates and specially developed mine-resistant seats are all designed to protect personnel against high-level mine threats and improvised explosive devices (IEDs). The PARS III 8x8 and PARS III 6x6 offer the protection level of mine-resistant vehicles produced for personnel transport, while also possessing the capabilities expected of a modern armoured combat vehicle. The modular connection of the vehicle subsystems to the mine-resistant hull ensures easy maintenance and replacement. The easy maintenance and easy replacement of moving parts and the power transmission systems, in particular, make these vehicles superior to their counterparts. The power pack architecture, which allows disassembly and reassembly in less than 60 minutes, allows the user to replace the engine in the field as an additional benefit.

PARS SCOUT 6x6: Special Purpose Tactical Wheeled Armoured Vehicle

Continuing to expand its PARS Tactical Wheeled Armoured Vehicle product family with new vehicles, FNSS brings a new breath to reconnaissance and internal security missions with its PARS SCOUT 6x6 Special Purpose Tactical Wheeled Armoured Vehicle (SPTWAV). PARS SCOUT 6x6 differs from other members of the PARS product family with its two-seat cabin at the front of the vehicle, featuring transparent armour (ballistic glass) and a 230° horizontal viewing angle. This cabin ensures high driving safety and situational awareness for the personnel on-board.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, also highlights that PARS SCOUT 6x6 is a special vehicle: "When you have a mature and modular tool at hand, it becomes easier to design different variants for specific needs. The PARS family gives us ample opportunity to do so. The PARS SCOUT 6x6 is actually quite a special vehicle, since it harbours at the same time all the superior qualities of PARS product family. We are confident that our vehicle will meet the special needs of our current and potential customers in the best way possible."

With a power-to-weight ratio of 22 HP/ton, the PARS SCOUT 6x6 can reach a speed of 100 km/h; move through 60 percent gradients and on 30 percent side slopes, and cross 60 cm high vertical obstacles and 120 cm wide trenches. The vehicle has 6x6 and 6x4 driving characteristics, and all of its axles can be locked when necessary. When used in amphibious mode, the PARS SCOUT 6x6 can reach speeds of up to 8 km/s. The hull

shape, underbelly structure, base plates and specially developed mine-resistant seats are all designed to protect personnel against high-level mine threats. The PARS 6x6 SCOUT offers the protection level of mine-resistant vehicles produced for personnel transport, while also possessing the capabilities expected of a modern armoured combat vehicle.

KAPLAN-30: Next Generation Armoured Fighting Vehicle with a High Level of Protection

FNSS is launching the KAPLAN-30 at IDEF'17, the new and more advanced model of its Next Generation Armoured Fighting Vehicle (NGAFV) product family. Compared with the KAPLAN-15 and KAPLAN-20, which are the amphibious members of the KAPLAN family, the KAPLAN-30 draws attention with its high interior volume and high level of protection. Continuing to take heed of its potential customers' requirements and to develop unique technologies, FNSS decided to develop the KAPLAN-30 NGAFV after noting the need for a higher weight vehicle in its class.

Mr.K. Nail Kurt, General Manager and CEO of FNSS, stated that the KAPLAN-30 represents the peak of the ACV class, noting that: "Behind the KAPLAN-30 lies FNSS' over 30 years of experience, as well as its operational know-how resulting from thousands of FNSS-made ACVs. The vehicle we have made is the leader of its class in every way. One of the most important points which makes us proud of the KAPLAN-30 is that we have designed a vehicle that is balanced in all its capabilities, and in which an improvement in any one of its features – such as survivability, mobility, payload and interior volume – has not negatively impacted another. We are fully confident that the KAPLAN-30 will, in the coming period, become one of the significant players of the market."

The vehicle has an average power-to-weight ratio of 20 HP/ton depending on its combat weight, an automatic transmission and the ability to operate jointly with main battle tanks. Moreover, through the integration of different subsystems, the vehicle can execute a broad variety of missions. With its ballistic armour and high level of protection against mines, KAPLAN-30 ensures the highest level of safety to the military personnel on-board. The ground clearance of the vehicle, the floor surface, the seating layout and height have all been designed according to the needed level of protection against mines and improvised explosive devices (IEDs).

The hull of the KAPLAN-30 NGAFV is manufactured from

ballistic materials and assembled using a ballistic welding technique. The power pack cabin and the expanded driver area are located in the front of the vehicle, while the gunner and the commander areas are located in the middle. The personnel carrier configuration can carry eight troops at the rear, while the configuration with the armed turret can carry six personnel. The increased usable inner volume of the KAPLAN 30 NGAFV enables the user to transport more mission equipment and ammunition on-board the vehicle.

KAPLAN-20: New Generation Amphibious Armoured Fighting Vehicle

FNSS continues to be assertive in the ACV class vehicles with the KAPLAN-20, Mr. K. Nail Kurt, General Manager and CEO of FNSS, notes "In recent years, the weight of armoured combat vehicles has increased considerably, especially due to the need for higher survivability. The KAPLAN-20 offers an effective solution in the market, in a different and lower weight class. The fact that our vehicle is amphibious also provides considerable flexibility to the armed forces that might potentially use it. With the KAPLAN-20, FNSS aims to continue the success it had with the ACV."

With the KAPLAN-20 Next Generation Armoured Fighting Vehicle (NGAFV), FNSS carries its ACV class vehicles – which are already serving commendably in the inventories of the Turkish, United Arab Emirates and Malaysian Armed Forces – to the 21st century. The vehicle has an average power-to-weight ratio of 23 HP/ton depending on its combat weight, an automatic transmission and the ability to operate jointly with main battle tanks. Moreover, through the integration of different subsystems, the vehicle can execute a wide range of missions.

The hull of the KAPLAN-20 NGAFV, one of the few vehicles of its class with amphibious capabilities, is manufactured from ballistic materials and assembled using a ballistic welding technique.

The power pack cabin and the expanded driver area are located at the front of the vehicle, while the gunner and the commander areas are located in the middle. The personnel carrier configuration can carry eight troops at the rear, while the configuration with the armed turret can carry six personnel.

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PARS 4x4 Anti-Tank Vehicle to Become the Star of its Class

The PARS 4x4 Anti-Tank Vehicle, which distinguishes itself from other 4x4 vehicles with its engine located at the rear, will continue to turn heads and draw attention to itself at IDEF 2017. Selected by the Undersecretariat for Defense Industries for the Anti-Tank Vehicle (ATV) project to meet the needs of the Turkish Land Forces Command, the PARS 4x4 has been developed to meet the specific and challenging requirements of its intended user. In the ATV project, the vehicle to be delivered in the tank hunter configuration is, thanks to its modular infrastructure, ready for new missions.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, highlights that the PARS 4x4 Anti-Tank Vehicle differs greatly from comparable systems around the world: "Having the engine located at the rear, as well as its mobility and amphibious capabilities, takes this vehicle to a very different class and level. The RCAT weapon system found on the vehicle is a highly effective system against all main battle tanks and heavy armoured vehicles found in inventories around the world. We can say this with full confidence: With the PARS 4x4 Anti-Tank Vehicle, FNSS offers a complete weapon system solution that is rarely seen in the market within the 4x4 category. In the near future, we will see the PARS 4x4 as a vehicle that can also meet user requirements under different configurations."


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In addition to a power-to-weight ratio of 25 HP/ton, the vehicle also fields a low silhouette and amphibious capabilities. The vehicle can operate in deep and flowing water without requiring any prior preparations. The PARS 4X4 is also able to operate on any rough terrain, thanks to its low centre of gravity, fully independent suspension system, ABS-assisted hydraulic disc brakes, low ground pressure, and increased angles of approach and departure. The PARS 4x4 can climb slopes with 70 percent gradient, hold on slopes with 40 percent gradient, and pass over 40 cm vertical obstacles with ease. The vehicle's windows provide ballistic protection in line with user requirements, and are designed to provide a very wide field of vision to both the driver and the crew.

To reduce operating costs, the lifespan of many subsystems was kept the same as the lifespan of the vehicle, during the design process of the vehicle. Thanks to its power pack, which can be dismantled and installed quickly in the field, the vehicle also offers great ease of maintenance and logistic support.

For firepower, the PARS 4x4 Anti-Tank Vehicle relies on FNSS' Remote Controlled Anti-Tank Turret (RCAT). Owing to its compact size and low weight, this turret can be integrated to almost all wheeled and tracked armoured vehicles.

The turret is offered in two configurations, depending on whether KORNET or MIZRAK anti-tank missiles are used. The RCAT enables the gunner to carry


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out surveillance, target detection, identification, recognition, lock-on and missile guidance through the control console, while remaining under ballistic protection within the vehicle.

The RCAT weapon system allows the effective use of the KORNET and MIZRAK missiles on the anti-tank armoured platform at their maximum effective range, and thanks to its modular architecture, other anti-tank weapons can be easily integrated onto the turret.

The turret incorporates the latest technologies in turret drives, fire control system, survivability and firepower. Due to its integrated electro-optical sensors, it can operate night and day, in all weather conditions.

As main armament, the turret can be equipped with two KORNET-E or two MIZRAK-O missiles. The coaxial 7.62 mm machine gun, used as the secondary armament, increases the firepower of the turret, while also expanding the vehicle's range of missions.

KAPLAN MT Brings a New Breath to the Tank Class

Currently under development by FNSS and Indonesian company PT Pindad within the scope of a joint project, the KAPLAN MT Modern Medium Weight Tank will be showcased to visitors in IDEF 2017 with its ready-for-testing prototype. The KAPLAN MT brings a new breath to the battlefield with its accurate direct fire capability, a wide selection of ammunition ranging from close fire support to anti-tank ammunition, and superior tactical and strategic mobility.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, highlights both the capabilities and development model of the KAPLAN MT: “KAPLAN MT is a very special vehicle. In the later stages of the project, when we will show the performance of the vehicle on the field, the effectiveness of this design will be demonstrated more clearly. We are very pleased to develop this vehicle together with our Indonesian partner. FNSS has been successfully implementing different cooperation models for many years. In Malaysia, we are conducting the AV8 project with our business partner DEFTECH. In Saudi Arabia, we are operating a state-owned factory through our joint venture company, FNSS ME. In Indonesia, we apply a different model in which we jointly develop products. With its technology and experience, FNSS is ready to work together with friendly and allied countries under different cooperation models.”

The KAPLAN MT is powered by a power pack at the rear of the vehicle, which delivers a power-to-weight ratio of about 20 HP/ton. The engine transfers this power to the drive system, which has a six-wheel, anti-shock suspension system with double-pinned tracks mounted on torsion bars. The vehicle’s firepower is provided by a CMI Cockerill® 3105 turret, integrated with a high-pressure 105 mm Cockerill gun and an advanced autoloader. Thanks to this turret, the KAPLAN MT has high firepower power despite its relatively low weight.

The interior of the vehicle was carefully engineered by taking into account the ergonomics of the crew and the different tactical and battlefield conditions, including driving, firing and ammunition loading and unloading. Special type of driver seat enables the operator to have adequate field of view, and to access all cabin equipment. The KAPLAN MT is also equipped with a battlefield management system and laser warning system that provides tactical awareness to the vehicle commander.

With high-end mine and ballistic protection for its class, the KAPLAN MT provides adequate firepower against battlefield threats with great speed of response and within a short period of time. This, in turn, ensures superior survivability and mobility on the battlefield.

TEBER-30 Two-Man Turret to Become the new Point of Reference its Field

The TEBER-30 Two-Man Turret developed by FNSS is set to become the new point of reference for manned turrets used in armoured combat vehicles. Incorporating the latest technologies in turret drives, fire control, protection and lethality, the TEBER-30 turret can function night and day in all weather conditions and battle environments, thanks to its integrated sensors and other electronic systems. The turret's modular structure also provides a basis for future configuration changes.

The TEBER-30 Two-Man Turret demonstrates how manned turret can still be effective: K. Nail Kurt, General Manager and CEO of FNSS, noted that "Certain countries continue to prefer manned turrets. In line with its goal of meeting, in the best way possible, the requirements of very different customers from across the world when developing products, FNSS has designed a manned turret that is the best of its class. The TEBER-30 Two-Man Turret clearly demonstrates that cooperation between man and machine can be achieved effectively and ergonomically, with a high level of protection."

The TEBER-30 Two-Man Turret combines all the advantages of manned turrets with technological solutions and an ergonomic design. Within the turret, the commander and gunner are seated in a conventional configuration, inside the turret basket. Both the gunner and the commander can control all functions of the turret. In addition, thanks to the manual backup system, the gunner can steer the turret on the traverse and elevation axis in cases of emergency and fire the weapons.

As its primary armament, the turret carries a 30 mm calibre, Mk44 dual feed automatic cannon with a rate of fire of 200 rounds per minute. The turret has two compartments storing 300 ready rounds in total. The modular design of the ammunition box and chutes enables the use of

SuperShot 40 mm (40 x 180 mm) ammunition. The calibre of the primary armament can thus be raised to 40 mm. Secondary armament consists of a 7.62mm Mk52 or 7.62 machine gun with 1,000 ready rounds.

Equipped with an electric drive system as well as two axis stabilization to increase the hit ratio while moving, the turret can turn 360 degrees on the traverse axis without limitation, at a minimum speed of 60 degrees/second, while its weapons can be used between an elevation axis of -10 to +45 degrees.

TEBER-30 Two-Man turret has an advanced fire control capability with the help of its on-board fire control computer and two axis stabilised independent sight system. The system generates a kinematic lead solution to increase the first-round-hit probability for stationary and moving targets, thus ensuring a more efficient utilisation of ammunition. The independent systems used by the commander and the gunner also provide hunter/shooter capabilities to the turret.

The shell of the TEBER-30 Two-Man Turret is made of all-welded aluminium armour with add-on composite and steel armour that provide a high level of ballistic protection.

TEBER-30/35 Remote Controlled Turret: Low In-Vehicle Signature and High Firepower

The TEBER-30/35 Remote Controlled Turret (RCT) provides high firepower to armoured combat vehicles without having a turret basket extending into the vehicle. The commander and gunner control the turret from one of the consoles inside the vehicle, leaving a considerable amount of space for personnel and other equipment.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, emphasized that the TEBER-30/35 RCT includes all the features expected from an unmanned turret: "In addition to being unmanned, the TEBER-30/35 RCT and enables reloading from within the vehicle, thus increasing operator safety to the highest level. FNSS has considerable know-how on unmanned turrets, which is a relatively new type of product on which various parties often express a lack of knowledge and experience regarding its operational concepts. We therefore offer an effective and competent solution to the user that includes our technology and experience."

The TEBER-30/35 RCT can be equipped with 30 and 35 mm main armaments. In its 30 mm configuration, the turret fields a double-feed Mk44 automatic cannon firing 30x173 mm ammunition at 200 rounds per minute, and can store 250 ready rounds in total. In the 35 mm configuration, it is equipped with a double-feed automatic cannon firing 35x228 mm ammunition at 200 rounds per minute, and can store 100 ready rounds in total. Another important feature of the 30 mm configuration is that, owing to its compatibility with the SuperShot 40 mm (40 x 180 mm) ammunition, it can be upgraded to field a 40 mm calibre main armament.

In both configurations, the secondary armament consists of a 7.62 mm Mk52 or 7.62 mm machine gun, with 750 ready rounds.

The most critical feature of the TEBER-30/35 RCT is that it allows the reloading of ammunition from inside the vehicle under high armour protection. This feature eliminates the need for crewmen to leave the vehicle to resupply ammunition under battle conditions, thus increasing personnel safety.

Equipped with an electric drive system as well as two axis stabilization to increase the hit ratio while moving, the turret can turn 360 degrees on the traverse axis without limitation, at a minimum speed of 60 degrees/second, while its weapons have an elevation axis between -10 and +45 degrees.

The on-board fire control computer and two axes stabilised independent sight system grants the turret an advanced fire control capability. The system generates a kinematic lead solution to increase the first-round-hit probability for stationary and moving targets. The turret also features a two axis stabilised 360o panoramic commander's sight with thermal camera, day camera and laser range finder on the top plate, as well as hunter/sharpshooter capabilities. TEBER-30/35 turret shell is made of all-welded aluminium armour with add-on composite and steel armour providing ballistic protection up to STANAG 4569 standard.

ACV-15 Modernization and Life Extension Solutions by FNSS

Standing behind its products that are in inventories throughout their life cycle, FNSS is also ready to carry its first products, the Armoured Combat Vehicle (ACV) and Improved Armoured Personnel Carrier (IAPC), to the future. Taking into account the evolving needs and newly emerging threats, FNSS will be demonstrating a prototype vehicle in IDEF 2017 on which it applied the comprehensive modernisation package it prepared for the ACV and IAPC vehicles. With this modernisation package, it financed entirely with its own resources, without there being an official project associated with this endeavour, FNSS clearly sends the message that it always stands by its products.

There are nearly 2,650 FNSS-made ACVs and IAPCs currently serving in the Turkish Armed Forces and the Armed Forces of the United Arab Emirates, Malaysia, Saudi Arabia, Bahrain and the Philippines. Deliveries began in 1991, with the last of these vehicles being delivered to the Turkish Armed Forces in 2004. The ACV and IAPC, which can operate independently or together with tanks, still constitute the backbone of Turkish infantry forces.

These vehicles have recently been used in various operations, and FNSS has been working for some time of modernisation packages to improve their survivability, situational awareness, firepower and mobility of these. With this modernisation package, prepared by taking user feedback into account, the aim is to update the vehicles according to the changing threat landscape, to increase their performance, and to lengthen their lifespan, such that they may serve better during their time in the inventory.

The main features of the modernisation solution prepared by FNSS are listed as follows:

- Survivability: Priority given to the enhancement of mine and ballistic protection levels, mine resistant seats, protection lining (spall liner) applications, dual-stage automatic fire extinguishing and suppression systems, an NBC System with new indigenously produced filters, air conditioning for the crew, and the RPG protection net.
- Situational Awareness: Close range situational awareness system, acoustic gunshot detection system and laser warning system.
- Firepower: Remote Controlled Weapon System (RCWS) with integrated acoustic gunshot detection system, and improvements on existing firing systems.
- Mobility: Improvement of drive systems and power pack.


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While putting together its modernisation package, FNSS focused on criteria such as ensuring savings by keeping costs low and making use of joint logistics support.

Mr. K. Nail Kurt, General Manager and CEO of FNSS, highlights FNSS' modernisation capabilities as follows: "FNSS is one the world's most experienced companies in the modernisation of ACV and IAPC class vehicles. For a long time, we have been operating a state-owned facility in Saudi Arabia together with our local partner, where we modernise the M113 vehicles in Saudi Arabia's inventory. Among M113s around the world, these vehicles stand out as the most modern and highest performing ones. The user is also very satisfied with the modernisation we call the M113A4. We are now adapting this experience, as well as the know-how and technology we acquired while developing new vehicles, to the ACV and IAPC. We offer the best solution from technical, cost and schedule standpoints. The vehicle we showcase at IDEF 2017 also bears an important message: Even after 27 years, FNSS continues to stand behind its products. "


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Leonardo - Credible Partner for Turkey's Ambitious Industrial and Technological Growth Strategy

In this exclusive Defence Turkey interview, Leonardo's Mr. Giovanni Soccodato, Executive VP Strategy Market and Business Development discusses the company's success as an international player, their expertise in technology transfer and their focus on staying attuned to national requirements of its customers. Mutual benefit between Italy and Turkey founded on trust and good industrial relations has paved the way for a solid future

Defence Turkey: Mr. Soccodato first of all could you please inform us about your strategies and future plans for the Turkish Market?

Commercial and industrial presence and strengthening of technological partnerships with Turkish Companies are the pillars behind Leonardo's strategy in Turkey. Our priority is to further improve the existing strategic cooperation with the Turkish Defense industry also involving the Small and Medium Enterprises (SMEs). We want to invest together with Turkish Companies not only for returns in the domestic market, but also to jointly challenge new foreign markets.

We have recently rationalized our commercial presence in the Country through the concentration of all our activities in the Leonardo office in Ankara. The new organization will allow the main Turkish stakeholders to have a single counterpart and will grant the implementation of an integrated commercial strategy that will enable us to pursue, in a wider context, the main business opportunities offered by the Country. In addition, we intend to strengthen our industrial presence through support to Selex ES Elektronik S.A, which has been operating in the Country for over 30 years.

Defence Turkey: What is your assessment of the Leonardo partnership performance with various Turkish companies over the years?

Leonardo considers Turkey as a main technological partner rather than a sales market. To this end, the Group is implementing important programs with the major Turkish industries, and it is important to remember the involvement of many Turkish SMEs these programs and in the projects we develop in the Country. The result of this collaboration is definitely positive, taking into account the high technological complexity of the activities jointly developed. The criticalities that have emerged in some cases have always been overcome in a mutual trusting way.

C-27J Aircraft

The "Atak" program is the most known example of a fruitful collaboration: the T129 is a formidable multi-role combat helicopter, based on the combat-proven AW129, developed by TAI, with the key contribution of Leonardo Helicopters and Aselsan, for Turkey and it is also suitable for the export market.

Whereas the most recent success has been signed with the Göktürk program, for which our joint venture Telespazio (Leonardo 67%, Thales 33%) is the prime contractor and integrator of the system, delivering the ground station that includes mission control capabilities, orbital satellite management, and data acquisition and processing systems. The Göktürk-1 satellite was successfully launched on Dec 5, 2016 and is now operated by the Turkish Air Force.

Defence Turkey: Due to your off-set obligations in Turkey, could you please share with us a bit about the accomplished commitments up to date? What are your future plans to enhance this partnership in Turkey?

Leonardo is an international player attuned to answer national requirements of its customers and has developed and consolidated business models and an expertise in technology transfer that guarantee the maximum return to its customers. We have a track record of successful programs developed in Turkey, which include technology transfer, industrial partnerships, commercial agreements as well as the fulfilment of offset obligations. We therefore believe we can be a credible partner for Turkey's industrial and technological growth strategy from security to advanced electronics and defense.

Defence Turkey: Leonardo intends to be involved in Liaison and the General Utility Aircraft tender in Turkey with the Spartan C-27J aircraft. Could you please elaborate on the outstanding features and your approach to this project?

The Turkish Land Forces and the Turkish Police are looking for new assets needed to enhance their mobility and capability to support critical operations, but at the same time flexible enough to be used also for operations to support humanitarian crises, Medical Evacuation Missions (MEDEVAC) and also capable of VIP and passenger transport.

These requirements may appear simple at first, but a cargo aircraft that could have been considered satisfactory for those roles just 5 years ago, today would be in trouble if used in real operations.

We strongly believe that the best solution for the Country is Leonardo C-27J because, among the others, it has been designed, developed and tested as a military aircraft, and also has obtained civil certification from EASA / FAA in 2010.

An important evaluation point for a new GMU aircraft will be the capability of the aircraft to operate in true operational scenario: Turkey does not need just a "cargo" but a highly cost effective aircraft, capable of being quickly reconfigured to perform a high number of alternative missions, while retaining its primary role of tactical airlifter. Moreover, it is the only one that can grant interoperability with heavier airlifters like the C-130 and the A400M, as it can carry the standard 463L pallets at full capability. Vehicles can be unloaded from heavier airlifters, loaded on the C-27J and delivered straight to the frontline and austere forward operating bases without repackaging, dismounting parts or deflating tires, increasing safety and mission success.

The Spartan has an unrivalled ability to perform short take-offs and landings (STOL) on snowy, sandy and unprepared airfields. And it is certified to do so. Compared with other military transport aircraft in its class, the C-27J has the best descent and climb rate (4000 and 2,500 ft/min) and can also perform 3 g tactical manoeuvres, minimizing its approach phase and reaching a safe altitude more quickly in high threat scenarios.

The Spartan is qualified for extreme temperature conditions and it is capable of carrying its load in very hot and high conditions as already demonstrated in real operations.

One fundamental feature of the C-27J is its APU, Auxiliary Power Unit, that make the aircraft fully autonomous in operations, also when deployed on remote, austere airfields (important for both the Land Forces and the Police) or when involved in disaster relief operations in hard hit areas, where ground infrastructure and equipment could be damaged or not available. The aircraft's APU (Auxiliary Power Unit), is fundamental also for flight safety as it can restart the engines in flight or be used as an alternate source of power in case of a problem with an engine. To summarize, the C-27J goes faster, farther, heavier and safer. In total, 82 airplanes have been ordered so far.

Defence Turkey: TAI and BAE Systems are signed a head of agreement contract at the beginning of the year. As we are aware, Leonardo is eager to be involved in this program with the wide range of critical systems. Could you please share some details about your activities?

Thanks to its multinational roots and extensive international program experience, Leonardo can leverage deep ties with all major international aeronautical primes. With BAE Systems, we share a successful story that spans five decades of breakthrough programs from the British trainer Hawk to European programs like Tornado and Eurofighter where our collaboration covered the airframe, sensors and on board electronics up to the training element. We also take pride in the partnership established with the Turkish leading company TAI, that evolved from a supply contract into an industrial and commercial partnership that is starting to produce its results on the export markets. More importantly, this collaboration has allowed Leonardo and TAI to develop positive personal relations across the organizations and has given us a better understanding of the Turkish working environment, mind-set and industrial ambitions. With this background and our world leading products and technologies, we believe Leonardo has all the credentials to be involved in any aeronautical program that will be launched by the Turkish government.

Defence Turkey: We know that Leonardo Helicopters have

C-27J Aircraft Cabin

been in the Turkish Helicopter Market for many years, what are your plans for Future?

Leonardo Helicopter Division has a long-lasting collaboration in Turkey dating back to the 1970s with various helicopter models. As of today, with TAI as the prime contractor and Leonardo being a key partner in the ATAK program, twenty one T129s have been delivered to the Turkish Land Forces. The success of the T129 Program is very valuable for us and offers significant export potential.

Beyond the T129 Program, we are very keen to continue working together with our Turkish Partners for further collaboration to meet the Turkish End Users requirements with our comprehensive product range.

Defence Turkey: Selex ES Turkey, a subsidiary of Leonardo has been conducting activities in Turkey for many years but it has been observed that the performance of this facility has not been sufficient for quite some time. Do you have any plan for Selex ES Turkey to become a hub to reach out to new markets?

For almost three decades, we have been operating in Turkey with a locally established operating company, Selex ES Elektronik S.A. The company is focused mostly on the development and delivery of communications systems, as well as in the support to contracts secured in Turkey across a wide range of applications, including the new Air Traffic Control (ATC) system acquired by Turkey's General Directorate of State Airports (DHMI), a key milestone in Turkey's SMART project (Systematic Modernisation of ATM Resources Turkey), and the new Vessel Traffic Management System (VTMS), installed in Izmir.

Leonardo's industrial plan, launched in 2015, set down clear guidelines and objectives in terms of performance and quality improvement, and this also affected Selex ES Elektronik S.A. In recent years, the company has significantly grown all its KPIs and we are confident we will be able to leverage its potential as a hub to promote our integrated capabilities as well as a base to develop new commercially attractive technologies and products for the export markets, together with local industries.

Defence Turkey: Turkey already possesses its indigenous Tactical and MALE Class UAV Systems and these systems are already combat proven. Within the light of these achievements, are you open to the suggestion of joint development or different business models with Turkey?

Remotely Piloted Air Systems (RPAS) are the frontier of technological innovation in security and defense and the results that Turkey has achieved are remarkable. Leonardo is the European company

with the widest and deepest understanding of RPAS systems, including the platform, the sensors, mission systems, ground segment and training elements. This understanding is based on proprietary market proven technologies and products and increased through the involvement in all major international UAV programs. In the light of this, we believe we can be a natural candidate for future collaborations on unmanned technologies with the Turkish government.

Defence Turkey: Turkey and Italy have accomplished a successful partnership within the ATAK program as well as the fact that Italy has fulfilled the commitment of technology transfer in this program. Thanks to this heritage, will you keep same approach for the up-coming potential joint programs?

Leonardo is assessing the possibility of additional cooperation areas based on the good results already achieved so far in the ATAK program, and it is looking at other opportunities for the whole family of new generation helicopters (the AW169, AW139 and AW189 types) and the AW101 to meet a variety of operational requirements. Surely, the same approach can be evaluated for other programs, in the Aeronautics sector, for example. As already highlighted, we strongly believe in the value we can share with Turkish industry, and in a win-win approach on which to base the roots of new partnerships.

Defence Turkey: As it is well known that former OTO Melara made sound achievements in naval projects in Turkey. Could you please inform us about activities performed over the years in Turkey? What is your approach to the new naval projects like MILGEM 5-8, TF-2000 (Anti-Air Warfare Frigate) and Turkish Type Fast Patrol Boat?

Almost 30 OTO 40L70 Twin Compact naval guns have been delivered:

9 Kılıç FPB, 16 Tuzla class patrol boats of TN while the Coast Guard has also adopted it on four of their search and rescue units. Another version of Leonardo 40mm naval guns, the Single 40L70 Fast Forty is currently being delivered to the Turkish Navy for its four LST ships. Leonardo Defense Systems (gathering former OTO Melara and WASS) also completed the supply of six 30mm guns to equip the Aydin class minehunters.


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As for the new Turkish Navy programs, the OTO 76/62 Super Rapid Multi-feeding has been selected for the MILGEM – I (5 to 8), meanwhile an option for the STRALES system operating the DART guided ammunition is also under evaluation. The 76/62 Super Rapid Multi-feeding with STRALES option is proposed for the new Turkish Type Fast Patrol Boats, which is targeting the acquisition of up to ten units. For the TF-2000 program, Leonardo is promoting the OTO 127/64 LW. In this project, Leonardo is facing the BAE Mk45 5" gun, which is already in service on board the eight Yavuz and Barbaros frigates. In this competition, Leonardo is leveraging the capability to operate 127mm Vulcano Guided Ammunition, the sole available technology capable of achieving such performance in extended range and pinpoint accuracy.


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76mm STRALES

Defence Turkey: Lastly, are there any remarks that you would like to share with the readers of Defence Turkey Magazine?

Leonardo's success in Turkey is the result of a commercial model that effectively understood and responded to the ambition of the Country to develop an autonomous Defense Industry.

This model has been able to recognize the high level of abilities and skills of the local Industry and to support its technological growth through a concrete transfer of technology, and was undoubtedly fundamental to the cooperation for the development of the ATAK helicopter and more recently for the satellite Göktürk-1. Based on these references, we expect new opportunities of cooperation which will, once again, benefit from both good industrial relations and trust between our Countries.

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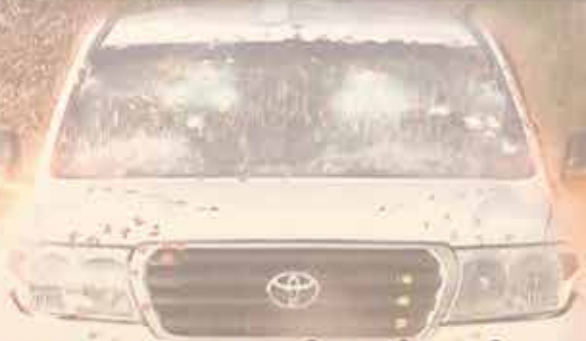

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Grup Impeks is Targeting to Double its Export Market Share in Africa & Middle East with its new Facility Investment

"In order to maintain continuity for specific products you have to follow the latest developments and keep yourself updated. While getting prepared for IDEF'17, we are looking for to meet major players of the defense industry and to expose our products for new markets."

Grup Impeks Ltd. Company is a full-fledged Foreign Trade Company, rendering services to all markets in terms of procurement and logistics. In preparation to attend IDEF'17 with R&D generated products of Ballistic Equipments and Full-featured Uniforms of tactical and operational usage, we are ready to display our own Ballistic product ranges from our newly established factory in Turkey finally.

"Grup Impeks is planning to export 2/3 of its production."

With the support of Turkish Exporters Assembly and Turkey's vision for 2023 we are about to establish our R&D Center and we believe that following those investments our export figures will increase each year. The Defence Industry and Security sector is growing rapidly by chancing of political conjuncture and the conflict atmosphere of the world, so requirements for Defense systems are increasing. We strongly urge that advanced technologies should come along as priority. We are about to a growth of wide range of our continuous products along with new ones to be exported all African Markets, Middle East of; Saudi Arabia, UAE, Qatar; and to Southern Europe; Macedonia, Albania, Croatia, Germany and Russia with full range of Military, Security and Police Equipment, Corporate designs for all kinds of uniforms and work clothes, Ballistic Equipment & various Medical Kits, all types of Textile, FMCG, Retail, Industrial Machinery & Spare Parts, Dry & Innovative Food and Turnkey Projects with operation, logistics and transportation services.

"In this context IDEF'17 fair is very important for our company not only to reach new markets but also to show our clients and to all visitors, the level of competency that Turkey has reached and the technology has been achieved."

The development and growth of our sector and each investment made to this end will be a source of success for us on behalf of our customers. As the military forces around the world become increasingly sophisticated and the Defence Industry is a key strategic sector which constantly grows and bodes well for our country's future, we are and we will always proud to be part of it.

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Furthering Exports – Building International Recognition for Turkey's Defense and Aerospace Industry

By Latif Aral Aliş, Chairman - Defense and Aerospace Industry Exporters' Association

The Turkish defense and aerospace industry is now designing, developing and producing the most critical products of the defense industry, from unmanned aerial vehicles to communication and observation satellites, from helicopters to trainer aircrafts, from battleship to infantry rifles, from modernization projects to command and control systems. It is meeting the requirements of the Turkish army and security forces. However, in today's world the borders of Turkey should be surmounted, by exporting our premium products. Not only Turkey's needs should be met but also export performance should be increased.

Our defense and aerospace industry with its almost 2-billion-dollar export performance stands tobe one of the most important export figures of Turkey. Our sector which aims to achieve 25 billion dollars in exports by 2023 managed to end the year with a growth rate that was beyond Turkey's average compared to the previous year. In 2016, our sector reached $1 billion 678 million in export performance.

Today, Turkey stands out as a country that is producing its own satellite, drone, trainer aircraft, helicopter, infantry rifle, battleship, armored military vehicle, missile and rocket system; developing simulation and software; cooperating in globally recognized projects like F35 and A400M; building a satellite production test center; working on the construction of the satellite launch center and initiating genuine helicopter projects, with its qualified labor force, research institutes, R&D laboratories, SMEs and huge companies.


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International cooperation is necessary in order take part in global competition; and being recognized is necessary for international cooperation. You can produce very good and perfect products without failure on the production calendar but unless you are recognized or known, nobody will be aware of you. This is precisely why prestigious fairs, with broad participation, such as IDEF 2017 International Defense Industry Fair, embody huge opportunities for us. By hosting this fair, we will show the world the high level of achievement reached by the Turkish defense and aerospace industry.

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Roketsan- The Address at IDEF for Innovations in Rockets, Missiles and Munitions

Roketsan, one of the world's leading rocket, missile and guided munitions companies, will showcase its broad variety of products to visitors at IDEF 2017. Developing effective products for every segment in the field of rockets, missiles and munitions – from the KHAN Missile to fuse systems, and from the SOM Stand-Off Munitions family to MAM Smart Munitions – Roketsan will also exhibit at IDEF the solutions it offers in niche areas, such as ballistic armor and munitions facilities.

Roketsan not only develops its own indigenous technologies that set the new standards in its areas of activity, but also supplies effective and immediate solutions to customers dealing with global threats, particularly to the Turkish Armed Forces. Roketsan's products enjoy two features that further enhance the level of interest they generate: advanced technology, and the fact that they are proven in the field. For this reason, it is expected that in IDEF 2017, where Roketsan intends to participate with a strong presence, the company's stand will be visited by every group closely following the latest developments and innovations in the field of missiles, rockets and munitions.

Products to be exhibited for the first time at Roketsan's stand include the KHAN Missile, TRG-122 Missile, TRG-300 KAPLAN Missile and the MAM-C Munition. As the newest member of Roketsan's artillery missile family, the KHAN has a diameter of 610 mm and weighs 2,500 kg. The KHAN is a solid-fuel missile with a 470 kg warhead that is guided to its target using the Global Navigation Satellite System (GNSS) and Inertial Navigation System (INS). The launch vehicle of the missile can carry two KHAN missiles, each housed in its own isolated composite pod. The MAM-C, on the other hand, is another addition to Roketsan's successful and proven smart micro munitions (MAM) product family.

Mr. Emin Alpman - The Chairman of the Board at Roketsan

Striding Confidently Towards the Summit

Employing 2,268 personnel in total, Roketsan's team has over 1,000 engineers, as well as 568 staff with postgraduate degrees and 58 with doctorate degrees. The company concluded 2016 with a turnover exceeding ₺1 billion, while its R&D expenditure in the same year was in the region of ₺269.9 million.

Roketsan arrives at IDEF 2017 after passing several important milestones in 2016 and the first few months of 2017:

- The TRG-300 TIGER Missile System has been delivered to the Turkish Armed Forces.
- The MAM-L entered the Turkish Armed Forces' inventory.
- Test fires were successfully performed with the HİSAR-A and HİSAR-O Missiles. The first double-pulse engine developed by Turkey also proved itself during these tests.
- Line qualification works for the SOM Serial Production Project have also been completed, while deliveries are currently on going.
- Roketsan has successfully completed tests on the TEBER Laser Guidance Kit, which it developed with its own resources and applied to the MK-81 and MK-82 General Purpose Bombs.
- The TRG-122 Rocket successfully completed its prototype testing. There is now ongoing work for the qualification of the product.
- Product and production line qualifications for the OMTAS have been completed.
- During the "HÜRKUŞ Aircraft L-UMTAS Firing Demonstration" carried out at Karapınar, Konya, the Laser-Guided and Long-Range Anti-Tank Missile L-UMTAS developed by Roketsan was successfully fired for the first time from the HÜRKUŞ – the trainer and close air support aircraft developed by TAI under a project initiated by the Undersecretariat for Defence Industries.
- RS-RPG-10 Statistical RPG Protection Systems, which have been developed by Roketsan Ballistic Protection Centre, have been applied to various armored vehicles in Turkey and abroad.

Emphasising that IDEF 2017 represents a very good opportunity to demonstrate the direction in

which the company is heading, Emin Alpman, Chairman of the Board at Roketsan, noted: "As an organization affiliated with the Turkish Armed Forces Foundation, Roketsan is an important asset for Turkey. At IDEF 2017, we will proudly display our work and achievements to the President, the Prime Minister, the Commander of the Turkish Armed Forces, the Minister of National Defence, and other high-ranking state officials. At every IDEF event, Roketsan showcases its development and progress through new technologies and products. In line with our Roketsan 2035 Vision Document, we are working to carry Roketsan to even higher levels. During this process, we aim to advance along with our fellows, solution partners and subcontractors. To acquire new business partners from all across Turkey through various activities, we not only describe our work and ourselves, but also listen to what's being done by companies that can potentially become our solution partners. In IDEF 2019, we'll take part with an even larger product family and new achievements and continue to do more than our best to spread the industrialization to a broader base, especially Anatolia."

Roketsan appears before its customers with the successful products it delivered in the past and with technologies whose intellectual property rights entirely belong to the company. It certainly doesn't present them with solutions that are confined, unchangeable and inflexible. We listen to our customers to understand their needs, assess their infrastructure, and develop tailor-made solutions for them. Both the Turkish Armed Forces and the countries friendly and allied to Turkey are highly pleased with Roketsan's approach. We are diversifying and improving our solutions in accordance with our customers' needs. Thanks to these efforts, we will, in the near future, be announcing to the rest of the industry new export projects that will contribute to Turkey's ambitious 2023 targets. I would like to invite all participants at the exhibition to Roketsan's stand, to see the latest innovations in rockets, missiles and munitions."

Roketsan showcases related products and cutting-edge technologies at IDEF' 17 as follows;

SOM, SOM-J, HİSAR-A, HİSAR-O, CİRİT, UMTAS, L-UMTAS, OMTAS, TEBER, MAM-L, MAM-C, Control / Propulsion System for Patriot Guidance Enhanced Missile-Tactical (GEM-T), KHAN Missile and Launch Vehicle, TRG-300 TIGER Missile and Launch Vehicle, TRG-122 Missile, T-122/300 Weapon System, T-107/122 Weapon System, PMC Vehicle (Pedestal-Mounted CİRİT),Antisubmarine Warfare (ASW) Launch System and Rocket, ASPIDE Rocket Engine,TESEO Rocket Engine, Base Bleeding Unit,Miscellaneous Fuses,Ballistic Protection Systems

Roketsan Unveils new KHAN Missile System at IDEF' 17

Turkish Leader Missile Manufacturer, Roketsan will reveal novel product, the artillery missile KHAN system, in IDEF exhibition.

The Artillery Missile KHAN (with 610 mm diameter), designed and produced by Roketsan, is a ground to ground missile which can provide mass fire power on high payoff targets within area of influence of the army. KHAN Missile provides fire support to manoeuvring units by creating timely, accurate and effective firepower.

KHAN Missile is able to hit targets accurately with its inertial guidance system or its GNSS supported inertial guidance system. KHAN Missile is placed inside a canister and it is stored, transported, loaded and launched in Missile in Canister (MIC) configuration.

KHAN Missile can be launched from Roketsan made KHAN Weapon System and other compatible platforms with suitable interfaces for integration.

The Launcher is used to fulfill fire support missions for maneuvering forces against area/high pay-off targets, day & night and in adverse weather conditions. The launcher platform is integrated on an 8x8 Tactical Wheeled Vehicle (TWV) that has superior on-road and off-road travel capacity as well as a strong structure providing a reliable platform.

The Launcher is also a deterrent force due to its long range and mass fire capabilities. It is therefore ready for vital tasks in a very wide array of missions from peace support operations to the attack with fire missions in addition to standard tactical missions for the support of a maneuvering force.

The Launcher has shoot-and-scoot capabilities enabled by navigation, automatic hydraulic leveling & stabilization and automatic cradle laying capabilities integrated to the weapon management system.

The Launcher is equipped with the necessary mechanical, electrical and electronic sub-systems to perform various steps required (mission planning, deployment, ballistic calculation, laying etc.) in order to conduct a fire mission, either under command of Command & Control Vehicle or individually. The system can be customized in different versions, which have different sub-systems including platform (vehicles), radios, power sources, navigation system etc., in various brands and models according to the user's logistical infra-structure and needs.

Due to the fully automatic weapon control, navigation and laying systems, the Launcher has a crew of maximum three, consisting of a commander, a gunner and a driver.

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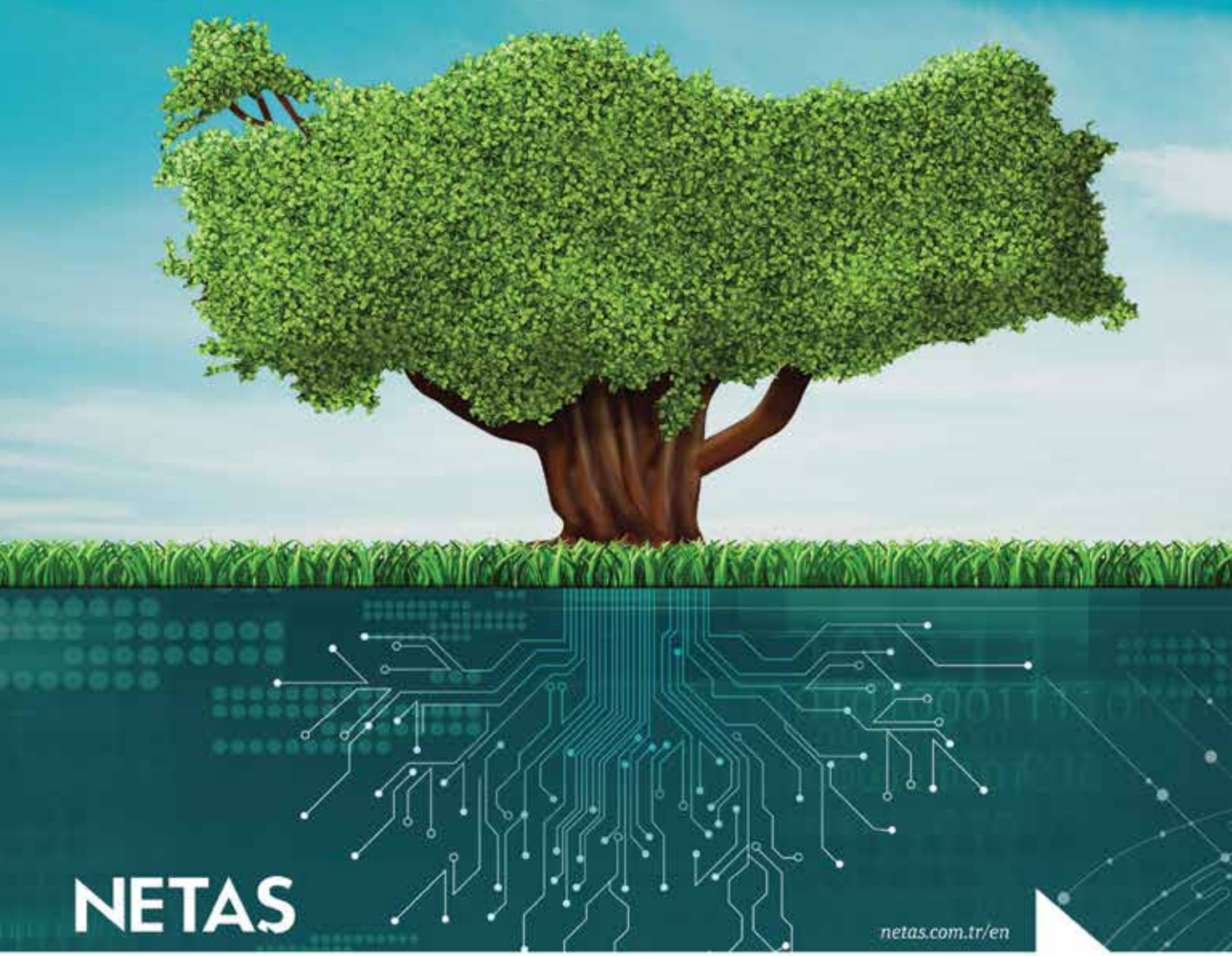

NETAS

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Thales, an Ideal Partner for Turkey - Technological Cooperation Addressing Local and Export Markets with Turkish Industry

In an exclusive interview, Thales Group Turkey Country Director Mr. Ali Serdar Baran discusses Thales' broad product and technology portfolio in the defense sector

Defence Turkey: Mr. Baran, as Thales Country Director in Turkey, how do you assess Thales's activities and presence in Turkey?

We have been present in Turkey since 1987 and now have 115 employees. Our principal activities include the major defense projects (TRS 22XX radar, Meltem aircraft, Genesis Combat Management System, SMART-S radar), ground transportation projects (Ankara-Istanbul High Speed Line Phase I & Phase II, and Kadıkoy-Kartal Metro), aerospace projects (In Flight Entertainment and Navaids), and space projects (Turksat 1A, Turksat 1B, Turksat 1C, Turksat 2A, Turksat 3A and Göktürk-1).

During this period, we created two engineering companies in Turkey; Yaltes in defense and Thales Ulasim in ground transportation. Both companies have software, hardware and maintenance capabilities and have quickly gained the confidence and recognition of Turkish customers. We are proud of it. Our presence since 1987 demonstrates our confidence in Turkey.

Defence Turkey: Could you give us any details on collaborations undertaken with Turkish defense industry companies?

During our 30 years of presence in the country we have built very valuable cooperation with local industry in the public and private sectors through the implementation of our major projects mentioned previously.

We have launched cooperative initiatives with Aselsan, Havelsan and TAI through the Meltem project. This has been extended to areas including Combat Management Systems, radar, avionics and satellites. In addition, we have several export success stories with Turkish platform manufacturers. Our brand in the defense domain is one of the strongest in the world. When it is combined with the excellent platforms of Turkish industry and Turkish shipyards, the result is a powerful platform for both domestic and export markets.

Another example of our international collaboration aimed at addressing growing markets such as coastal defense is the Aselsan Missile Launch System (MLS) with our Lightweight Multirole Missile (LMM).


© Defence Turkey

Our successful experience in cooperating with Turkish companies encourages us to develop more export opportunities with them.

Defence Turkey: Could you please inform us about your Space capabilities?

For more than 40 years now, Thales Alenia Space has designed, integrated, tested, operated and delivered innovative space systems. Our cutting-edge products and services meet the needs of commercial and government customers from around the world, spanning the space, defense, science and security markets. Thales Alenia Space's satellites and payloads are recognized worldwide as benchmarks in delivering communications and navigation services, monitoring our environment and the oceans, better understanding climate change and supporting scientific research. Today, Thales Alenia Space is one of the main suppliers to the International Space Station, and a pivotal player in systems to explore our Universe.

Thales Alenia Space's huge experience in the Space domain paved the path to COSMO-SkyMed the first Earth Observation Satellite System in the world to be conceived and developed since the beginning for full dual application (where a civilian requirement joins a military one).

Defence Turkey: TF-X Indigenous Fighter Aircraft Program is one of the major programs on Turkey's agenda. Could you please inform us about your activities within the concept of this program?

For combat aircraft platforms, we provide a complete package of electronics to meet our customers' needs for tactical situation assessment. As a result, our customers are better equipped to:

- Assess incoming threats,
- Detect and to identify air and surface targets at short, mid and long-range,
- Engage in reconnaissance,
- Fuse data from different sensors for a complete picture of the battlefield,
- Prevent detection by enemy forces through jamming and decoying.

Thales is the only company in Europe who can fulfill all the technological development needs (Integrated Electro Optical System, Integrated RF System, Integrated Processing Unit, Advanced Warfighter Cockpit Technologies, Integrated Communication and Navigation System, Helmet Mounted Display, Electrical Systems and many more) of the Turkish Fighter Aircraft TF-X project.

Thales confirms its willingness to:

- Discuss further with Turkish Aerospace Industry the possible working methodology to build up a mutually beneficial business model,
- Scope the budget based on technology approach, architecture and cooperation scheme to be decided for the TF-X project.

Defence Turkey: Turkey also has several significant ongoing naval projects for the period ahead such as the mass production of MILGEM 5-8 vessels. Could you tell us more about your naval capabilities?

© Defence Turkey

Thales is proud to have supported the Turkish Navy for more than 35 years and we are continuing support to our valued customer. As a demonstration of our commitment, we are preparing a maritime services office through its Turkish subsidiary YALTES in order to support legacy Thales equipment.

We also value our co-operation with local industry; as an example may I emphasize the licensed production of SMART-S with Aselsan for the Turkish market, and where feasible, the export market. In addition, several Aselsan-produced elements are contained in Thales exported SMART-S systems.

Thales Naval capabilities stretch across the complete naval sector, ranging from surveillance and fire control sensors, sonars, electronic warfare systems, up to combat management systems and complete turnkey integrated Naval mission solutions. Currently more than 50 navies sail with Thales equipment on more than 500 vessels.

In addition, Thales fully supports the export opportunities of the Turkish platform providers, in a well-balanced Turkish-foreign companies approach.

We wish to continue our good and supportive relationship with the Turkish Navy and industries for many years to come and provide solutions and technologies matching the requirements of the Turkish Navy as well as the Industrial Participation & Offset requirements of the Turkish government.

Defence Turkey: Cyber-attacks aimed at national infrastructure are on the rise globally and are becoming a serious threat. This has sparked significant investments by nation states to bolster their defenses. Turkey has been developing a road map to tackle this new threat. What are some of the group's activities in this area which could benefit Turkey?

Cybersecurity is one of our main pillars. Thales, as a trusted partner, is one the European leaders in the fast-growing market of cybersecurity and the world leader in data protection.

© Thales

SMART-S

Thales cybersecurity solutions are a crucial part of bids and proposals in the aerospace, transportation, defense and security sectors as well as in the development of future solutions. Drawing on its unrivalled experience, built up over 40 years of protecting classified information up to 'top secret' level, in today's age of digital transformation, we provide our customers and partners with cutting-edge solutions and services in cybersecurity covering communication networks, databases and access control.

We have a team of 5,000 IT and security engineers, including 2,000 experts in cybersecurity. Among our references, Thales protects the transactions and sensitive systems for numerous international corporations: 19 of the 20 largest banks and over 3,000 financial institutions around the world, 9 of the 10 internet giants in the world, 80% of the world's banking transactions, three of the largest pharmaceutical companies. Thales solutions are deployed in 50 countries, including 27 NATO countries.

We are active in all sections of cybersecurity and provide end-to-end solutions, wherever high grade security matters. With all our expertise, solutions and references, we are ready to support Turkey's cybersecurity efforts specifically in managed security services, deployment of security operation centers, CERT (Computer Emergency Response Team) infrastructures, cloud computing, trust management, data protection, mobile security and big data. Secondly, Thales, a global technology leader, devoted more than € 743 million to self-funded R&D in 2016. We are also ready to co-develop next generation products for Turkey's cybersecurity future.

Defence Turkey: Could you inform us about your Air Defense capabilities?

The world of Air Defense is an increasingly complex environment to manage, with conventional and unconventional threats, it is a global concern for armed forces, nations, governments and citizens.

RUNFLAT systems

hidden hero in tyre

When the vehicle is traveling, the explosion of the tire caused by various reasons can not fulfill the crushing wheel function of the vehicle's weight and the rim comes into contact with the tire. With the effect of the friction on the wheel rim and the effect of the rutting which occurs after the wheel rim rotation, the rubber heats up, crumbles and the vehicle is completely out of control. The vehicle that has lost control can open doors to possible disasters. In order to prevent this danger, it is very important that the control of the car is not lost and can go to the target when the tire bursts. The system that allows a certain distance to go without losing control is called run flat.

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At Thales, we produce radar equipment and Command & Control systems to help forces detect, orient, decide and act to neutralize threats.

Our highly mobile and deployable missile systems such as Crotale, MMS and GM radars demonstrate our world leading network capacity for complex system design and integration.

This capacity extends to mission planning and tasking capabilities and also cyber security innovations through Thales.

Best in class, Thales Global Air Defense key decision makers master complexity and make timely decisions for better outcomes and a safer world.

Thales is the only company in Europe able to deliver a fully integrated air defense capability, from radars and C2 centers to effectors and their respective fire control systems. Thales has developed, manufactured and supported best-in-class air defense systems for customers worldwide for more than 40 years. Hundreds of air defense radars have been sold to 26 countries. Thales is also the world's leading supplier of integrated weapon systems, with more than 450 mobile, integrated systems in service with customers throughout the world.

Its solutions include the STARStreak system, integrated on a wide range of armored vehicle platforms. Thales's innovations in open systems architecture are behind the development of the RAPID range of mobile integrated weapon systems, which combine sophisticated sensors, fire control software, latest-generation human-machine interfaces and a wide range of weapons, including missiles, guns and directed-energy weapons.

Defence Turkey: Could you please inform us about your R&D programs and new technologies?

Innovation is nothing new at Thales. It has always been at the heart of the Group's strategy and R&T remains crucial to our success today and into the future. We invest heavily in innovation: more than 25,000 Thales employees are directly involved in research and technology, which accounted for 743 million euros in self-funded R&D in 2016.

Turkey increasingly supports and invests in R&D. We have established very good relations with Turkish Universities and the research community. We will mutually provide R&T interest domains and topics. In case of any matching domain, we will have further discussions to explore the possibility for co-developments.

Defence Turkey: Within the framework of your offset obligations in Turkey, what are the activities that you have carried out with Turkish SMEs and supporting industries?

We have a long track record of initiating long-term partnerships with Turkish industry to generate offset credits.

Over 15 Turkish companies, from large industrials to SMEs are involved in the implementation of our offsets, performing a wide range of activities from software development to manufacturing. We very much welcome the chance to extend this successful cooperation.

Defence Turkey: Finally do you have some remarks for our readers?

The clear aim of the Turkish Government is to become a high technology economy. We are ready to strongly support this vision through technological cooperation with our Turkish partners. Our strategy is to address local and export markets with Turkish industry. Thales has a broad product and technology portfolio in the defense sector. Therefore, we firmly believe we are an ideal partner for Turkey

Mr. Cem Akalın - Managing Editor of Defence Turkey Magazine met with Mr. Serdar Ali Baran - Thales Group Turkey Country Director in Ankara

Otokar is Ready for Altay Serial Production

As the only national armoured vehicles manufacturer of Turkey, Otokar continues to carry out our activities as planned for the Altay Main Battle Tank Project, the biggest land systems project of the country. The 'Acceptance Tests' carried out by the Undersecretariat of Defence Industry (UDI) and the Land Forces Command for Altay, designed and developed by Otokar as the prime contractor, are finalised by February 2017

Otokar, the largest privately owned defence industry company in Turkey, after designing and manufacturing the "Altay" main battle tank, has now completed the tough qualification testing stage including mobility and endurance testing on rough terrain and climatic conditions, firing tests with various scenarios and survivability testing against the highest performance ATGMs, kinetic energy rounds and mines.

Serial Production

Late in 2014, as per contractual requirement, Otokar submitted Serial Production Requirements Document to the Undersecretariat for Defence Industry (UDI) for preview. Following; UDI issued the Call for Phase II: Serial Production Proposal in 2015, to start serial production preparations of main battle tank Altay simultaneously in accordance with the contract terms and realize its serial production without losing time.

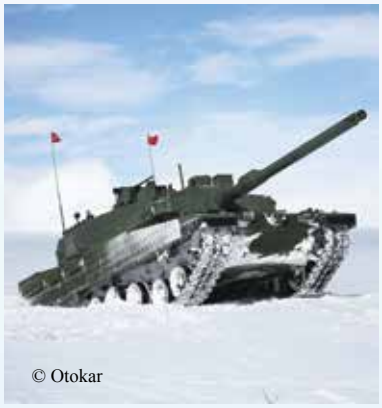
The only authorized company to receive this document, Otokar submitted its first and last serial production proposals on January 18, 2016, and BAFO proposal on August 29, 2016, respectively. Otokar's last proposal as the only bidding company includes the serial production of 250 Altay MBT and Integrated Logistics Support activities for them. Currently BAFO proposal is being evaluated by UDI.

Regarding the tests and serial production of Altay, Otokar General Manager Mr. Serdar Görgüç said;

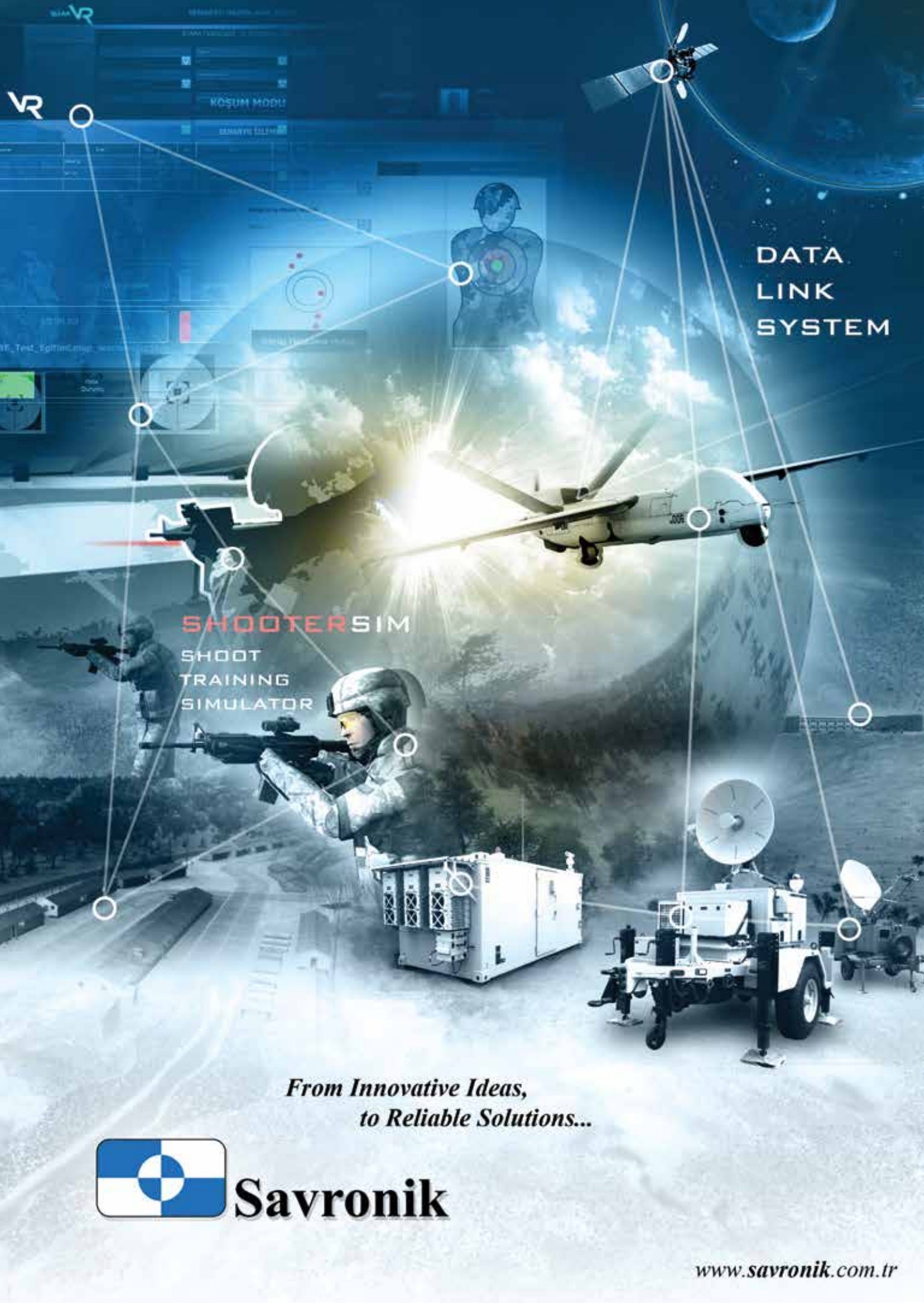
"The 'Acceptance Tests' carried out by UDI and the Land Forces Command for Altay are finalised. After being subjected to such a qualification and acceptance testing by the customer and meeting the ultimate requirements under extreme conditions successfully, we are confident that Altay will be one of the best modern main battle tanks on the field very soon.

Equipped with all the competencies required to successfully carry out the serial production of the Altay main battle tank, Otokar submitted its best and final offer for serial production in August 2016. As the only land defence systems manufacturer with the "Production Permit Certificate" in Turkey required for serial production of the main battle tank, Otokar has prepared the necessary production schedule and infrastructure to launch serial production in the shortest time possible.

In addition to producing 250 units of Altay, Otokar made an annual capacity plan taking into consideration the export potential, mine clearance, and various complementary vehicle requirements such as rescue and fortification tank. In this way, it aims to have a flexible production program that can meet all demands of the Undersecretariat of Defense Industries or other friendly allied countries.


© Otokar

I believe that if we are tasked with the serial production of Altay, we will go beyond satisfying the needs of our country in the best possible way, and take an important step forward in exports as well. The interest of friendly and allied nations in the prototype of the national main battle tank Altay indicates that this project will also contribute positively to Turkey's defense industry exports in the long run."



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Austal - Meeting Global Needs of Asymmetric Maritime Threats

In an exclusive interview, Mr. Michael McCourt, Vice President, Middle East of Austal shares insight into future market strategy, the naval market is a logical extension of Austal's engagement in Turkey. At the forefront of high speed aluminum shipbuilding for nearly three decades, Austal offers a range of platforms that can use speed as either an offensive or defensive capability

Defence Turkey: Dear Mr. Michael McCourt, first of all thanks for this interview. Could you please share with us a bit about Austal's international policies and offering models in different markets?

Thank you for the opportunity to share Austal's vision and products with your readers. Austal is the world's largest aluminum shipbuilder and Australia's largest defense exporter; in the past 28 years, we've delivered over 255 vessels to 100 operators in 44 countries. Our customers include navies, coastguards and other government authorities, ferry operators and offshore service providers.

At Austal we believe that exports are fundamental to growing and sustaining the business, ensuring we remain competitive in international markets and increasing our brand awareness globally. Although our home markets, where we have a permanent presence, are the bedrock of the company, we are constantly seeking new product and market opportunities where we can deliver value to our customers and generate returns for our shareholders.

Defence Turkey: Regarding exports, which regions are you focusing on? Can you inform us about your up-coming strategy and related progress?

As we deliver vessels into different market sectors, we are constantly reviewing trends and opportunities. In the defense market, we see many countries sharing similar maritime security challenges as we have in Australia, with long coastlines, irregular arrivals of people by small boats, and a need for counter-terror, counter trafficking and fisheries protection activities. Austal has now delivered 73 patrol vessels from 16 to 58 meters and has been the sole supplier of patrol vessels to the Australian Government for 18 years, so we have great expertise and experience that we can share with customers. With established presence in both the Middle East and Asian markets, we continue to target these areas.

Littoral Combat Ship

Also, with a rise in asymmetric maritime threats operating small, fast vessels, as a specialist in high speed aluminum vessels, we can offer a range of platforms which can use speed as either an offensive or defensive capability.

Defence Turkey: You have a wide range of platforms such as Expeditionary Fast Transport (EPF), High Speed Support Vessel (HSSV), Littoral Combat Ship (LCS) for the requirements of allied countries. Which technological outstanding capabilities stand out among the rivals?

Austal has been at the forefront of high speed aluminum shipbuilding for nearly three decades. From our origins in the fast ferry industry, we were among the pioneers of large vessels capable of moving people and equipment at high speed. Today we produce the world's largest aluminum trimaran, the 127 meter LCS, for the United States Navy. Our ability to build aluminum vessels of this size and complexity, capable of operating at high speed and over long ranges, is a key differentiator. Also, our proprietary Ride Control System reduces ship motions, and while originally designed to improve passenger comfort in our ferries, it is equally valuable in maximizing crew comfort and therefore operational performance in our military vessels.

High Speed Vessel

Defence Turkey: When we analyze the inventory of the Turkish Navy and the emergency requirements of the regions, according to your opinion which class of Austal Platforms could emerge in the up-coming period for the Turkish Market?

Turkey's strategic location at the crossroads of Europe and Asia has seen a number of regional security challenges that cross into the maritime domain. However, Turkey has a vibrant and capable naval shipbuilding industry and therefore we are looking at niches where our innovative products can differentiate themselves. We see opportunities in both the larger high speed patrol vessels, and also in high speed logistics vessels.

Defence Turkey: What are the current and upcoming programs that Austal is interested in Turkey?

Austal is continuing to engage with the relevant authorities for possible alignment between the Navy's upcoming programs and our vessel range.

Defence Turkey: What is your approach to various project models such as those that comprise technology transfer etc. to Turkey?

We recognize that many countries are seeking to establish or expand a sovereign shipbuilding capability. This can be motivated by self-reliance, to drive innovation, to create jobs or to encourage investment in local capabilities. This is the case in both the US and Australia where we have naval shipyards. Also, we recognize that to be successful in those countries, we need to be willing and capable to transfer technology into those markets when required. As I mentioned above, Turkey already has a capable shipbuilding industry, however there are opportunities for us to focus on our core strengths.

Defence Turkey: Do you have any plans to cooperate with Turkish Shipyards or investment in Turkey as part of your future marketing strategy?

As we have identified the importance of local content in the construction of Turkey's future vessels, we certainly see the merits of cooperating with a local shipyard.

Defence Turkey: Would you like to add some remarks for Defence Turkey readers?

As a nation, Australia has a long and proud history with Turkey which continues today. Also, IDO has been one of our strongest ferry customers over our company history. Given the maritime security challenges that Turkey faces and what we consider to be the suitability of some of our products to address these, we see the naval market as being a logical extension of our engagement in Turkey and look forward to playing an expanded role in the future.

Ms. Sena Akman- Austal Ships Representative and Consultant, Turkey & CIS; Mr. Michael McCourt, Vice President, Middle East of Austal; Mrs. Şebnem Akalın - International Relations Director of Defence Turkey Magazine

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From the Laboratory to the Final Product, Havelsan Seeks Innovation and Technology

Havelsan, which was one of the cornerstones in the establishment of Turkey's modern defense and aerospace industry, has been operating as a company with a focused mission for 34 years with its more than 1,300 expert staff and a total of six facilities in Turkey and the United States. Having undersigned many reference projects in the national and international markets, Havelsan is a reliable and sustainable provider of high technology products and services in its fields of activity, as a result of innovative and sustainable strategies.

Actively engaged in the area of software intensive systems, Havelsan offers a broad range of indigenous product and service solutions in the fields of:

- Command Control and Combat Systems,
- Training and Simulation Technologies,
- Management Information Systems, and
- Homeland Security and Cyber Security Solutions

Havelsan offers these solutions both to the Turkish Armed Forces (TAF) and to its international customers.

Competitive Solutions

Today, Havelsan is one of the most important solution providers of the TAF. The solutions developed by the company for the TAF are globally competitive as well. Among these solutions, the Command Control and Combat Systems developed for naval platforms have helped Havelsan become a significant player in the global market. The GENESİS Combat Management System (CMS) developed for Oliver Hazard Perry class frigates - which have a broad user base across the world - still constitutes the most comprehensive modernization solution for these frigates. Havelsan's experience and knowledge in the field of CMS has also paved the way for the company's involvement in the modernization projects for Romania's Type 22 class frigates and Pakistan's Agosta 90B class submarines.

Havelsan has also successfully implemented the Air Force Information System project (HvBS), which is Turkey's largest ERP (Enterprise Resource Planning) project. Various versions of the same system in different sizes have also been offered to the use of friendly and allied nations.

Training technologies is another area of activity where Havelsan is assertive. As one of the world's leading simulator companies in the defense and aerospace industry, holding a Level D qualification certification granted by the EASA (European Aviation Safety Agency), Havelsan's operations focus on Training and Simulation Technologies, including simulators. Havelsan's simulator solutions are preferred by the Republic of Korea and Qatar and they have also entered the civil aviation market with the Boeing 737NG simulator it has developed for THY (Turkish Airlines). In the area of training systems, Havelsan offers integrated solutions such as the Electronic Warfare Test and Training Range (EWTTR) and the Artillery Forward Observer Training Simulator (AFOS) not only to the TAF, but also to friendly and allied nations such as the Republic of Korea, Pakistan and Saudi Arabia.

Having worked on software intensive systems for many years and holding a CMMI (Capability Maturity Model Integration) Level 3 certification in this field, Havelsan considers the subject of cyber security - on which it has been working to ensure the security of its own systems - as a separate line of work. Besides land, air, marine and space, cyber security nowadays constitutes another field of operation - or the fifth dimension - in international conflicts. To satisfy the requirement in this area, Havelsan established Turkey's first and only Cyber Defense Technology Center (SISATEM), putting it into service in March 2016. Havelsan also produces systems and products to meet cyber security needs that are increasing at an unprecedented pace, while also meeting the cyber security-related needs of various institutions.

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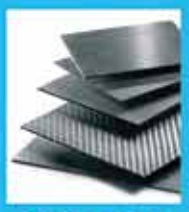
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With its Cyber Security Operation Center, Cyber Software Analysis and Test services, Corporate Security Support for Public and Private Sector, Cyber Security Training, and Indigenous Cyber Security Software, Havelsan is rapidly forging ahead on the way to developing products and solutions for Turkey and friendly and allied nations, while also moving closer with each passing day towards its goal of becoming 'Turkey's Center of Excellence' in Cyber Security.

Homeland security (of which cyber security is a sub-field) is in another area on which Havelsan has focused its activities in recently. The company plays an active role in various projects across Turkey, including pipeline security, the renewal of the MOBESE system, and ensuring the security of the third airport, which is currently under construction in Istanbul and will become the world's third largest airport.

For years, Havelsan has also been successfully meeting the management informatics system requirements of public institutions. Products like UYAP, the automation system of Turkish judiciary, and SEÇSİS, the election automation system that successfully fulfilled its task in 12 different elections, have come across as self-proven solutions.

Havelsan Becomes Globalized

Aiming to become a global player by rapidly developing its indigenous technologies, and having already achieved this position in certain areas, Havelsan is taking strategic steps toward the future. The first of these steps was the acquisition of US-based Quantum3D company by Havelsan. As a result of this acquisition, which was officially announced in May 2015 and completed in 2016, Havelsan became one of the few companies capable of completing in the image production process indigenously within its own system.

With Quantum3D joining the Havelsan family together with its 50 employees, a new page has been opened in the company's 34 year history. With this move, Havelsan took an important step toward becoming a global company that is competitive in international markets.

F-16 360º Dome Flight Simulator

Through the acquisition of Quantum3D, the company has also become a local US company. Quantum3D continues to conduct promotion and marketing activities for Havelsan's other indigenous solutions, especially those that best meeting the various needs of customers in the US market.

Different Fields, But the Same Quality

One of the features that has brought Havelsan to an esteemed position in the world market is the fact that, although it operates in various fields ranging from command control to simulation, and from software systems for public institutions to cyber security, it carries out all these activities as a single and integrated company. This enables Havelsan to use its expertise in the field of software technologies on different software systems. Based on its many years of experience in software intensive systems, Havelsan has come to the final phase of establishing a software development platform to be used throughout the company. With this platform will enable the development of module based software, it will allow different units to jointly develop software on the same module, and establish a library of logic and Havelsan will offer faster and higher quality services to its customers.

T129 Atak Helicopter Simulator (ATAKSIM)

While Havelsan believes in the importance of figures like turnover, profitability, share allocated to R&D, and exports, it is also aware that what makes a company successful is not limited to these details. Therefore, Havelsan, which has joined the National Quality Movement (UKH) organized by the Turkish Society for Quality (KalDer), aims to achieve excellence by utilizing elements of total quality management in all of its processes, business approaches, and all types of activities. According to Havelsan's point of view, turning success into a systematic outcome through total quality management is one of the keys to competitiveness.

Havelsan Shapes the Future with Its Stakeholders

Continuing its operations with a focus on innovation and high technology, Havelsan aims to create something new rather than repeating what already exists. Fully committed to the view that this can particularly be achieved together with its stakeholders that includes academicians, universities and SMEs, Havelsan is ready to work with anyone, any university or any company that possesses the required capabilities. The company frequently meets with its potential stakeholders at specific workshopsthat it organizes. In addition to these, it also continually carries out other work to meet with new potential stakeholders.

While Turkey aims to become one of the world's top 10 economies by the year 2023, Havelsan is working to reach a turnover of $ 1.5 billion by the same year. Preparing its strategic plans accordingly, the company will continue to make progress by adding new stakeholders to the existing ones, and by developing its business ecosystem

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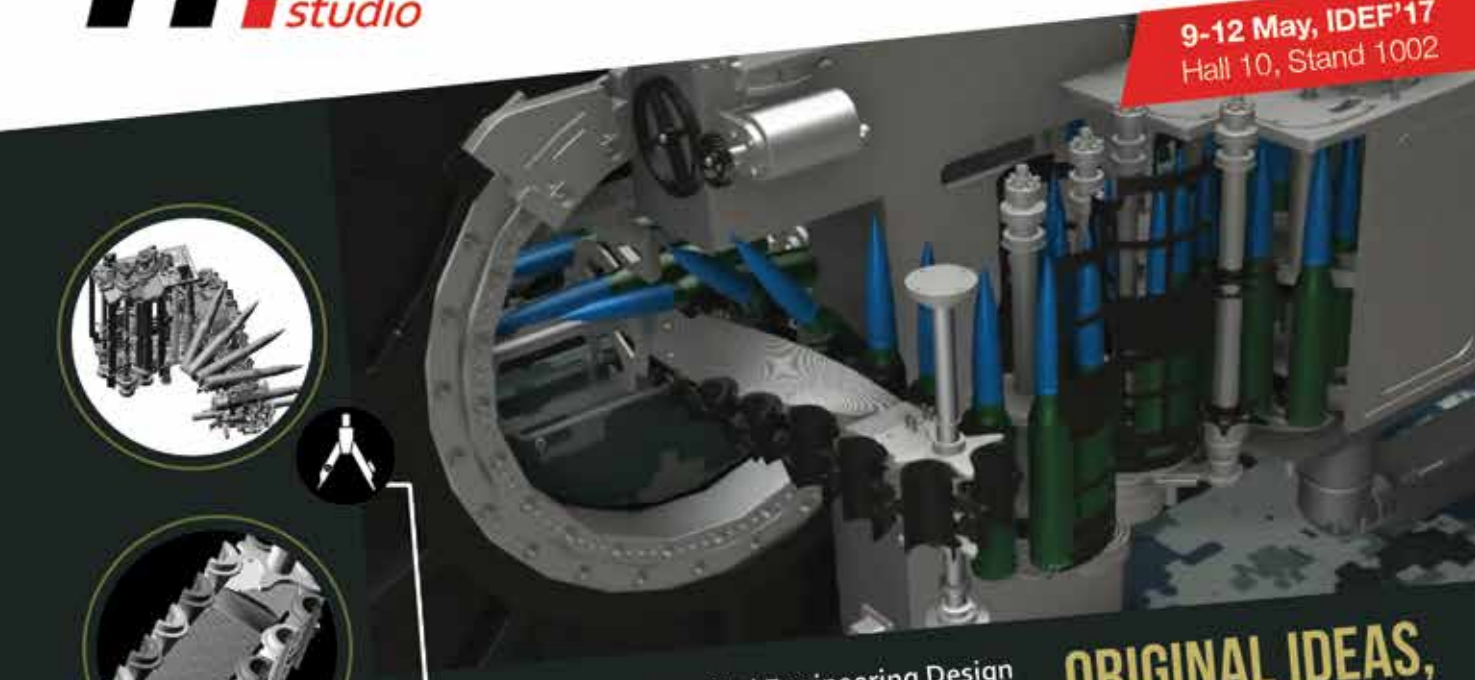

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Heksagon Mühendislik ve Tasarım A.Ş.

Military Systems Advance with Augmented and Virtual Reality

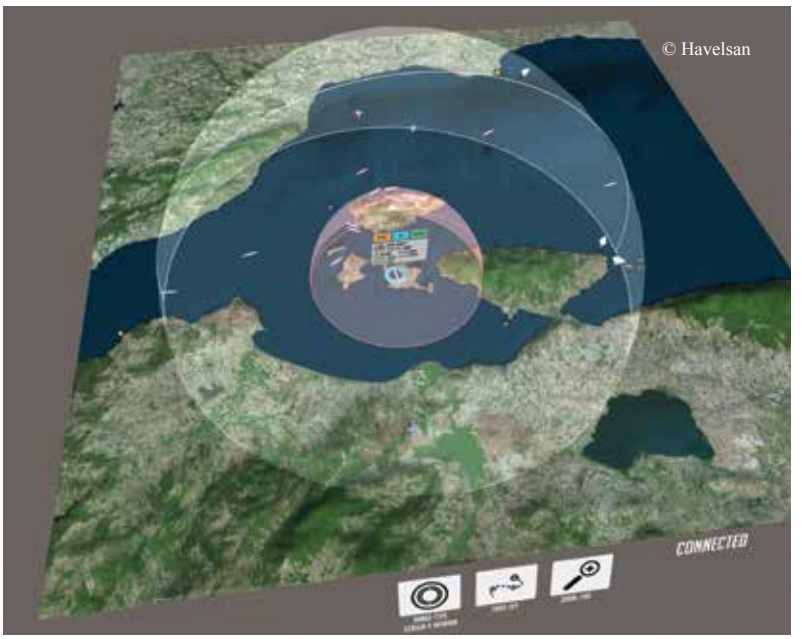
Studies on the development and production vision of national and domestic military systems in our country are continuing at a rapid pace. Within this vision, the development of military systems using new technologies is of high importance. In addition, the introduction of new technologies, which are expected to increase the capabilities of existing military systems, has become one of the most important targets, as it will increase the quality and efficiency of the systems.

Augmented Reality (AR) and Virtual Reality (VR) technologies have begun to be used in various fields in the context of this target. It has also been acknowledged in academic circles that these technologies give users high situational awareness in various fields.

It has been evaluated that it is possible to increase the operational capability and the analytical capabilities of military personnel who plan and perform military operations at various levels in combat operation centers and joint operation centers by using these technologies in an operational and tactical sense.

Augmented reality can show the user the real environment and the virtual environment overlapping each other simultaneously. In other words, it becomes possible to see virtual objects in the real world and to interact with them. Virtual reality presents an entirely virtual world to its users. The user can navigate through and interact with the virtual world.

Nowadays, the fast development of electronic and software technologies and the widespread use of mobile technologies have made it easier to develop AR and VR technologies and to present them to the end user. Even with a mobile phone, augmented reality and virtual reality can be experienced.



However, with the development of wearable technologies, AG and SG glasses have widely been used.

Havelsan, with the vision of developing and developing emerging technologies, defines and carries out projects with the mission of bringing these technologies to our armed forces. In this context, it has launched an R&D project to develop the aforementioned technologies. The C4ISR Holographic Situational Awareness (HoSA-C4ISR) System exhibited at the IDEF 2017 fair is a prototype that includes preliminary studies of the initiated R&D project.

The HoSA system currently consists of 3 AR glasses and one server. Users can utilize

the system by wearing AR Glasses. With HoSA, the tactical miniature operation area (world in miniature - WIM) can be seen as a 3D hologram. This hologram contains two-dimensional hologram windows displaying tactical tracks and track data and 3D environmental terrain data as mesh. The system can be controlled via natural gestures. Through personalized role-based content, multiple users can see the same holograms in the same realm together and interact with holograms.

In the scenario prepared for the prototype to be presented at the IDEF 2017 fair, tactical tracks such as ships, airplanes, submarines and land troops are defined. In this system, the user, who is included in the AR glasses, will be able to see holograms as defined contacts on the hologram geographical form. The user can see a virtual cursor icon equivalent

to the mouse cursor, and when the cursor is brought into contact with the head movements and touches with hand gestures, a 2D hologram window is displayed which includes basic tracks information moving on tracks with the tracks. Through the buttons in this window, 3D models of tracks can be displayed in detail, track details can be displayed in larger 2D hologram windows, and at the same time the track trajectory can be seen as a hologram.

Havelsan R&D has the ability to test the AR and VR based systems to be developed in real-time with real-time data. Within the context of R&D, the user experience (UX - user experience) tests will be executed with real users (tactical commanders). Test results will be considered in academic research conducted jointly by Havelsan and Gebze Technical University. Effective systems will be developed by taking into consideration test results and academic research optimized to criteria such as increasing the situational awareness of the users and ensuring rapid reaction in case of emergency. In addition to this, compatibility of the human brain (neuroergonomics) based on academic research will be completed to increase the human-machine interaction efficiency of the AR/VR based systems.

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Extreme Low Light Digital Vision

The model: AN/VSS-502 is the next generation military driver night sight periscope with image fusion. It was designed by Wärtsila JOVYATLAS EUROATLAS in Germany according to armed forces requirements and meets all military standards. The company has extensive experience and a track record of night vision equipment since 1962.

The next generation driver night sight periscope fit for MBTs, APCs, AFCs, special purpose vehicles and can replace former image intensifier driver night sight systems, day sight periscopes or other camera systems. The digital vision periscope system consists of state-of-the-art sensors and electronic components designed under the measures of the latest available technology. The components are selected to fulfil the requirements of MIL-STD 810 and MIL-STD 1275 equipment. The electronics and sensors are housed in a modular body which is protection class IP68K and filled with nitrogen. The system is extreme robust, reliable and well protected against harsh environmental condition like: shock, vibrations, high- and low- temperature, water, sand- & dust. The periscope system is operating 24h at day and night up to night level 5 and can detect most of the battle field laser. The standard configuration has two high resolution camera sensors, long wave infrared and CMOS. The system is available with up to 4 different camera sensors and technologies. All 4 camera sensors can be fused in real-time into one high resolution image and displayed to the driver and vehicle commander. Customer specified options are available on request.


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The military vehicle driver sight periscope system consists of:


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- Periscope housing with computer module and cameras
- Monitor cable with protection shield
- 8.4" TFT monitor with connector and user interface
- DRIVER PERISCOPE KEY FEATURES
- Combat & safety upgrade
- Compatible with many vehicles
- Dual camera system, thermal & image intensified
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FİGES is Manufacturing 3D Functional Metal Parts with Additive Manufacturing Technology by its Own Developed Metal Melting 3D Machine

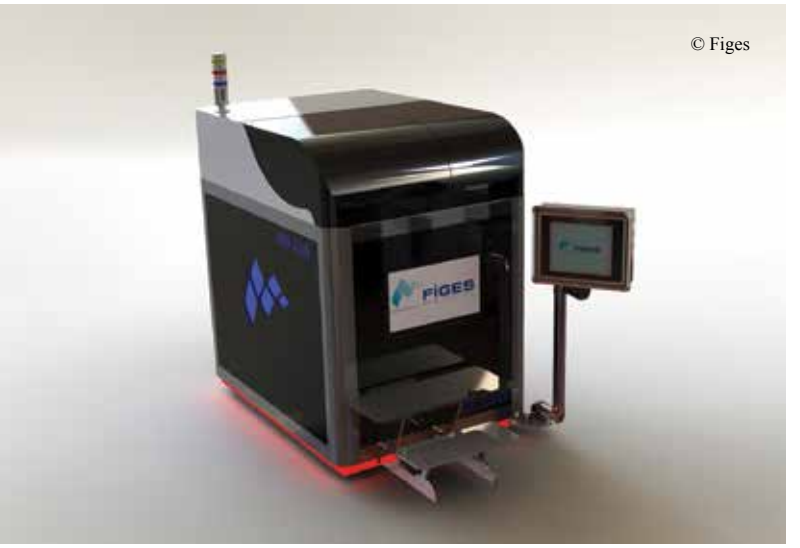
FİGES, which has been a solution partner for the Turkish defense and aviation industry since 1990, developed Turkey's first Laser Melting Additive Manufacturing Systems. At the beginning of 2017, FİGES put three different models, FLS 100, FLS 200 and FLS 300 Machines into serial production after three years of dedicated R&D and Product Development work with the involvement of subject matter experts and its strong engineering team.

Powering the machine industry with its new machines in the field of Additive Manufacturing Systems (AMS), FIGES has developed its FLS 200 series machine with best in class laser, scanning galvo systems and actuators to be able to compete with the machines of the world's prominent players in the market. FIGES caters to various industries with its FLS 100 and FLS 200 series machines with larger manufacturing capacity, whereas FLS 300 is manufactured for the desktop and personal use.

FLS 100 and FLS 200 series machines utilize 250 and 500 laser generators. The machines have 100x100x100mm, 300x300x300mm, and 500x500x500mm volume manufacturing capacity.

FLS 300 series systems involve two different models built specially for jewelry and dentistry which utilize lower power lasers for 20x20x20mm and 70x70x70mm volume manufacturing capacity.

FİGES has given special priority for the use of additive manufacturing machines in the Aviation Industry. The certification process has been started in cooperation with the leading aviation company of Turkey, TAI, to prove that the machines and its final products satisfy the Manufacturing and Product Standards in Aviation Industry.



FIGES will launch its FLS100 series FSL110 Machine during IDEF'17 13th International Defense Industry Fair between 9-12 May 2017.

The machines designed by FİGES Engineers also involve software developed in-house by the FİGES Engineering Team. FİGES, which is able to maintain a competitive position against competition with its new in-house technology, carries out new Product Development and R&D activities in order to increase domestic parts use, further develop performance at affordable prices, and expand product portfolio.

FİGES provides economic solutions to its customers who request additive manufacturing services. Parts at high complexity can be manufactured easily, breaking the borders of conventional manufacturing. The parts can be optimized by FIGES using Finite Element Analysis and Optimization tools if the client needs optimization services, as well.

There is growing demand from customers at various industries who need high precision fully functional metal parts to be produced faster for rapid prototyping purposes. The fast prototyping 3D Metal Printing services which has been already delivered at distant locations out of Turkey are now being delivered by FIGES at its Additive Manufacturing Systems and Services facility at Başkent OSB in Ankara.

FIGES is also planning to open new 3D Additive Manufacturing Service Locations in several other cities of Turkey, as well, in order to be able to better serve its customers, being more local, in line with the increasing demand.

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Hexagon Studios - Technology Based Innovative Engineering Services in Mobility and Defense Industries, launching Domestic Designs and National Products

In an exclusive Defence Turkey interview, Hexagon Studio Managing Director Mr. Tolga Kaan Doğancıoğlu discusses Hexagon Studio's collaboration in projects of various sizes and scope with nearly all public and private sectors for both OEMs and Suppliers in local and international platforms, as well as the company's ambition to assume responsibility in the indigenous product design and development projects that will minimize Turkey's foreign dependency

Defence Turkey: Dear Mr. Doğancıoğlu, first of all we would like to thank you for your time. Hexagon Studio has been providing engineering and design services to a wide variety of industries, from the defense industry to automotive industry, at home and abroad. Could you please tell us more about Hexagon Studio?

Hexagon Studio was established in 2006 in order to provide engineering and design services in local as well as international markets. Our company, which aspires to become one of the leading R&D centers of Europe within the next decade, is one of the significant research and development centers in Turkey with hundred percent domestic capital.

We are focusing on delivering unique products with added value in the automotive, defense industry, composite boat and agricultural machinery sectors. Within this context, with our 260 skilled personnel and our technological infrastructure, we provide turnkey solutions for our clients throughout the entire product development process; starting with conceptual design and proceeding with engineering design and development, prototype manufacturing, design verification and technical assistance in product launch.

Our in-house model and prototype workshop enables us to manufacture full vehicle prototypes to be used in on-road performance tests and functional tests. We are also capable of conducting fatigue durability tests in subsystem and component levels.

Thanks to our know-how and past experiences that we gained in the projects, which we completed in the past, we have the opportunity to create synergy in the industrial sectors we serve. Additionally, projects with different scopes help us leverage our technical capabilities.

Defence Turkey: Hexagon Studio stands out with impressive R&D investments and projects. Within this context, what would you like to say on investments and R&D projects conducted thus far and also what are your strategies for the upcoming period?


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As Hexagon Studio, we are performing engineering R&D activities focused on commercial products. Our product development process is shaped by our design and engineering activities based on R&D and scientific basis. The verification of an engineering design through computer aided simulations and analyses prior to the prototype product stage is an undeniable interim process where the importance of investment in R&D infrastructure becomes evident.

The infrastructure should not be limited merely to the machinery, equipment, hardware and software. We believe that it is essential to consider indigenous product development projects based on R&D within the overall program. Hence, we tend to execute small scale R&D projects that would boost up the technological infrastructure of the complete program through our equity capital.

Concept V1 vehicle that we developed from scratch for the New York Taxi Tender in 2010; bus family ranging from 6 meter minibus and 8 meter bus providing access for the physically disabled, which we designed for a domestic customer of ours in accordance with related laws and regulations; 12 meter solo buses and 18 meter articulated buses that we developed for city transportation are some examples of the indigenous products realized by Hexagon Studio in the automotive sector

In the near future, we aim to focus on vehicle electric power systems, vehicle control and power control electronics and embedded software. We are reviewing and shaping our human resources and infrastructure accordingly in order to design the future today.

Defence Turkey: Hexagon is involved in international programs abroad with innovative and indigenous projects based on R&D. Could you please inform us about these projects and the cooperation activities that are being conducted abroad?

Since its establishment in 2006, Hexagon Studio has assumed responsibilities in significant projects in the automotive sector abroad as well as at home. Our journey, started with the design of the interior and exterior trimming on behalf of Italian companies considered to be the masters of the European automotive industry, continued with the conceptual design of a vehicle that we designed specifically for the European and Indian markets, featuring IEC engine and electric power package options.

The previously mentioned bus projects led to vehicles which successfully operate in Turkey and Europe today. Our experience in public transport vehicles sector has provided us with an advantageous position in a bus development project that we are performing again for the Indian market. We are glad to see that we are in a preferred position as we combine our high-quality design approach with our affordable engineering costs, compared to those in Europe.

Defence Turkey: In order to unveil R&D based, indigenous and innovative products, without a doubt necessitates skilled human resources, individuals who are experienced in their fields. Within this context, what would you like to say on the structure of your personnel and the infrastructure of your facilities? What are your selection criteria within your HR screening and recruiting process?

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Mr. Inan Kıraç and Mr. Jan Nahum, esteemed experts in the automotive industry, are the founding partners of Hexagon Studio. Their notability is recognized not merely within the limits of Turkey but also internationally, considering the knowledge, experience and the contributions they have made in the sector. Mr. Nahum's contributions to the defense industry are of great significance and shall be valued as well.

Our qualified manpower is our most significant resource as we shape our activities in various sectors in line with the vision of our founders. No matter how advanced the software, the hardware and the benches that we have been utilizing are, the way to derive the maximum benefit out of them is through existence of the knowledge and the staff making use of this knowledge in a proper way. Knowledge is not an easily gained value. In our contemporary world based on competition, no one provides the other with the required information fully, even if it is paid for. Therefore, you shall generate, advance and protect the knowledge by your own resources. We shall keep in mind that human factor is the primary equity capital here.

We endeavor to identify the most suitable candidates with the qualities required by the position during our recruitment process. The challenging part starts after the employment of the appropriate staff. We equip our staff with the responsibilities to challenge themselves in the projects to which they are assigned. We take care of training the team members to be proactive so that they are capable of foreseeing problems, and also taking measures and creating solutions in the event that a problem arises.

We perform all our activities with the R&D principle based on innovation. We have a corporate process that collects our staff's ideas containing innovation and invention. In this process the ideas are evaluated by examining their indigenousness by comparing them with IP databases at national and international levels. We award every idea that is qualified for registration. In this way, we not only motivate our personnel to generate indigenous ideas but also expand our patent and design patent portfolio.

Defence Turkey: At the model and prototype workshop on your premises, you are capable of manufacturing 1:1 scaled and/or small scale models, and static/ functional prototypes. What are your comments on the advantages that this significant capability brings to you in the market?

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In order to evaluate and understand what the final product would look like after completion of the conceptual design phase, we manufacture small scale and/or 1:1 scale models to have feedback from the end users and customers. In this way, we are able to finalize the interior and exterior designs of the vehicles based on the comments we received for these samples.

Verifying a product design with the help of computer aided engineering simulations during the development phase is of great importance as it enables the designer to foresee possible problems that may arise after prototype build and act accordingly to improve the design. However, one should keep in mind that this process is just a simulation of the real world. The design needs to be verified through observation of the impact of various user profiles under actual operational conditions. We find the opportunity to correlate and correct our mathematical models by comparing simulation results with the data set collected on the functional prototypes. In this way, we gain the opportunity to proceed merely with virtual verification without requiring prototype tests for a similar product in the next project.

Building the prototype in-house ensures confidentiality of the project and end product at both commercial and national levels. Moreover, managing the entire product development cycle is an advantage in terms of achieving the integrity of business processes.

Thanks to our in-house model production infrastructure, we are capable of manufacturing composite boat mold models up to 26 meters. This type of manufacturing process is particularly preferred since the molds utilized in mass production conditions need to be long lasting and dimensionally stable.

Defence Turkey: Hexagon was awarded the best R&D center in engineering and design areas by the Ministry of Science, Industry and Technology. What is the importance of this award for your company?

R&D activities constitute a high percentage of our annual expenditures. In order to render our innovative design approach sustainable in the services and solutions that we provide and to be one step ahead in the market, we periodically review our R&D based investments through innovation perspective. We are aware of the positive outcomes of this approach, as we have become an exporter of engineering design services to the main leading contractors in the world specific to vehicle design and development.

The "Most Successful R&D Center in Engineering and Design Award" that we received in 2015 indicates that all our efforts and achievement are recognized and approved by the government as well. In this sense, we are pleased to observe the positive consequences of the incentive policies, which are implemented by our government to extend R&D over the industry base especially within the last fifteen years, on our business results accordingly.

Defence Turkey: Hexagon Studio has many patents and useful model applications. Could you please elaborate on your activities regarding these?

In our opinion, innovation is based upon indigenous product design. This is possible through promotion of creativity and innovative thinking only. We established an Idea and Invention Management System in our company. We collect our employees' ideas having characteristics of innovation and invention, that they put forth throughout the product design process and we survey whether they are indigenous or not by using national and international databases. We award the owners of the inventions that are qualified for patent registration application and initiate the registration process in turn. We also present an additional award after the patent application is approved. In this way, we now have a portfolio of over thirty-five intellectual property rights. We continue to motivate our employees to increase this number rises each year. Another advantage enabled by this system is the execution of our design process without violating of any existing intellectual property rights.

Defence Turkey: What would you like to say on the companies you cooperate with for local defense industry projects and any details you can share about these projects?

Hexagon Studio collaborated in projects of various sizes and scope with nearly all public and private sector defense industry main contractors so far, most of them being Turkish Armed Forces Foundation companies. The conceptual design of a bridge console for a naval ship, weight and durability optimization for armored tactical vehicles, transfer mechanisms for ammunition in various calibers, turrets for different purposes, shock dampener systems for surface combatant platforms, test and simulation platform design and production, engineering design of a new generation CBRN gas mask are the main projects that were accomplished by Hexagon Studio as the mechanic design subcontractor. The majority of these projects have completed field performance tests successfully and have entered the inventory of our Armed Forces.

The main point we would like to emphasize primarily is our trust in our government, who exhibits a firm willpower in promoting national end products based on domestic design. We believe that we will make our mark in major future projects and realize our government's determination in this direction by synthesizing the know-how and experience of main contractor companies with our technical background.

Defence Turkey: It seems that under the leadership of the Ministry of Science, Industry and Technology the electric commercial and passenger car development projects have been gaining momentum and in parallel this market in Turkey has been

growing every day. We know that your company has indigenous solutions in this area as well. Could you briefly evaluate Turkey's breakthrough and the capabilities of your company in this area?

We are closely monitoring our government's steadfast efforts in creating an indigenous product in the automobile segment with a national brand that can compete in international markets. Focusing on an electrical drive system is a indeed a proper approach As we all know, the market for passenger cars and commercial vehicles running on ICE is dominated by major brands in the automotive industry. Therefore, aiming at the electric vehicle market with a continuous growth trend is a real opportunity for countries like us who are a little bit late in the market entry. Today, we experience no deficiencies in developing a vehicle that would perform on the roads. We have the necessary infrastructure for implementing self-proven sub-systems.

When it comes to electric vehicles we shall admit that there is a long way ahead of us en route to develop critical sub-systems such as electric motor, battery, inverter, power control system and battery control system. We believe it would be unfair to expect a single company to accomplish it all by itself due to limited resources. In our opinion, the collaboration of companies specialized in sub-systems would create synergy through a proper strategy.

As Hexagon Studio we have been working on electric vehicle projects with our own engineering resources. The individual work packages of these projects are financed through TÜBİTAK R&D incentives. At present, we are currently running on-road tests on our prototype vehicles. We are ready to serve in developing embedded software for vehicle control system and power control system where we believe we have strength.

Further to that, thanks to our company's independently owned structure we believe that Hexagon Studio is a proper candidate to assume tasks to be assigned by our government in the design, development and sub-system integration with regard to the national electric vehicle.

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Defence Turkey: Where do you see the position of Hexagon Studios in the defense industry in the next decades?

Since 1980s, Turkish Defense Industry had made its mark on major projects with its willpower to increase local content ratio and manufacture indigenous products through national resources. Many new product development projects in various platforms were launched in line with the requirements of our country. In this aspect, we, as Hexagon Studio were assigned as the engineering design subcontractor within our capabilities in some of these projects, and gained experience accordingly.

We would like to emphasize that we are ready to assume responsibility in the indigenous product design and development projects that will minimize Turkey's foreign dependency in the future. We have the determination to be diversified without losing our focus on R&D. We are committed not only for performing mechanical or electromechanical design, but also producing a sub-system that we developed and maintaining its sustainability in the field. It is worth noting that our Facility Security Clearance Certificate and Production Permit reveal our infrastructural readiness in this context.

Defence Turkey: Finally, is there any message you would like to convey to the readers of Defence Turkey?

Once again, we would like to underline our determination in providing engineering assistance to national prime contractor companies through indigenous products with a focus on unique design and thus reducing foreign dependency. We believe it to be the only way by which we can increase our export of technology based innovative products. It would be most appropriate to assess this process as a total engineering mobilization based on innovation. As Hexagon Studio, we are always ready to do our part in this mobilization

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FX Marking Cartridges: .38cal, 9 mm & 5.56 mm

FX – the world's most interactive combat training system for the ultimate level of realism. The FX Marking Cartridges are the core of this training system with their unique telescopic design and patented reduced-energy technology. These non-lethal rounds are fired with a weapon conversion kit for safe and reliable training.

More than 600 000 000 FX Marking Cartridges have been sold to Law Enforcement & Military for more than 27 yrs. Over 250 000 conversion kits sold in over 75 countries. Several Armies and Law Enforcement agencies covering Canada, UK, US, The Netherland, Denmark, Switzerland, Germany France and Turkey have been using FX for training.

The 5.56 mm FX is also using the simunition patented reduced-energy technology and works with a conversion bolt, increasing safety and ensuring proper weapon functioning.

The FX Marking Cartridges are ideal for Reality-based training, force-on-force interactive scenarios, Force-on-target training, Weapon safety handling training, Urban fighting (MOUT/FIBUA), Anti-terrorism, Convoy protection tactics, Compatible with laser-based training simulators, Patrol exercises, Close-quarter battle (CQB), Shoot/No shoot decisions, Individual/Team situations, Room/Building/Trench clearing and Mission rehearsal


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Always on Target Training Ammunition

General Dynamics OTS Canada also produce Lethal Cartridges for training which cover 9 mm and 5.56 mm Greenshield Frangible rounds and 5.56, 7.62 and 12.7 mm Frangible Short Range training ammunition.

The Greenshield cartridge is known as the best frangible training ammunition worldwide. This truly frangible, lead-free, full-energy training ammunition, designed to reduce health and safety hazards by eliminating exposure to lead and other heavy metals. The bullet is composed of a patented polymer compound that disintegrates into powder upon impact with hard surfaces such as steel targets or backstop materials, virtually eliminating splash back and ricochet. It is truly a safe alternative to any other training rounds. This lethal cartridge is not to be fired at personnel.

Short Stop Short-Range Training Ammunition (SRTA) rounds are designed for use on ranges where ricochet and stray bullets present a problem. The unique design of the Short Stop bullet allows it to match the accuracy of conventional ammunition at 100m, while reducing maximum range under 600 m. All Short Stop cartridges feature frangible copper-polymer blend projectiles, which reduces significantly the danger of ricochet and splash back while eliminating environmental contamination.

Short Range Training Ammunition provides greater training exibility and reduces ricochet and splash back, damage on steel targets, range set-up/maintenance costs, damage to range infrastructure and targets and safety/danger zone.

(SRTA 5.56, SRTA 7.62, SRTA 0.50 Cal) Advantages

- 1. Non-toxic projectile;
- 2. Greatly reduced safety/danger zone distances ; greater training flexibility;
- 3. Accuracy and ballistic match to conventional ammunition at shorter ranges;
- 4. Enhances user freedom of movement while conduction convoy protection drill and live-fire training;

© General Dynamics

- 5. Similar recoil, noise level and function as conventional ammunition;
- 6. Decreased damage to range infrastructure and targets;
- 7. Surface Danger Zone (SDZ) is approximately 1% of conventional munitions;
- 8. No modifications of M2 machinegun;
- 9. Improved ballistic match with M858 and M860 (T);
- 10. Reliable functioning from -20C to +50 C;
- 11. Maximum range of 750 m
- 12. Greatly reduced splash back, ideal for close range metal targets.
- 13. Ball and tracer versions for the 7.62mm and .50cal;

9mm and 5.56 mm Close Quarters Target Practice Cartridges

The innovative CQT cartridges are designed using the Always on Target patented reduced-energy technology and work with a simple conversion kit, ensuring proper weapon functioning. Available in 5.56 mm and 9 mm, the CQT cartridges are target practice training rounds, powered by a primer and a small amount of propellant. At tactical ranges, the Mean Point of Impact (MPI) of the CQT will approximate the MPI of ball ammunition. They are used for target practice only and are never to be fired at personnel, as they are considered lethal ammunition.

The CQT cartridges have many impressive features such as Non-toxic projectile

Accurate at tactical ranges, but reduced safety template, Similar recoil and sound level to ball ammunition, Function in user's own converted service weapon, and Distributed worldwide exclusively through the Always on Target network.

MilSOFT – Excellence in System Integration and Software Development

MilSOFT Software Technologies Inc. was established in 1998 as a 100% Private Company. We specialize in System Integration and Software Development for the defense industry. Besides the defense industry, we develop technologies for the public security and telecommunications industries.

MilSOFT develops high-end products by using the latest software technologies. From the beginning, MilSOFT has competed projects in the high technology field with the most technologically advanced companies in both national and international arenas. We strive to maximize customer satisfaction through our deep domain expertise and engineering methodologies. No doubt, we see our customers as partners, and their needs are materialized with our expertise.

We also anticipate future customer demands and the launch of R&D projects. Our R&D efforts evolve into innovative solutions and we deploy them into operational environments.

In 2005, due to our dedication to international standards, MilSOFT is the first company in Europe to achieve CMMI Level 5 certification, (Capability Maturity Model Integration) which is a type of process level improvement training.

All of the projects that we have completed over the years have subsequently created immeasurable expertise and assets. Today, we have our own products without any license restriction to third parties. With the support of The Scientific and Technological Research Council of Turkey (TUBITAK), MilSOFT continuously initiates new R&D projects in new areas.

With our successful international tenders, MilSOFT has already proven itself internationally and is able to market its products anywhere, throughout the globe.

The software capabilities that we will share at IDEF 2017 are the C4I Systems, Data Links and Messaging, Image Exploitation Systems, Electronic Warfare (EW), Modeling and Simulation, Embedded Systems, ICT Solutions and Cyber Security technologies.

C4I Systems: MilSOFT is capable of meeting all needs of partners in terms of C4I. Thanks to the Open System Architecture applied by major players in the market, we can provide Command and Control Systems to a wide range of platforms. The platform spectrum ranges from complicated destroyers and flattops to LCACs and patrol boats. The MilSOFT Combat Management System (CMS) integrates sensors and effectors; establishes the recognized maritime tactical picture as well as provides the operator with support functions to enable effective decision making onboard ships, to be used for Situational Awareness by the Command Centers and Surface/Air/Subsurface Platforms.

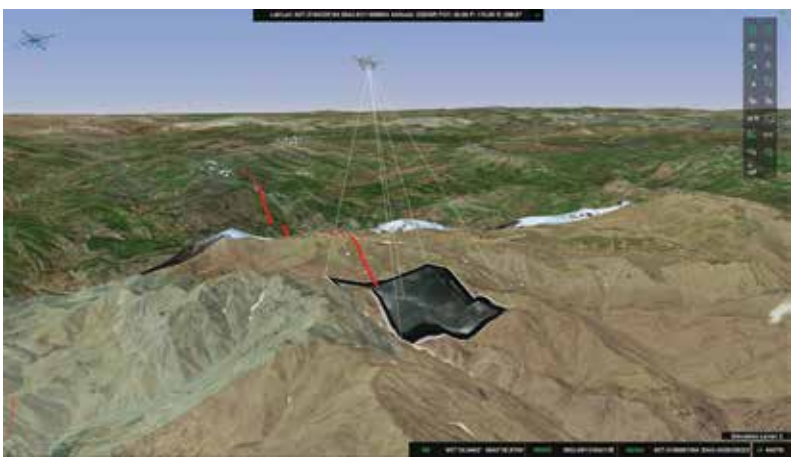
Our main accomplishments on C4I systems are:

Turkish Coast Guard Command: Coast Guard Search and Rescue Ship, Scalable Combat Management System (CMS) based on DDS & OACE, Coastal Surveillance C2I System.

NAVSEA/BAV-USA: Evolved Sea Sparrow Missile Integration to Turkish Frigates.

TKMS-GERMANY: Integration between ISUS 9072 Weapon Control System and DLP.

Turkish Navy: Modernization of Ex-Perry Class Frigates (GENESIS) and middleware to MILGEM. Export of Naval Information Exchange System.



NIXS: Navy Information Exchange System (NIXS) to use for Situational Awareness by the Command Centers and Surface/ Air/Subsurface Platforms.

Data Distribution System (Mil-DDS) to Turkish Defence Sector (ASELSAN, HAVELSAN, ROKETSAN, ext.)

Data Links and Messaging: MilSOFT has developed a Multi-Link Tactical Data Link System (Mil-TDLS) which provides the Data Link capability to share tactical information with other Link 16, Link 22 and/or Link 11 capable platforms. We are capable of forwarding data link messages among different link systems either Link 11/16/22 or indigenously developed Link M. MilSOFT either completed or contributed to many projects with Link 11/16/22, including but not limited to, HiSAR Medium Altitude Air Defense Missile System, Gabya and Milgem Class warships, Landing Ship Tank (LST), C-130, Meltem-2/3, Type 214 Submarine etc. MilSOFT has also successfully demonstrated the interoperability of its Mil-TDLS product by participating NATO CWIX trial every year since 2014. Mil-TDLS also provides JREAP-C and SIMPLE capabilities for Beyond Line of Sight transfer and rig testing of tactical data link information. MilSOFT can also contribute our partners in developing their own country-specific link systems.

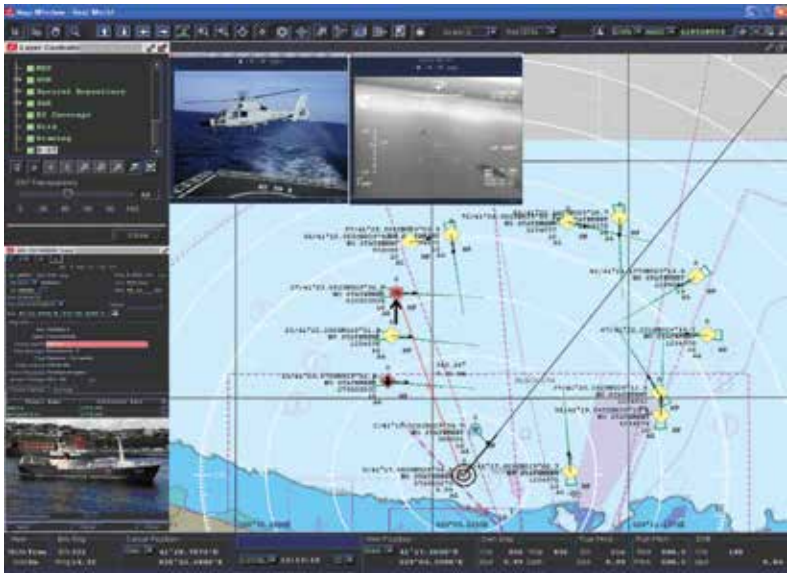
Image Exploitation and ISR Systems: MilSOFT has experience in control, mission management and image exploitation capabilities of Unmanned Systems. Mission planning of these UxV s can be done on Tactical consoles. It is possible to control UxVs and their payloads through CMS consoles with integrated solution. Video streams in MPEG2, MPEG2TS, MPEG4, H263, H264, H265, WMV, MOV, VPX formats can be integrated into the Content Management System (CMS) for display of a tactical picture and stored into databases for future access. Image processing and handling capabilities are also integrated to the CMS providing capabilities such as picture overlays to the tactical picture. MilSOFT Image Exploitation System (IES) receives EO/IR, SAR, GMTI, Telemetry sensor data from the UAV via Control Station, performs screening and exploitation functions and reports the exploitation products to intelligence requesters. With this integration,theUAV can exchange data directly with CMS. One of the main purpose of MilSOFT IES is to collect different kind of intelligence data (OSINT, HUMINT, IMINT, SIGINT etc.), process and fuse them and serve the usable common intelligence picture.

Electronic Warfare (EW), Modeling and Simulation:

MilSOFT has provided many products and solutions in the EW, Modeling and Simulation domain, consisting of Avionics based flight test readiness and post analysis simulation, Automatic Counter Measure Dispense System Simulation for Fixed and rotary wing aircrafts, existing and generic typed surveillance and tracking radar simulator, Tactical Data Link Simulators for various Links (e.g. Link 16), coastal security planning and the EW training simulator.

As of May 2017, more than 2000 Electronic Warfare Officers of the Turkish Armed Forces, were trained with our Electronic Warfare Training Simulation system. MilSOFT also provides EW courses to officers and to allied countries.

Embedded Systems: MilSOFT has been awarded with a critical software package with the Sikorsky S-92 Maintenance Data Computer Software Project in the international market. In addition, MilSOFT produced the SeaHawk Helicopter Mission Computer and



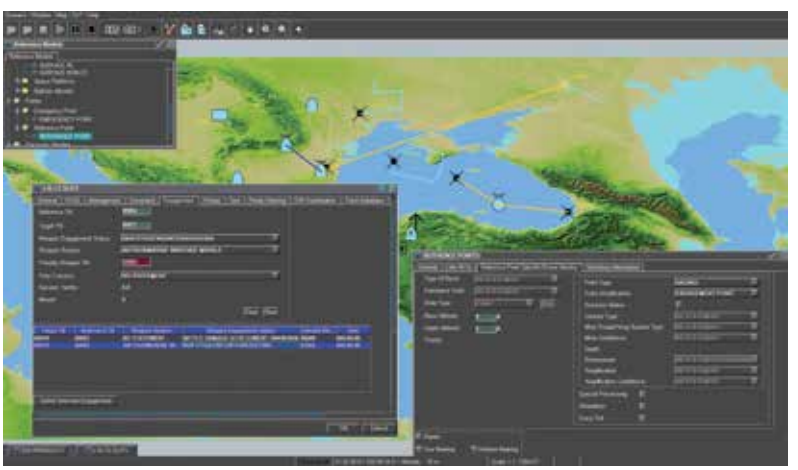
the S-92 Helicopter Maintenance Data Computer SW.

In satisfying airworthiness regulations of the USA FAA (Federal Aviation Administration), Maintenance Data Computer (MDC) software is developed, verified and certified according to RTCA/DO-178B standard Level C by MilSOFT, as part of the Sikorsky S-92 Helicopter Type Certification.

MilSOFT is also developing avionics/embedded software for some national programs. Open Architecture Computing Environment (OACE) compliant software development experience has led to the implementation of FACE as a vital infrastructure to be invested in for embedded avionics software development projects. Today an interpretation of FACE is implemented and used in avionics/embedded in our projects such as the ANKA Unmanned Aircraft System, Kement and Erciyes projects. MilSOFT also developed an in-house Data Distribution Service (DDS) Library, which can easily be adopted as required for another advanced version of the existing FACE infrastructure.

MilSOFT also has provided its Tactical Data Link System products as an Embedded System which is running on Real-Time Operating Systems for F-16s, C-130s and Network Enabled Weapons (NEW).

ICT Solutions: MilSOFT has strong bonds with logistic support systems. Our Logistic Support System Mil-TRAC-Lifecycle Support & Management Information System is a part of the Main Battle Tank prototype of OTOKAR. The General Directorate of Meteorology and the Turkish Coast Guard are also using modular parts of the logistic support and management package. We are continuously evaluating our products with our partners in order to best serve them.



MilSOFT has an IT middleware product, TURKUAZ, compatible with international standards, extending the capabilities of applications by using a foundation of common services and functions that are built on a service oriented and network-centric architecture.

TURKUAZ brings together enterprise service middleware and real time information providing middleware (such as DDS). TURKUAZ is deployed on top of a computing environment and a set of commercial infrastructure elements: an operating system, an application server, a database server, an enterprise service bus, etc.

MilSOFT uses TURKUAZ, in all net-centric system products, especially those that require a complex set of interoperability requirements. Some examples are Emergency Management applications, Logistics and Fleet Management applications, Command Control Information Systems (C2IS), Maritime Information Systems, etc.

As the Undersecretary for Defense Industries stated earlier, the software business is the area in which we have no excuse to lag behind globally. MilSOFT is working hard to be competitive around the world in terms of quality, performance, technology and price. Being at the top tier in quality does not necessarily mean success in business. Companies have to be known. In this regard, we visited the Sea Air Space Exposition on April 3rd-5th 2017 in Washington D.C and we used the occasion as exposure, demonstrating that MilSOFT can most definitely be player in the international market with its expertise and know-how.

We also know that our proficiency and capabilities will expand with every partner/customer that we work with. We value and appreciate every detail of feedback on our path to perfection. We are working hard to make our capabilities known and held in high regard. As we grow, our added value to Turkey will also grow. In this direction, IDEF 2017 is an excellent opportunity for us.

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AKSA Run Flat Systems – Providing Assurance in Safe Mobility

AKSA Run Flat Systems was established in 2011 in Ankara, Turkey and has been serving the Turkish defense industry with the suppport of the Undersecretariat of Defense Industries (SSM).

As an innovative and leading Run Flat Systems solutions provider, AKSA Run Flat Systems not only fulfills the requirements of the Turkish defense industry, but also provides a wide variety of products that are in line with leading armored defense vehicle manufacturers worldwide. In addition, providing solutions for civilian vehicles are also an expertise of AKSA Run Flat Systems. The company's factory produces run flat systems for the police force and other public vehicles such as ambulances, buses, fire trucks, loaders etc. With dedication, AKSA Run Flat has produced improved run flat systems to save human life.

Over the past six years, AKSA Run Flat has provided a range of different run flat systems for companies in the Turkish defense industry, including:

- Katmerciler
- Bmc
- Otokar
- Turkish police headquarters
- Nurol Makina
- Anadolu Isuzu
- Best Grup
- Turkish Army

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Demonstrating their pride as a family business, AKSA Run Flat works to solve client challenges with efficiency, providing expert training and service. Unlike other big corporations, AKSA Run Flat is able to step in quickly to meet customer requirements; from obtaining materials, designing, producing, to assembling and testing, all efforts which benefit their customers in time and labor savings. Key factors in the company's success include their ability to offer:

- Short response time
- Advantages of speaking with a live representative
- Short turnaround time for logistics
- Flexible working conditions
- Priority and urgency

The Republic of Turkey is taking proactive measures to increase the manufacturing of local products and to decrease dependence on foreign products. With the unequivocal and decisive support of the Undersecretariat of Defense Industries (SSM), local companies in Turkey, such as AKSA Run Flat, are able to confidently produce and sell their products in domestic and foreing markets. Ukraine, Russia, Indonesia and Iran are now included on AKSA Run Flat's growing list of client.

AKSA Run Flat is not just a company, they are truly a customer partner.


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Netaş Fully Supports Local 4.5G Infrastructure with ULAK

Spearheading innovations in the field of telecommunications in Turkey for 50 years

Standing out with its R&D and innovation activities, Netaş continues in line with its vision to become the #1 systems integrator in the region. The company carries out major ICT and defense communications projects. As part of the ULAK project led by the Undersecretariat for Defense Industries, Netaş developed the baseband unit of Turkey's first local 4.5G base station in collaboration with Aselsan and Argela. ULAK will lay the groundwork and build a knowledge base for the 5G work in our country.

Expressing his pleasure from taking part in the development of the first locally developed base station by Turkish engineers using technology that only a few firms in the world have at their disposal, Netaş CEO C. Müjdat Altay commented:

"We are proud to be a member of the ULAK consortium, which will contribute greatly to Turkey's development in all areas. We are developing the baseband unit of the ULAK 4.5G base station at Netaş laboratories. The project offers a major opportunity that will help a significant portion of the billions of US dollars kept in the national economy rather than spent abroad. In addition to being a national brand in the field of advanced technology, ULAK will also create a totally new market and allow for the emergence of global technology brands from our country."

Mr. C. Müjdat Altay - CEO of Netaş

ULAK received first orders!

First orders were placed for Turkey's national 4.5G project at a signature ceremony was held on 27 February 2017 at the Mobile World Congress Barcelona. Ministry spokespeople, BTK, Undersecretariat for Defense Industries, and operators signed the purchase order agreement. Each of the 3 operators in Turkey placed an order for 250 base stations, further strengthening commitment to take Turkey into the future in mobile communication.

C. Müjdat Altay commented on the first orders for ULAK: "Within the framework of our collaboration with the ULAK 4.5G base station, which will greatly benefit our country, we joined forces with Aselsan and Argela with a view to build Turkey's digital future. At Netaş, we are further diversifying our joint efforts with telecom operators while bringing business intelligence projects to life as a technology producer. As a result of the 4G development work we launched using our own resources in 2008 just as 3G licenses were being issued in Turkey, we developed the Baseband Unit of the 4.5G product under the ULAK project in line with LTE-Advanced Version 11. We have recorded significant gains on 4.5G from the day we launched this project. Today, we have the most extensive 4.5G laboratory and most experienced 4.5G team in Turkey. We are leveraging our 4.5G knowledge and infrastructure to rapidly develop the 5G technology. We hope the first order placed for ULAK will be a significant

milestone. Hopefully, this step will also pave the way for Turkey's 5G map."

C. Müjdat Altay added that as a 5G Infrastructure Association member, Netaş was also elected as a board member of the European Technology Platform NetWorld2020, which was established with a view to shape the mobile and fixed communication systems of the future. Under the Turkish flag, Netaş continues its efforts together with the world's foremost technology firms.

First Test Conducted at Netaş Laboratory

ULAK's Universal Service Utilization demonstration was held at the Netaş R&D Next Generation Communication Systems Laboratory in Kurtköy, Istanbul. ULAK Base Station aims to provide 4.5G service in Turkey's most remote corners. Accordingly, ULAK's Radio Access Network Sharing feature is of great importance to its usability under Universal Service. This feature was demonstrated on 15th of March at a session attended by the Ministry of Transport, Maritime Affairs and Communication, Undersecretariat for Defense Industries, Mobile Operators Turkcell, Türk Telekom and Vodafone, and members of the ULAK Consortium.

During the demonstration, Radio Access Network Sharing feature, which is essential to the use of ULAK's Universal Service, was successfully used to render services to all three operators simultaneously on a single card. Thus, completion of the most important step in the use of ULAK Base Station in the Universal Service Network was observed and tested.

Netaş Taking the Lead in the Development of Telecom and Defense Communications in Turkey

Since it was founded in 1967 with the goal of meeting Turkey's communication needs through local development, Netaş has consistently spearheaded innovations in the field of telecommunications in Turkey for 50 years. The company established Turkey's first private telecom R&D center in Turkey, where more than 700 engineers currently work. Netaş believes that R&D is a crucial factor that would allow Turkey to develop its own technology through genuine and local means, and views all R&D activities and gains as a "national cause."

In addition to all its operations, Netaş also plays a major role in the modernization of the defense communications network to cater to the needs of the Turkish Armed Forces. Designing high tech products for the Turkish Defense Industry, Netaş develops multi technology communication systems in line with world standards. All solutions provided in this field are completely original and designed and developed by Netaş.

Netaş' defense solutions include various general purpose or application-specific military electronic and avionics system solutions, particularly strategic and tactical communication systems. Some of these also include IP/ATM/ISDM Switching and Routing Products that offer Tactical Field Network Solutions and end-to-end IP routing, ATM and Ethernet switching, ISDN and X.25 package switching data communication providing voice, data, and video communication.

PEI Genesis: Mission Critical Connectors for Military Operations

FilConn Inc. manufacturer of precision high reliability filter, transient suppression, and custom configured connectors Acquired by PEI Genesis

The Customer

The Naval Air Warfare Center Aircraft Division (NAWC-AD) team supports research and development, engineering, and testing and evaluation of all U.S. Navy and Marine Corps air vehicle systems and trainers. NAWC-AD manages test ranges, test facilities, laboratories and the aircraft necessary to support U.S. military fleet acquisition requirements. NAWC- AD also provides a variety of services to the Department of Defense and other federal agencies, as well as non-federal customers. For this project, FilConn worked with the NAWC-AD department that oversees aircraft weapons systems, called Air Vehicle Stores Compatibility Branch.

The Challenge

The U.S. military was bringing decades-old OV-10 Bronco turbo-propeller planes out of retirement to use again against ISIS. Broncos, first used during the Vietnam War, are slower and lower flying than newer aircraft, so military leaders thought they would better support ground troops in the Middle East. They are also more cost-effective. However, because the aircraft were not initially designed to carry newer technology and weapons, NAWC-AD ran into major space and weight restrictions trying to get the vehicles back into flying and fighting service.

The project required electronic connectors that would get in these tight spaces that were also as light as possible, which could not be found in Commercial Off-the-Shelf (COS) connectors. The team also required a quick disconnect between the aircraft's weapons carriage device – or pylon -- and the weapon, so the cable and interface could be retained once the store has been deployed. A custom solution was needed. They were faced with a rapid response project to update the technology and field the aircraft so it could be tested in a real wartime scenario.

The Solution

FilConn began communications with the NAWC-AD team, and traveled to the Maryland site to meet in-person with the engineering team, study the requirements and see for themselves the aircraft space restrictions and configurations. Immediately following the visit, the FilConn design engineers went to work, first developing a connector design and prototype, then a design that included the connectors with a low-profile custom integrated banding platform, to save on space and weight. They sent the model to NAWC-AD, who printed it on a 3D printer in plastic for evaluation before metal was ever cut. Of course, the connectors had to withstand harsh environments, and were tested for, among other things, shock, vibration, altitude, moisture, salt spray, immersion (water/fuel), and electromagnetic interference, vulnerability, and pulse (EMI/EMV/EMP). In the end, partnering with the FilConn experts delivered a unique design solution with unmatched speed and precision, outfitting yesterday's aircraft with current state technology in only eight weeks. From design to delivery, a timeframe that allowed NAWC-AD meet their operational goals.

The Outcome

FilConn delivered a highly-tailored solution on a very aggressive timetable that integrated a new store on the aircraft that is not currently on any other Navy aircraft. According to U.S. Central Command, the twin-engine OV- 10 Broncos completed 134 sorties, including 120 combat missions, acting as cover for soldiers fighting ISIS terrorists on the ground, over a span of 82 days beginning in May 2015. The OV-10s' famously reliable nature was evident, with 99 percent of their planned missions completed. Central Command would not confirm where they were based, or the targets they attacked, but said they were part of Operation Inherent Resolve, the American-led initiative against the extremists in Syria and Iraq.

The NAWC-AD R&D team learned some valuable lessons on this project, for one, how to better handle this weapons interface. In addition, they now have quick access to a FilConn custom connector solution for future projects. And the use of the integrated banding platform (connector and back shell in one) simplifies the purchasing process as the solution is one part number with a smaller profile vs. two.

The weapons and counter-measures division has also passed learnings on to other NAWC-AD divisions who oversee flight controls, or aircraft equipment in general. As a result, this project may provide benefits beyond just getting the Broncos operational.

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Katmerciler at IDEF Fair with its Unique Armored Vehicles

With its influential participation in the IDEF'17 Defense Fair, Katmerciler will be displaying the 4x4 tactical wheeled armored combat vehicles that are in line with NATO standards with high ballistic and mine protection levels, while also unveiling its armored ambulance for the first time at this event. Katmerciler will be at Hall 8 at stand number 807

Katmerciler, the Leading Manufacturer of Turkish Land Platforms, is displaying the unique land vehicles and their capabilities at the IDEF exhibition which will be held in Istanbul on 9-12 May 2017.

Katmerciler will be welcoming its visitors and showcasing the tactical wheeled combat vehicle HIZIR developed in line with NATO standards, with ballistic-reinforced armor. Also on display will be the personnel transportation vehicle KHAN and the 4x4 armored vehicle NEFER will be displayed for the first time throughout this IDEF exhibition. The launch of HIZIR, which is the most powerful vehicle in its segment, was conducted by President Mr. Recep Tayyip Erdoğan in November 2016 at the 3rd High Tech Port by MÜSİAD event held in Istanbul and the vehicle captured attention and was one of the prominent vehicles of the event. NEFER, the composite ceramic armoring system on a Rubicon Jeep, which was a first for Turkey, was introduced at the same fair as well.

Filled with novelties, Katmerciler at Stand number 807 stand in Hall 8 is once again expected to draw tremendous attention.

Solution Partner of the Sector

Established in 1985, Katmerciler started-up its activities for the requirements of the defense industry in 2010 with the Anti-Riot Vehicle (TOMA) that it manufactured. With its product portfolio aligning with the various requirements of the armed forces and security forces, Katmerciler is the powerful solution partner and supplier of the defense and security sector.

Additionally, considering the defense industry, the following vehicles and products exist within the product range of Katmerciler: Armored ADR Fuel Tanker, Riot Control Shield, Armored Dump, Remote Controlled Armored Caterpillar Excavator, Armored Low Bed Trailer, Armored Water Tanker, Armored Construction Equipment.

Unique Vehicles to be on Display at IDEF' 17

Introducing its 4x4 Armored Ambulance for the first time at this fair, Katmerciler's products, completely developed and manufactured at its own R&D center, will be displayed at company's stand at the fair; their features are briefly summarized below.

HIZIR: The most powerful combat vehicle in its segment

HIZIR is the tactical wheeled armored combat vehicle featuring the highest engine power in its own category within Turkish defense industry.

HIZIR was developed in compliance with the NATO standards, in 4x4 configuration with high maneuver capacity in accordance with the operational requirements of the security forces. It has the capacity of nine personnel and features protection levels against high ballistics, mine and improvised explosives. It was designed to display high

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performance under intensive conflict circumstances in rural and urban areas. Due to its superior capabilities, HIZIR is a reliable vehicle of the armed forces and security forces.

HIZIR is a platform vehicle providing versatile, cost efficient and practical maintenance for various configurations such as command control vehicles, CBRN vehicles, weapon carrier vehicles (feasible integration of various weapon systems), ambulance vehicles, border security vehicles and scout vehicles.

4x4 Armored Ambulance

4x4 Armored Ambulance was designed and equipped over a Ford F550 Chassis to conduct transportation, first aid and to transport patients in high risk regions. With the advantage of its broader interior volume, medical teams inside the vehicle are able to effectively carry out operative procedures and respond to the patient. The vehicle features the carrying capacity of up to a total of 8 staff consisting of 5 patients, 2 healthcare personnel and a driver included. The armored ambulances are capable of maneuvering all types of road and climate conditions, with 300HP and 4x4 driving featuring 4x4 off-road capabilities.


© Katmerciler

© Katmerciler

NEFER armoring system was demonstrated over the Rubicon Jeep as a first example of its category in Turkey. NEFER armor system can be placed over 4x4 off-road vehicles such as Toyota Land Cruiser, Volkswagen Amarok, Ford F550 and it can be applied on other wheeled vehicles as well tracked platforms. Katmerciler has been proceeding its activities in order to use this technology for armored ambulances in addition to its combat vehicle HIZIR and personnel carrier KHAN.

These vehicles with their superior mobility and agility have a unique position in their class and are able to cope with all types of ground and weather conditions. As the cutting-edge high technology composite and ceramic based characteristics that maintain the full security of the driver, healthcare personnel and the patient. They could be designed in the required configuration and in accordance with different ballistic levels.

NEFER: The Armoring System that does not Make the Vehicle Heavier

The new armoring system introduced to the sector by Katmerciler is called NEFER. This system was launched at the 3rd High Tech Port by MÜSİAD event in November 2016 and drew great interest. This composite ceramic based armoring system is lighter than steel armor and therefore, while it provides the same level of protection as steel armor, it does not make the vehicle heavier. This system can be optimized for both rural and urban usage over vehicles

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material system is developed especially for the vehicle in this armoring system, the vehicle is equipped with the full protection features without decrement to its performance. In other words, as the NEFER armor system does not make the vehicle heavier, a vehicle with higher maneuver capability than its equivalents yet comfortable comes to light. From an objective point of view, one could never realize if these vehicles are armored, therefore they are quite convenient for the government and state authorities such as ministers, members of the parliament, mayors and chiefs of police demanding high security and protection.

Mr. Furkan Katmerci - Deputy Chairman of the Executive Board at Katmerciler

KHAN: The first member of the Armored Personnel Carrier Family

KHAN developed by Katmerciler according to NATO standards, provides ballistic protection and a high level of protection against grenades. It is the first member of 4x4 tactical wheeled armored personnel carrier family. The vehicle features the carrying capacity of 8 personnel. It is a high-speed, versatile vehicle with maintainability. Over a Toyota Land Cruiser, it has monocoque steel armor carcass providing high ballistic protection. The vehicle is capable of fulfilling all requirements of internal security forces in rural or urban terrain operations and with the capacity to conducted operations under all types of weather conditions.

Deputy Chairman of the Executive Board Mr. Furkan Katmerci: "Our goal is to broaden the product-range from Armored Vehicles to Tracked Platforms"

Katmerciler's Deputy Chairman of the Executive Board Mr. Furkan Katmerci: "We possess a powerful R&D Center and to us the feedback coming from the field is a treasure to us. When we are developing a vehicle, we initially define the requirements clearly, survey equivalents at home and abroad and we are provided with the feedback from the field, especially from the users of the vehicles. We strive to develop a vehicle that is optimal with the requests of our army and our security forces. Then again, we know that the development process never ceases. We have to constantly struggle with maximum effort to develop and manufacture a better vehicle, more proper, more robust and the strongest vehicle, as the staff in these vehicles in conflict conditions are our children and our brothers. All of our vehicles are being designed and developed at our own R&D Center. We are becoming our defense sector's strong production base and solution partner through our ballistically reinforced, wheeled armored vehicles within NATO standards which have high protection against mines. Following the establishment of our facilities at İzmir Çiğli, our investment in Ankara which we plan to concentrate on the defense industry, will prominently enhance our company's development and production capabilities. Our armored combat vehicle HIZIR and armored personnel carrier KHAN are our vehicles that are winning the recognition of the sector and are entering inventories in various sectors. Besides, the 'NEFER Armor System' that provides protection for high profile authorities with exclusive high protection requirements is an innovation that we introduced to our sector. We presume that our armored ambulance, which will be introduced at IDEF'17, will draw significant interest as well. In the long run, Katmerciler will be in a wide variety of products extending from the 6x6, 8x8 armored platforms to tracked platforms. By demonstrating ownership in Turkey's ambitious 2023 vision, we aim to enhance our contribution to our defense industry through the products we will develop and strengthen our position within the sector on global scale. We will stride with purpose to this end."

KHAN 4x4 Vehicle

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Solid Reputation of YDS Goes Beyond the Borders of Turkey, Making Footprints all over the World

YDS is a Turkish company that manufactures technical boots, shoes, textiles, ballistic eyewear, saddlery and tent products in the field of military and security according to international standards.

YDS is located at a facility spanning and area of 100,000 m2 in Ankara and utilizes the world's highest technologies. YDS is the industry leader producing 6 million pairs of technical boots annually. YDS is ranked amongst the top 500 companies in Turkey and is the only company in its sector on this list.

Through innovative perspective, YDS has started to offer new solutions to military, police and outdoor requirements by expanding its product range

in technical textile production in recent years. It aims to meet the requirements worldwide by consistently developing all kinds of textile such as uniforms, cold climate parks-pants, backpacks, ammunition and ballistic vests, sleeping bags, ponchos and tents, the products that it has been producing for many years.

YDS has become one of the key suppliers in the field of technical shoes/boots in the UK with the Goliath brand and its team incorporated in 2003.

Having international certifications such as EN ISO 20345/20347, ISO 9001 and OHSAS 18001, YDS has exported its products to more than 50 countries mainly to England, Russia, Denmark, Oman, Jordan, Saudi Arabia, Qatar, France, Italy, Spain, Portugal, Mongolia, Kyrgyzstan, Kazakhstan, Georgia, Azerbaijan, United Arab Emirates and Lebanon.

YDS produces the technical boots of the British army by having won the largest boot tender in the world, on the basis of turnover, opened by the British Defense Ministry.

The YDS Teknoteks Laboratory is accredited by SATRA International Shoe Technology and Test Center. At the Teknoteks Laboratory quality control of products are tested regularly and continuously through physical and chemical methods according to the technical specifications, European and NATO standards.

YDS aims to be the most preferred technical footwear and textile brand in the world. Have confidence. Nothing is difficult. Step forward with YDS.

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3G and 4G Smartphone Security

Understanding security and encryption on mobile networks

The smartphone is the most commonly used communications device in the modern world. 72% of Americans, 59% of Turks, and 88% of Koreans use them. Virtually every business executive, politician, and military leader uses a 3G or 4G smartphone. Thus, it is ironic that key holders of corporate and national security secrets rely on a communication device that is virtually devoid of security.

Discrete communications are widely intercepted. One has only to read the news to recognize that "secret" national security discussions by the leaders of Turkey, Germany, USA, and many others have been recorded and publicly released. Clearly, purportedly secured communications are anything but. And the most unsecured communications involve 3G and 4G mobile devices.

Figure 1. 3G/4G encryption is not end-to-end. Only the RF between the mobile device and the BTS might be encrypted.

3G and 4G encryption

It is often repeated that 3G is encrypted and 4G is not. This is only true from a basic sense. In reality neither should be considered encrypted sufficiently for national security. First, both 3G and 4G refer to radio frequency (RF) protocols broadcast between the mobile and the Base Transceiver Station (BTS) on the tower. As a radio signal, the communications between the device and the BTS are easily intercepted and recorded.

3G employs an encryption protocol known as A5/1, which was demonstrated to be cracked by a single PC in two hours. Today, the methods and tools to decrypt A5/1 are commonly available on the internet, and devices which include the A5/1 decryption may also be purchased on the internet. Thus, the 3G A5/1 encryption is effectively useless against even elementary interception. Some networks employ newer encryption protocols, but that offers but a minor deterrence to serious hackers.

4G in itself has no inherent encryption of the RF signal. It does, though, offer improved authentication, as well as AES and two other encryption methods. But offer — as opposed to employ — does not guarantee any level of encryption since the level of encryption is dictated by the capabilities of the BTS and mobile operator. In short, neither 3G nor 4G offer any assurance that the RF communications between the mobile and the BTS are secure.

Man-in-the-Middle (MITM) interception

Law enforcement agencies in the USA and other countries employ false BTS units that emulate those of mobile carriers. This is known as Man-in-the-Middle (MITM) interception and is quite commonly used to violate IP-based networks.

Figure 2. Security concerns exist everywhere on an unsecure network. A Man - in - the - Middle (MITM) with a false BTS unit can intercept mobile communications. Additionally, external hackers or even spies inside the network can listen in on conversations.

These MITM devices pretend to be a mobile BTS, coordinate an encryption key with the mobile device, intercept the communications, and pass it back to the mobile carrier or the PSTN. The mobile user has no idea that the communications have been compromised. And, since the MITM BTS knows the encryption key, it can easily decrypt communications before forwarding it to a lawful network.

Like RF interception devices, these MITM fake BTS devices are available to governments and naturally are available on the black market. As a result, 3G and 4G communications- encrypted or otherwise- cannot be considered to be secure.

Encrypted vs. secure

Encryption of digitally conveyed communications is a mechanism to scramble all or part of a message such that patterns are not readily identifiable and thus cannot be recompiled into the original form until decrypted by another device.

Security is a much broader consideration. Encryption is merely a part of a full security plan, which also involves network design and, more important, human behavior. As observed prior to the US elections, individuals used unencrypted devices even while encrypted devices were available.

Examination of encryption

Modern digital communications (e.g., VoIP) encryption mechanisms scramble the message with the use of a standardized unique key which is known only to the devices on either end of a connection. Typically, the key used for the popular Advanced Encryption Standard (AES) is 128 bits in length.

Cinematic films have popularized the scene of the good guy entering codes (keys) in order to guess the correct key/ password to decrypt the information. This is known as the Brute Force method. But while popular in movies, Brute Force would require a billion billion years (yes, that is a billion times a billion years) to decrypt one message. In fact, to this date AES 128 has never been broken with Brute Force.

That is not to say that AES 128 has not been deciphered. The most common "secure" VoIP encryption protocol is Secure Real Time Protocol (SRTP) which uses AES 128 encryption. However, oddly enough, if SRTP is sent over non-encrypted medium (as is commonly done) then the key is sent unencrypted. This is equivalent to locking one's home but leaving the key hanging on the front door. In order to benefit from the AES 128 encryption, SRTP must always be sent over Transport Layer Security (TLS).

3G and 4G encryption is meaningless to security

Even if 3G and 4G were properly encrypted, it must be recognized that these terms refer only to the RF signal between the device and the BTS. To make it perfectly clear: 3G/4G encryption is not between the two devices. In almost all cases, the BTS decrypts the communications and passes it through the mobile network, the PSTN, and/or the government network totally unencrypted.

Besides MITM interception of 3G and 4G RF communications, great risk also resides once the unencrypted communications are inside the fixed network(s). It should be no surprise to anyone that IP-based networks have been regularly compromised. Networks based on Signaling System 7 (SS7 or C7) offer little added security, as these have been demonstrated to be hacked by external forces, and communications recorded. Those concerned about secure communications should consider no mobile, public, private, or government network to be secure.

While hacking by foreign agencies or domestic enemies is a grave concern, it pales in comparison to the real problem- internal interception and dissemination of communications. That is, a person with inside access to the network's decrypted communications with virtually no impediment to intercepting 3G, 4G, VoIP, and other technologies. Virtually all of Wikileak's tens of thousands of state secrets were internally intercepted; U.S. president Donald Trump's calls to Russia were internally intercepted. Turkey as well has made international news with voice conversations internally intercepted. It should be perfectly clear that the primary concern is not 3G/ 4G encryption, but total network security and encryption from end device to end device.

Figure 3. Achieve end-to-end encryption with REDCOM's Sigma Client, which encrypts all voice, video, and chat communications with AES 128 encryption that has never been broken.

Security for smartphones

With the networks that carry communications so easily compromised, it is obvious that the only way to secure 3G and 4G (as well as VoIP) communications is with appropriate encryption from device to device, with the encryption carried uninterrupted throughout all networks in which the communications may pass. Only in this manner may communications be secured against enemies external and internal, foreign and domestic.

Fortunately, a solution does exist. REDCOM's Sigma Client is an app that provides end-to-end total AES 128 encryption between smartphones, PCs, and VoIP phones/ video terminals. With Sigma Client on both the originating and terminating smart devices, and an IP transport network in between, all voice, chat, and video is encrypted to a standard that has never been broken.

As a client application, Sigma Client ensures complete encryption through 3G, 4G, public (IP-PSTN), and packet-based government networks. This alleviates the real risks of external as well as internal interception. REDCOM's Sigma® Core encryption server provides authentication (authorization of use) as well as access control (who is permitted to call who/where; e.g., prohibiting calls out of country).

As an added bonus, REDCOM's Sigma Core encryption server can provide end-to-end AES 128 encryption to not just 3G and 4G mobiles, but also to VoIP phones, IP video terminals, and even the Sigma Client app on Windows PCs.

Considering the damage caused by international espionage and the lack of security with 4G, can any agency continue with such incredible risk? It would be foolish to do so, given that a solution readily exists and is available today.

Charles DeRoller leads international sales and marketing activities for REDCOM Laboratories, Inc. For more than a decade Charles has assisted international governments and carriers with realistic transition to packet-based solutions with a focus on network resilience and disaster recovery. His paper Economics of Next Generation Networks: Preventing a National Economic Catastrophe published in PTC '11 Proceedings correctly predicted significant national communications outages due to deficient network design. He holds a BS in Computer Science, a Certificate in International Business, and a Masters in Business Administration. In his free time Chuck studies malicious attacks and single-point-of-failure catastrophes in critical core networks.

EnVision GOSSAMER on the Road to Catch the Essential

By Katja Kiukas, CBRN Solution Business Manager, Environics Oy

The EnVision Product Family by Environics provides fast deployable temporary CBRN detection capabilities for variety of applications where ever and whenever they are needed.

Mobile CBRN detection Capabilities to the FDF

The newest launch by Environics in the EnVision product line - EnVision GOSSAMER - represents a military grade, mobile Ground Operating CBRN Surveillance System with Advanced Measurement and Event Reporting. The product originates from the concept of the CBRUGS project (Chemical, Biological and Radiological Unattended Ground Sensors) supplied for the Finnish Defense Forces. This system has been successfully delivered and approved in the site acceptance

testing at the beginning of the year 2016. Currently, operator trainings and field testing are in progress, and it is expected that the CBRUGS system aka EnVision GOSSAMER will be taken to operative use by the Finnish Defense Forces later this year.

Building up Sensor Fields with Wireless Communication

The EnVision GOSSAMER is formed by tripod based CRN measuring and data processing units and bioaerosol detector units, command and control posts with GIS based EnviScreen Operix CBRN monitoring software and rugged laptops, PDAs for local user interface, related radio communication system components and battery packs as power supplies. The EnVision GOSSAMER is typically featured with several sensor fields, each built upon a number of the key system building blocks, e.g. one sensor field containing ten Sensor Nodes and A Command and Control Post.

Real-time Situational Awareness for Many Occasions

The system has been designed for Military Special Forces to be applied both in peacetime and wartime missions. It is ideal for creating temporary, mobile sensor fields for national or international crisis management or support for the other authorities. These occasions include surveillance of accidental releases of airborne hazards e.g. around factories, warehouses, power plants, seaports and airports or surveillance of possible intentional releases of airborne CBRN agents related to battlefield operations, suspected terrorism or vandalism. “Real-time CBRN situational awareness is critical in the operational decision making process. With this field deployable

EnVision GOSSAMER system situational awareness, required in actions of the defense forces, can be increased. Furthermore, the area of application of this sophisticated surveillance system is wide, from harbor protection to airbases and mass events,” says Major Mikko Elo from the Finnish Defense Forces.

Environics Oy has operated in the field of CBRN detection nearly for 30 years and grown intensively as a provider for turnkey CBRN System Solutions during the last ten years. The trend has been boosted with related system software and application customized CBRN detector development. Nowadays fixed installed and mobile CBRN detection/monitoring systems play a significant role in the Environics´ annual CBRN business.

The Turkish Defense Industry's Newest Consortium of 5 Shipyards; TAIS Sets Sail to Become a Global Brand

TAIS, the Turkish Defense Industry continues to work as a modern, rapidly developing and dynamic sector, providing excellent opportunities for business partners, investors and customers all over the World. In this context, some portions of projects awarded by the Undersecretariat for Defense Industries have been completed, and some are still under construction. All of the potential strength in the state-owned and private sectors has been mobilized for the MILGEM Project. Excellent cooperation has been demonstrated between the private sector, and in particular institutional information, utilizing the experience, facilities and personnel of the Undersecretariat for Defense Industries and Naval Forces Command, pertaining to program management, resource allocation, project management, design and shipbuilding. Developing projects in accordance with the ship building plan, manufacturing, and punctual delivery have all been carried out within a budget able to compete with the precedent set by our foreign predecessors. The experience gained from these projects will be used in other military ship projects. In addition, they will create opportunities for privately owned shipyards to expand into foreign markets with their certified and to-standard. A consortium named TAIS, with the cooperation of five shipyards: Anadolu Shipyard, Istanbul Shipyard, Sedef Shipyard, Sefine Shipyard and Selah Shipyard has been established due to the desire of our shipyards to export their products to the international market in the coming years with the momentum of their superior achievement level in the defense industry projects. Our shipyards, demonstrating great success with the support and contribution of the government, have the will to achieve greater accomplishments by exporting our products with the prestigious TAIS brand, in addition to providing all the requirements of our Navy. We wish for this new union to be established as TAIS in goodwill for the betterment of our community, our navy and our country.

Aselsan to Provide V/UHF Electronic Support System for Turkish Land Forces Command's Electronic Warfare Command, Control and Coordination System

The Electronic Warfare Command Control and Coordination System of the Land Forces Command and the V-UHF Electronic Support System Project was signed between Aselsan and the Undersecretariat for Defense Industries on 29 March 2017.

With the completion of the Electronic Warfare Command, Control and Coordination System project, the objective is to develop a joint system that will enable more effective use of the different Electronic Warfare systems already existing and to those to exist in the inventory of Land Forces Command in the future. Thus, the Electronic Warfare command elements will be able to evaluate acquired information faster and more accurately, and the obtained Electronic Warfare information will be conveyed to the affiliated troops and major commanders in a timely manner.

The EHKKKS system will be fully developed with local industry capabilities and the related deliveries under the Agreement are scheduled to occur between 2020 and 2022.

Within the scope of the V/UHF Electronic Support Systems Agreement signed concurrently, the Turkish Armed Forces will be able to detect, monitor and track threatening communication signals. The design, development and production of these systems will be accomplished entirely by local resources. The establishment of the Training School for the system and related training will also be provided to the Land Forces Command within the framework of this Agreement.

Laselec Modernizes Wiring Processing

Founded in 2001, LASELEC designs and manufactures cutting-edge electrical wire processing equipment: UV laser wire markers, laser wire strippers, interactive harness assembly boards and harness braiding machines.

This wide range of products demonstrates the company's willingness for continuous innovation and leadership in the latest trends in aircraft electrical harness manufacturing – And that latest trend is automation.

Over the next decade, the landscape of the factory will change dramatically. Challenges for factories of the future will not so much consist in their ability to produce, but to produce with the most flexibility.

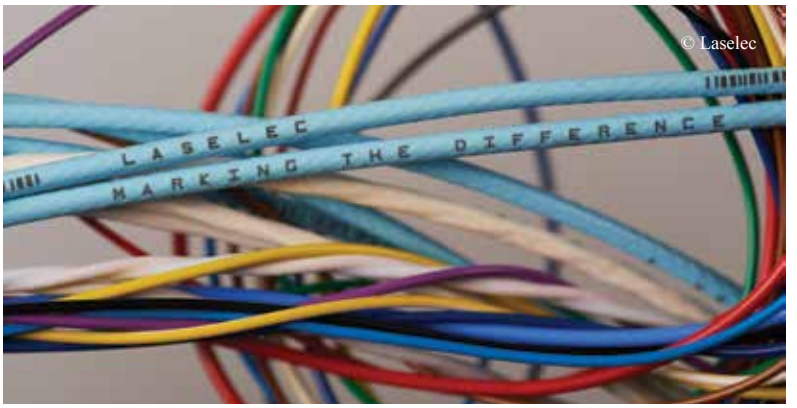
LASELEC will present its automated solutions in a special presentation at the SIAE 2017 show, in Paris (Le Bourget), from the 19th through 23rd of June, 2017.

Automation of Wire Marking Process

Until recently, the most common method for wire marking was hot stamping; a technique used since World War II. This aggressive and outdated method put the wire at risk of being damaged or burned.

For the past 20 years UV laser marking technology has been utilized as the primary solution for wire identification in aerospace harnesses. LASELEC had first developed the laser wire marker to meet the specific needs of the aeronautical field. Now, its many benefits are attracting lead actors in the railway field. By marking the wire directly, as compared to heat shrinkable sleeving that must be manually attached to each wire, wire shops equipped with a UV laser wire marker can considerably reduce their production times.

This non-aggressive UV laser marking technique ensures the electrical integrity of wiring subject to the most extreme conditions. UV laser wire markers are PC based, fully automated and range from low to high volume production. They offer



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a safe, permanent and highly legible mark resistant to light exposure, solvents, etc.

LASELEC's new ULTIMA laser wire marker is ideal for the laser marking of electrical cables and fiber optics on the production line. ULTIMA allows for "on the fly" marking of alphanumeric characters or bar codes of different sizes.

The RapidShare Automated Wire Processing Line

RapidShare is a solution designed to automate wire processing production. Prior to RapidShare being launched, the first step in the manufacturing process of an aerospace electrical harness started with the marking and cutting of wires. Next the operator had to manually group the batch of wires. Then the operator would

label and sort those batches for production processing before sending them to the shop floor for assembly on a form board.

RapidShare, attached to the ULYS Modena laser wire marker, is able to perform automatic tasks such as: labeling, stripping, crimping, bundling and kitting processes. The operator is now free to handle multiple tasks/machines instead of operating a single marking machine for an entire shift. RapidShare's compatibility with the ULYS Modena line of laser wire markers has allowed companies, such as the Airbus Group, which owns several LASELEC markers, to upgrade to the automated production system that has increased their competitiveness. More and more customers are experiencing an unprecedented level of automation. Among them are the Airbus Group (mentioned above), GE Aviation, and Killdeer Mountain Manufacturing.


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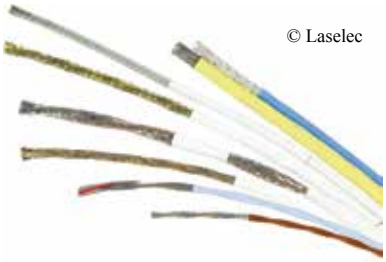
Laser Stripping Becomes a Reference in the Field of Cabling

Over the last two decades the aerospace industrial landscape has seen a tremendous surge in laser processing solutions (cutting, welding, marking, etc.). Electrical harness manufacturing is a booming sector driven by the strong growth of aircraft production and the race for autonomous cars which includes the multiplication of sensors/multimedia systems and the ever increasing complexity of the harnesses. The use of high-precision laser solutions for marking or stripping of a lighter, technical and sensitive electric cable is constantly increasing.

In recent years, cable laser stripping machines have followed a trend of sophistication, increased power, size and capacity to try to penetrate new markets in the industry. LASELEC has chosen to work against the flow by relying on innovation,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miniaturization, ergonomics and ease of use. LASELEC has developed Sylade, a patented technology for contactless cable stripping based on laser diodes. Sylade technology has been qualified and approved by AIRBUS and AIRBUS Group has recommended the use of this system for stripping their wires and cables according to AIRBUS AIPI standards. Sylade is integrated in the field of aerospace cabling and offers a level of precision, quality and consistency far superior than that of traditional tools.

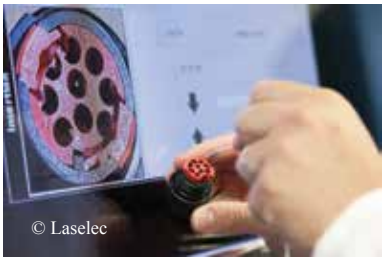
Laser stripping is establishing itself as the best solution for the stripping of shielded, twisted and multi-filament cables and meets the new requirements of the aerospace standards ASD EN2812, SAE AIR6894 updated and published in recent months.

The Sylade products are available as a stand-alone or can be integrated in an automated harness manufacturing solution. Sylade perfectly meets the need for stripping aluminum cables used in the transport sectors as well. Laser technology safeguards the ultra-sensitive strands of these new families of technical cables.

Interactive Harness Assembly Board Brings Wire Harness Manufacturing to the Digital age

Planes, trains, cars and ships contain thousands of wires that connect their various electrical systems through an electrical wire harness. The manufacturing of this wire harness is a monumental and complex task. Technicians have to deal with a plethora of assembly instructions that help aid in locating the appropriate wires, cutting them to size and connecting them to the proper components. Currently, in the electrical harness building process, technicians typically use wooden nail boards and large paper drawings. In many cases mistakes are made due to wrong information, a misunderstanding of instructions, improper training and the human error that accompanies any manual process. A double-quality check is required to root out potential errors. Unfortunately this adds to the time and productivity lost along the way.

Electrical harness manufacturers have been searching for solutions to reduce production time and related errors. LASELEC has developed an alternative to the traditional harness building method: EasyWiring interactive harness assembly boards. This innovative solution brings modernization to electrical harness building through the use of software that guides the operator through the entire harness assembly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process. Benefits of this system are readily realized and include increased productivity, reduction in training time and best yet, traceability. EasyWiring even reduces the risk of an error and trims the time spent on prototyping.

The Easywiring system itself is composed of HD Display modules (available in size 65", 75" or 82"). Each system can consist of up to 6 modules; which represents a 1.015m x 11m table with 82" modules. One EasyWiring system can replace numerous boards and increase shop floor space.

The key feature of this product relies on the full guidance from


© Laselec

the software during the harness assembly. The operator has direct access to all the information that is required for the harness building process and proper tool selection. Pictures, videos and PDF files can be accessed at any moment to save time during production.

Technicians that are equipped with the bar-code reader (optional) can scan the wires to be connected and the tools utilized in the harness building process thus allowing for full traceability of the harness assembly.

"The wire harness dynamic display and mobile wire supports allows our team to build as many electric harnesses as we need with a single production device." Says Bretagne Atelier's CEO. "This acquisition allows Bretagne Ateliers to build more complex harnesses and train their employees faster on electrical harness assembly."

While prototyping, technicians are able to make real-time modifications on a harness without changing out an entire paper drawing. Add, delete or modify any information directly through the EasyWiring software.

Today, more and more companies are looking for flexible solutions to boost their productivity, improve quality and optimize their shop floor layout. Through Laselec's innovations in wire processing equipment these solutions can be easily realized


© Laselec

Nicomatic - Pioneering and Innovating Spirit Anchored in its DNA

A worldwide reference in micro-connectors designed for harsh environments and advanced interconnect solutions ; Subsidiary Nicomatic Turkey Ltd : Hub of Middle East & Africa Region

Nicomatic is a French family SME business that was created in 1976. Its original activity was micro-screw machining, which still is a strong industry in the Haute-Savoie region (South-East France). Nicomatic started out as a trading company with a strong focus on export sales for machined parts with diameters below 3mm, before growing to become a 100% integrated company & a global connector specialist.

Today, all products are manufactured in-house with special expertise in stamping, molding, screw-machining, assembly & cabling.

Nicomatic Group is a recognized player in the connector field specializing in niche markets with miniaturized rectangular connectors and high density solutions (2mm pitch) for harsh environments, low profile MIL connectors, cabling for harsh environment and FFC flat cables. Its main use markets are defense, avionics, medical & the membrane switch industry. A growing number of space applications is listed with our technologies such as the "Jade Rabbit" of the Chinese space program or the ExoMars searching for signs of life program in collaboration with the European Space Agency (ESA).

The company had 300 staff at the end of 2016, (30M€ consolidated turnover in 2016). Its Headquarters are in France at the Bons-en-Chablais site (Haute-Savoie) which is located a few kilometers from Geneva.

Nicomatic Group is comprised of subsidiaries in the US, China, Brazil, India, UK, Germany, Turkey, South Korea, Japan, Singapor & Canada as well as a vast network of sales representatives, agents and distributors that provide a sales presence in over 50 countries worldwide. 83% of Nicomatic revenue is from export markets.

About Nicomatic Turkey Ltd : Hub of Middle East & Africa Region

For more than 40 years, Nicomatic Group has been designing and manufacturing creative interconnect solutions for harsh environments such as Defense, Avionics, Space, Medical, Energy and Transportaion markets. Nicomatic Group is considered the partner of choice for more than 500 leading companies all around the world.

Nicomatic Turkey, Managing Director, Mr. Idris Dumlu

Nicomatic Turkey operations mainly focus on the defense and avionics markets in the Middle East & Africa region. Idris Dumlu, an experienced executive in the field of Engineering and Business development, leads the new company in Turkey.

"Our new subsidiary in Turkey marks our entrance into one of the most interesting and evolving markets in the region. This move is fully aligned with our strategic orientation for further geographic expansion of our Group", said Olivier Nicollin, Nicomatic Group CEO. "Turkey is a growing market in which we want to strengthen our local footprint to better serve our customers with our broad portfolio of solutions and best in class services. Being close to our customers, monitoring their needs and requirements and responding quick to their continuously changing demands is a major business driver for Nicomatic."

Nicomatic has been active in Turkey for over a decade, and has an established strong customer base in the defense sector. "After years of growth, both with direct sales and through business partners, we decided that it was good timing to have an organization in place for an active local presence", stated Olivier Nicollin, Nicomatic Group CEO. "We are lucky to have appointed Idris Dumlu, who has very sharp knowledge in Electronics and very good sales skills, to head the new operation. Moreover, Idris has both French and Turkish citizenship, which help a lot for business development".

In June 2014 Nicomatic Group was pleased to announce the opening of Nicomatic Turkey. With this new subsidiary Nicomatic Group will be present in 10 countries through 100% owned subsidiaries.

Nicomatic Turkey Managing Director, Idris Dumlu, commented, "Turkey represents a unique and fast-growth opportunity for us, where we can offer Nicomatic's solutions and build business partnership with the main actors in the defense industry. In cooperation with Nicomatic's global partners, we aim to provide great benefits to the national economy with creative solutions and services that will allow our customers to meet their most demanding requirements".

He added "Thanks to our high quality (AS/EN 9100 aerospace and defense quality certificate), compact (2 mm pitch, low profile & light weight) and extreme modular connector solutions (more than 20 million configurations) delivered with a short lead time (1 week and No MOQ with CMM range), Nicomatic Turkey is now well known and even a preferred supplier for main defense contractors and supplies connectors for most of the big defense projects in Turkey ."

But the young Director looks toward the future and stated "I want Nicomatic Turkey to become a value added subsidiary by providing new know-how/expertise to our existing product ranges and contribute to the growth of Nicomatic Group."

Today the Nicomatic Turkey head office is located on the European side of Istanbul in the Maslak district where all the operations are managed. Sales, cabling workshop and logistics are located in the brand new Sögütözü district in Ankara in order to be closer and to provide extraordinary services and engineering solutions to their customers that are mainly based in the capital city.

Nicomatic Group is a member of several trade organizations & clusters such as the Aerospace Cluster,

EDEN (European Defense Network), SGIA (Specialty Graphic Imaging Association), FT (Fachgemeinschaft Tastaturen).

Last year (2016) Nicomatic Group celebrated its 40th anniversary: 40 years of developing interconnect solutions worldwide, 40 years of expertise and collaboration that have been successful due to the dedication and expertise of their employees. Today they are more mature and more solid than ever, with double digit growth figures over the past 5 years, they have the ability and confidence to head toward the future, taking on more challenges with vitality and ambition.

They are also building up a new company culture based on shared values of innovation, engagement, transparency, integrity, proactivity & simplicity. Nicomatic Group's philosophy is based on the Human factor as the key to success, focusing on client satisfaction and employee autonomy and well-being.

Rennovations of their HQ is underway, which will allow an additional 2,500 m² of floor space along side a new work reorganization of new equipment and a collaboration around flows and a flat structure, with no more than 3 levels of hierarchy. They strive to be more agile, and bring value added solutions, meeting more demanding customer requests.

Nicomatic SA has been ranked in the top 40 independent French companies in terms of success in exports. Their sales have reached new records, with their products now present in 65 countries as of last year.

Nicomatic product ranges :

CMM Micro connectors : Small & Brillant

CMM connectors are designed to meet or exceed electrical & mechanical performances of MIL-DTL-55302F and BS-9525-F0033 standards. This modular connector allows more than 20 million arrangements. Compact and low profile this connector allows you to save space & weight which are 2 criticals factors in embedded systems.

CMM Multi-Mix connector (Data signals, High power and High frequency contacts on board to cable configuration)

DMM connector mixed layout - 8 data signals & 2 high power contact on cable configuration with mono backshell.

Features:

- Extreme modularity (HF, HP, LF contacts, from 1 to 3 rows)
- Modularity (HF, HP, LF contacts, from 1 to 3 rows & 120 pins)
- 2mm pitch
- Board to board, board to wire, wire to wire
- Space saving up to 60% , weight saving up to 50%
- Robustness with PPS material: no humidity absorption, oxygen free, radiation resistance, solvent resistance and temperature up to 260°C
- Vibration & shock severity
- Lead time from 1 week, No MOQ
- Online services iOS/Android for designers (automatic part numbering system, automatic 2D and 3D drawings)

Microflex™ octopus – 2 branches, Female-Female.

DMM Micro D Mix connectors :

Compact & Robust

DMM Micro-D Mix connectors are compatible with MIL-DTL-83513G performances, and enable a wide choice of arrangements compared to micro-d or sub-d. They allow space saving, electromagnetic & mechanical protection thanks to one piece or two piece backshells.

Features :

- High modularity : contacts LF, HP and HF up to 2M arrangements
- Board to board, board to wire, wire to wire, panel mount (1 to 4 rows of contacts)
- Miniaturization: 2mm pitch, low profile
- Ruggedized with aluminium alloy 6061
- Short lead time and low MOQ
- Easy maintenance thanks to dismountable contacts
- Online services ioS/Androïd for designers (automatic part numbering system, automatic 2D and 3D drawings)

Nicomatic product ranges :

Microflex : flexible harness

Microflex™ interconnection is a flat cable harness with screw fixing for high vibration environment. This jumper mates with CMM 220 connector for high mechanical resistance. This solution has been tested to meet MIL-DTL-55302F performances. 3 versions are available Female-Female, solderpin-female and octopus multi branches.

Features:

- Board to board, board to wire, wire to wire
- From 04 to 60 signal contacts, 2mm pitch
- Clear and easy cabling system
- weight reduction up to 60% vs round cable
- Flexible cable and high life expectancy
- Vibration resistance

Custom solutions : Your specifications are our standards

As the electronics markets are in perpetual change, integrating new requirements and constraints becomes Nicomatic's top priority. Nicomatic decided to build a flexible initiative capable of supporting its clients and effectively meeting their ongoing challenges. Nicomatic Custom Solutions, creates a value-addition allowing Nicomatic engineers to constantly develop new solutions that will help their clients go forward in their innovation processes. In creating this new initiative, and placing the client at the heart of its development strategy, Nicomatic has the vision to be the go-to source in the world of custom-made connectors.

Nicomatic's advantages:

- Free pre-study
- For Prototype, small & medium series
- Flexibility
- Reactivity
- Quality
- Technical support

Nicomatic celebrates its 40th anniversary

Gold plated DMM full HF contacts - "Jade Rabbit" of the Chinese space program

iXblue: Exploring the Future of Navigation

MARINS, PHINS C-Series: State-of-art, full solid-state solutions for inertial navigation

During the Sea Air Space 2017 show in Washington, DC, Naval Sea Systems Command (NAVSEA) highlighted the coming advent of digital solid-state technologies over legacy MILSPEC analog ones. NAVSEA commented on the benefits sought in such a shift: advanced performances, ease of maintenance, enhanced availability and lowest total cost of ownership.

Naval navigation is currently witnessing a transformation, notably in the field of inertial technology. Recent months have seen some of the most demanding navies in the world discarding legacy inertial technologies in favor of a full, strap-down, solid-state technology: Fiber Optic Gyroscopes (FOG). The most striking example of such a mutation is certainly the Royal Navy decision in 2016 to retrofit their 35 major combatant surface ships and submarines with FOG inertial systems, following its previous selection of FOG for the new Queen Elisabeth-Class aircraft carriers and Astute-class nuclear submarines.

iXblue, a global leader in the design and manufacture of innovative solutions for navigation and positioning purposes, is recognized as the driving force behind this transformation. MARINS series, iXblue's range of MILSPEC FOG inertial systems, has established itself as the new standard for combat vessels as witnessed by its recent selection by numerous navies (UK, Germany, UAE, Sweden, France...). On top of it, MARINS M7, Royal Navy's choice, offers an unrivalled drift performance of less than 1nm in 72 hours in pure inertial mode for application in surface GNSS-denied or stealth submarine navigations.

Guillaume Dandrieux, former naval officer and iXblue's director of business development for naval affairs, explains: "The medium-term preeminence of FOG technology in the strategic naval field was anticipated some years ago by several recognized experts in the inertial domain, such as those found at the Massachusetts Institute of Technology (MIT) and the Draper Laboratory in Cambridge, MA. They acknowledged that FOG technology was to become unchallenged for strategic applications. The advent of FOG systems is therefore not a surprise and the US Navy is turning towards this technology for all of their future needs. iXblue has been the accelerator of this transition in the naval domain. It is the result of our deliberate R&D program over the last 30 years. We develop, manufacture and integrate internally all components to include optical fiber, coil winding, modulator and laser sources to maintain full control over the global system performance chain. This policy allows us to continue to reach for the highest performance while the possibilities offered by FOG technology are theoretically unlimited."

Fiber Optic Gyroscope technology (FOG) relies on the same physical principles as the elder Ring Laser Gyroscope (RLG), but with true solid-state strap-down architecture. This differentiation relieves FOG from all well-known drawbacks experienced by RLG users. Unlike RLG, FOG components' properties do not wear out with time and usage. This positively impacts the system's lifetime and exempts the users from unnecessary preventive maintenance and intermediary recalibration work. Solid-state architecture makes the system intrinsically silent with no radiated interference noise. In a FOG, two identical laser beams are injected and propagate in opposite directions through a fibre optic

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coil. The actual angular velocity of the coil, hence of the system, is then accurately measured by an interferometric measurement of the resulting phase difference between both beams. iXblue makes its FOG impervious to temperature changes and magnetic disturbance through advanced modelling of environmental sensitivities, specific designs and in-house testing and calibration. They are made resistant to extreme shocks and vibrations to meet the most stringent military requirements.

Another big advantage of FOG is its low electrical consumption compared to other technologies. FOG inertial systems offer a very good compromise in terms of low electrical performance and radiated heat versus size and drift performance. This is a prerequisite to equip underwater systems like UAV, SDV and ROV where these constraints, along with the necessary noise discretion, are paramount. Guillaume Dandrieux comments: "iXblue equips a majority of UAV systems for defense purposes. Our range of PHINS C-series is specifically designed for OEM integration within UAV systems of all sizes. We have developed strong collaborations with UAV suppliers to make these PHINS C-series INS perfectly fitted for their systems and applications.

In addition, we propose acoustic positioning solutions that together with the FOG INS authorize hybrid navigation with even greater performance". In March 2017, two iXblue MARINS M7 have been ordered by SPAWAR Pacific to equip the LDUUV prototype under development by the US Office of National Research. The language used to support this purchase communicated the position iXblue currently holds in this market: "The iXblue MARINS M7 INS possesses unique and highly specialized capabilities for undersea autonomous navigation. The MARINS M7 is a proprietary integrated navigation system which, to the government's knowledge, provides the best available position, velocity and heading accuracy in a package which can be mounted within a UUV. No alternative systems exist which can allow for the critical unaided (pure inertial) navigation required to support the UMTJC2 mission".

Today, iXblue equips more than 35 navies worldwide. This enviable position has just been reached over the last 15 years. "We entered this market initially through retrofits while expanding our range of solutions. Now, iXblue FOG INS and AHRS are selected more often by our customers for their new ship designs. The iXblue family of AHRS/INS covers all types of requirements, from IMO-compliant AHRS designed for patrol ships under civilian classification rules up to full MILSPEC-compliant INS for submarines and aircraft carriers. Navies relying on iXblue systems benefit from the advantages of an up-to-date, solid-state technology with high reliability and availability and the best performance offered in the industry. In addition, iXblue systems share strong commonalities with regards to hardware, software, and interfaces. This results in significant savings at the fleet level in terms of integration, installation, configuration management, logistics, training and maintenance costs.

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NETANS: Smart Data Distribution Units in an era of Navigation Warfare

Inertial is not the only domain in which iXblue is paving the way of a technological transition. Recent years have seen the development of NETANS, a new range of smart naval Data Distribution Units (DDU), tailored to meet the most challenging requirements of surface and subsurface combatant ships. Guillaume Dandrieux explains: "With the numerous retrofits we carried out on board all types of naval platforms, we rapidly realized that the best exploitation of the performance we offered with our inertial systems was not being achieved. We often had to interface with DDUs that were limited in terms of functionalities and capabilities. DDUs used merely to redistribute data from the various navigation sensors without bringing any additional value or intelligence in the navigation system chain. The decision was then made by iXblue to develop a range of scalable smart DDUs able to bring added value and meet the new challenges met by modern navies."

Indeed, with the advent of military-grade GNSS systems, single-source uninterrupted, accurate and reliable real-time navigation data was once made easily accessible to surface vessels. At the same time, subsurface platforms remained very dependent on diverse sources of sensor data which has to be assessed, compared and post-processed to build up coherent and reliable navigation information. However, recent intense development in threats to GNSS signals has raised strong concerns in the military. To compound matters, navigation information has become even more critical for the success of naval operations, particularly as a significant contributor to the effective performance of increasingly sophisticated sensors and effectors on board surface combatants and submarines.

These developments put even more critical demands on navigation information, in terms of performance, reliability, robustness and availability. Moreover, there is a discernible trend towards convergence in surface and subsurface requirements, notably with regard to resilience in hostile environments.

To this end, iXblue NETANS DDUs do not only distribute the individual sensor data, they also acquire, analyze, correlate, validate, select and, if needed, raise alarms or even reject the diverse input data, to elaborate the most complete real-time merged and consolidated Navigation Information available to subscriber systems (and most notably the Combat System). Built-in navigation algorithms deliver the most reliable, coherent and accurate information, relying on the most consistent data (inertial, GNSS, magnetic, terrain, log, etc.), whatever the environmental conditions. NETANS key features include built-in redundancy management, hot-swapping capability and sensor auto-recognition to ensure data robustness, integrity and validity. NETANS DDUs are simple to install, with an integration process reduced to simple pre-recorded settings, easy to use through an intuitive interface, versatile and scalable. "NETANS has been installed on numerous combatant ships in the last decade to the satisfaction of all their naval users. iXblue MARINS / NETANS suite offers an unprecedented level of capability as a backbone for integrated navigation systems"

With the NETANS series, iXblue once again extends its scope of expertise in the Navigation domain, to bring the best-in-class navigation solutions and to achieve superiority in naval operations

Vericor - High Speed Naval Propulsion Package Solutions

Today's high speed marine platforms need power to execute their missions, plenty of power. And there is not always a lot of space on these ships for powerful machinery. The twin gas turbine package that is offered by Vericor Power Systems is a popular solution and one that is being offered to shipbuilders in Turkey for programs here and in foreign markets.

The TF Series marine gas turbines built by Vericor are in the 4000 kW class and have been used in a variety of fast and high performance ships and craft around the world. Two of the most prominent applications are the US Navy Landing Craft Air Cushion (LCAC) and the Swedish Navy Visby class corvette. (Figures 1 and 2)

Gas turbines are much smaller and lighter than traditional diesel engines of the same power and often have much longer operating lives. Yet they use the same marine diesel fuel.

One of the most unique advantages of the Vericor marine gas turbines is the ability to mount the engines directly to the main reduction gear (MRG) without any other support structure. This design feature has two very important effects. It contributes significantly to the weight savings of the overall package by eliminating a heavy base frame or structure for the engine. It also eliminates any relative motion between the gas turbine and the main reduction gear. The gas turbines and gear box are essentially a "single machine" which can withstand the "g" loads of high speed marine service.

In the twin marine gas turbine package, this is particularly advantageous as the power of two engines can be delivered the ship drive shaft. The Twin TF Package as it is known consists of two Vericor TF Series marine gas turbines coupled to a twin in / single out main reduction gear. This propulsion package delivers 8,000 kW or more shaft power to the propeller or waterjet.

Fig. 3 The Twin TF Marine Gas Turbine Package

As a comparison, this powerplant weighs about three times less than the diesel engine equivalent and is less than half the length. For this reason, designers seriously considering options for high performance ships regularly investigate this kind of powerplant. This light power-to-weight package has allowed designers and builder to meet speed requirements fast ferries, naval ships and mega yachts.

The entire line of TF series marine gas turbines were designed specifically to be fully mounted to an MRG without further support for sea going applications. The ability to withstand heavy sea states has been proven not only on the Visby class corvette but also on some of the fastest open water mega yachts operating today. Yachts of this type are capable of 50 kts speeds which can transmit tremendous force to the installed equipment. Other gas turbines simply cannot be mounted in this way, needing instead the heavy base frames and skids. Saving weight is critical in the high speed game, that why gas turbines are employed in the first place.

Fig. 2 The Swedish Visby Class Corvette

There is also the added flexibility of single or twin engine gas turbine operation. The package can be operated on one or both gas turbines with ability to drop one engine off line and/or add an engine while the other engine is operating through the use of synchronizing clutches. This provides redundancy, a notable safety factor but also increases overall efficiency of the powerplant at low speeds.

Diesels can also be added for a Combined Diesel or Gas Turbine (CODOG) package. While gas turbines can be operated throughout their power range, it can be very economical to add a small diesel to the package to be used for the lowest power ship operation such as maneuvering and docking or simply entering or leaving port. The system on the Visby corvette is a CODOG system.

Fig.1 The US Navy LCAC

The Twin Package can be configured with the engines side-by-side or with the engines mounted one over the other in a Vertical Twin configuration. Vericor Marine Sales Manager Tony Wilcoxson explains "We work with the main reduction gearbox supplier to achieve the ideal package design for the requirements of the ship, whether it is a narrow hull form or a low draft design". With the ability of companies such as Stork BV whose gear is shown in Fig. 2 to tailor the package, Vericor can meet stringent installation requirements. The vertical Twin configuration has also been proven at high speed sea conditions. This particular design allows adaptation to a variety of narrow hull forms including catamaran and trimaran.

Vericor is the Original Equipment Manufacturer for the TF and ASE Series marine and industrial gas turbines and provides engineered systems and packages using these engines to customers and operators worldwide. Vericor's TF50B engine is the commercial version of the engine that powers the US Navy LCAC air cushion vehicles and similar vehicles in Japan and Korea. TF engines power high performance fast ferries, mega yachts, fast patrol boats and corvettes. There are more TF Series marine gas turbines engines in propulsion service than any other in this size class.

Peli-Hardigg Showcases at IDEF its Advanced Packaging and Transport Solutions for Defense

Since 1976, Peli Products engineers have successfully developed custom solutions for the transport and packaging needs of the Earth and Sea Defense Military. Peli's innovative products enable sensitive equipment to travel through hostile environments and arrive operational. Most models have been tested in the field as well as in combat situations, since Peli's expertise is in building robust line of cases and lighting products that proudly live up to the harsh demands of the military. At IDEF Show (Hall 2, Stand 248A) Peli

showcases solutions that helps Military succeed in their missions.

Mobile Military Standard Cases or Customized Solutions

Peli-Hardigg offers two different lines of cases: a range of Mobile Military standard cases that provide reliable protection in the field, and the Advanced Case Solutions, which offer bespoke cases designed to meet the client needs and specifications, by delivering large-scale container projects for the most demanding applications.

Peli-Hardigg Mobile Military Standard Cases

This line of cases provides war fighters extreme protection to the sensitive electronics, weapons, optics and communication equipment, needed to accomplish the missions, including:

Peli-Hardigg Mobile IT

These cases incorporate state-of-the-art features into containers to shield portable computers, printers and other electronics from adverse conditions in the field and even under battle conditions.

Peli-Hardigg Mobile Office: With these cases soldiers can, in minutes, set up a field office of durable field desks, administration desks, and bookshelves. And for personal gear storage, nothing beats a secure footlocker and trunk locker.

Meteksan Defense Reveals Cutting-Edge Solutions at IDEF' 17

Performing activities under the auspices of Bilkent Holding, Meteksan Defense was established in 2006 with the objective of uniting and coordinating the projects and activities of the high technology companies regarding the defense industry.

Meteksan Defense launched its activities with the Millimetric Wave Radar Technology. R&D activities having strategic importance were executed at that time in Turkey by Meteksan Defense for the development of radar systems regarding various air platforms. At the end of these activities, MILDAR – Millimetric Wave Radar was selected to be integrated into the unique platforms such as the "Atak" Tactical and Reconnaissance Helicopter and the "Anka" Unmanned Air Vehicle by the Undersecretary for Defense Industries

In line with the know-how and experiences gained in radar systems, Meteksan Defense subsequently developed the Retinar PTR Perimeter Surveillance Radar for the security of borders, units and critical facilities completely through its own resources.

Concurrently, Meteksan Defense continued to enhance its competencies in various areas as well. As a result of participation in industrialization activities for the sonar systems of MILGEM vessels regarding the underwater acoustics systems, the company was appointed as Turkey's "Underwater Acoustics Center of Excellence".

Within the scope of the cooperation with Aselsan, Meteksan Defense initiated the development and manufacturing of the data links of the indigenous missile systems in Turkey. The data links of UMTAS, OMTAS and HISAR missiles manufactured by Roketsan were again developed and produced by Meteksan Defense. Following the acquisition of this capability, Turkey's first network based dual data terminal with national encryption and anti-jamming feature working in the national waveform is still being developed by Meteksan Defense for the SOM cruise missiles.

$ 30 Million Turnover Achieved in 2016

Becoming one of the greatest private sector defense industry companies of Turkey, capable of competing worldwide with very competent products in the area of electronic systems, Meteksan Defense reached a turnover of $ 30 million by the end of 2016.

Active in 4 main areas composed of sensor-based systems, communication systems, underwater acoustic systems and platform simulators, Meteksan Defense continues to assume tasks in many critical and strategic projects such as the development of anti-tank and air defense missile systems as part of the platform projects like indigenous vessels, helicopters and unmanned air vehicles. Radar systems for helicopters and UAVs, Perimeter Surveillance Radar, altimeters, data links of tactical and strategic missile systems, sonar systems, underwater early warning and communication systems containing underwater acoustic sensor indexes developed with new type material and technologies and live training simulators that are amongst the major indigenous and unique products developed by Meteksan Defense.

Visions and Targets for the Future

Within the scope of the vision and strategies for the upcoming period, Meteksan Defense aims to continue focusing on sensor-based systems, communication systems, underwater acoustic systems and platform simulators and to expand its depth of field. To this end, Meteksan Defense intends to increase the sales value of its products and related services within the structure of medium and long term turnover. Surely, in order to maintain long-term sustainability, becoming a company with worldwide defense product exports, rather than conducting sales merely in Turkey, is amongst the company's primary targets. Planning to continue its investments in 2017 as well, Meteksan Defense aims to establish an R&D center this year in addition to the assets it owns. To this end, this investment is targeted for completion and to become operational in the final quarter of this year.

Focused on Global Market Growth

Successfully development and delivery the Damage Control Simulators to the Turkish Naval Forces and to the Naval Forces of the Royal Navy of Oman as well as the Naval Forces Command of the Republic of North Korea resulted in being awarded a contract for the requirements of the Damage Control Simulator to Meteksan Defense with its local business partner. Following this major success, Meteksan Defense continues to conduct its export activities with over 20 countries, Gulf Countries, North Africa and Asian markets being in the first place.

The High-Tech Products will be on Stage at IDEF 2017

Throughout IDEF 2017, Meteksan Defense is expected to introduce technologies and capabilities such as MILDAR Fire Control Radar, Automatic Take-Off and Landing Systems for UAVs, Retinar OPUS Perimeter Surveillance Radar and RF Guided Missile Simulator.

JSF Project Sign-Off Completed - Engine Final Assembly Line Establishment, Activation and 1st Air Supply and Maintenance Center Command (ASMC) T-11 Test Cell Modification Phase

The signature ceremony of the Joint Strike Fighter (JSF) Project Engine Final Assembly Line Establishment, Activation and 1st Air Supply and Maintenance Center Command (ASMC) T-11 Test Cell Modification Phase Project was held on 23 March 2017 at the Defense Industry Executive Committee (SSIK) meeting room of the Undersecretariat for Defense Industries with the participation of Undersecretary for Defense Industries Prof. İsmail Demir and President and CEO of TEI Prof. Mahmut F.Akşit.


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Upon execution of this agreement following the completion of the planning and management phases, as part of the efforts for Engine Final Assembly / Check-Out Line and Establishment of the Depot-Level Maintenance Center for the European Region, TEI will realize 1st ASMC T-11 Test Cell Modification and Engine Final Assembly / Check-Out (FACO) Line Assembly within a three-year project schedule at the 1st ASMC Command in Eskişehir. The project will be conducted under the leadership of the Aircraft Department of the Undersecretariat for Defense Industries (SSM). The capabilities acquired as part of the project will serve for not only assembly and testing processes of any engines to be included in the inventory of the Republic of Turkey, but also for the establishment of a facility and infrastructure for regional engine maintenance, repair, overhaul and testing processes at the 1st ASMC Command.

The JSF project is considered to be the greatest defense industry procurement projects of all time. It will be carried out by TEI (acting as the main contractor) and multiple domestic sub-contractors, under which the 1st ASMC Command will be the first center to be established for the purpose of providing heavy maintenance and repair services for JSF aircraft of all users across the European region.


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Elopsis - Promoting cooperation and Technology Transfer Through Seasoned Consultancy, Championing High Quality Optic and Optronics Maintenance and Repair Services in the Region

Elopsis was founded in 1995, a family company that was set up as an agency providing consultancy. In the beginning, the company mediated the supply of imported spare parts from abroad for the requirements of public authorities, especially for military materials. In addition, Elopsis provides Engineering and Consultancy Service and works to promote and market products of foreign companies who have granted Elopsis the authority of representation.

Parallel to the efforts to improve our defense industry, the company has aimed to adapt an approach that promotes cooperation and technology transfer in order to be more efficient, rather than simply trying to sell ready made products to Turkey from the foreign companies we represent via our consultancy services. Within this scope, it became possible to take place in the Submarine Periscope Maintenance and Repairs project and the "Altay" MBT project with the companies represented by Elopsis. Also, Elopsis worked as sub-unit supplier in local Inertial Navigation System (INS) of the Turkish Armed Forces and its activities are ongoing in this project.

We provide services of Representation, Agency and Distributorship Relations with foreign Manufacturer Companies. Our company personnel also receive training improving our technical substructure. Parallel to the improvement in our equity utilization opportunities, with our strengthened technical substructure, based solely on local opportunities, we were able create a center that is designed to provide Maintenance and Repair Services of Optic and Optronics. We started providing services at the center from the beginning of 2013 for Target Coordinate Determination Systems Solutions, Laser Distance Measurement Devices i.e. LH30, LH40 and LP16 Maintenance Repair, and these services actively continue. Within this scope, malfunctioned devices from users abroad are sent to the Elopsis center. These devices are repaired and sent back and "service export" is performed, thus bringing foreign currency to Turkey.

Furthermore, we continue working as a system integrator and a supplier for manufacturing companies in export projects that are executed from our country, as well as in domestic projects regarding monitoring and border safety systems and military type navigation systems.

Improving our ongoing maintenance repair capabilities and related opportunities are of principal importance to us. Correspondingly, our activities are ongoing in order to become a known regional service location for devices and to improve our service export ability. Elopsis is trying to acquire maintenance repair opportunity capability for different types of models of devices and to reduce the amount of devices that are sent abroad for maintenance and repair from our country. Elopsis has planned investments around this objective and activities continue toward acquiring required abilities.

Also, Elopsis is planning to start activities aimed at increasing its local share by acquiring the capability to repair laser sources, which Elopisis began importing in 2015.

The importance of being able to meet the requirements of our country and nation completely with local manufacturing and our own resources is incontrovertible. Historical events reflect that the significance of military requirements has increased. The current level of our country's defense industry is satisfactory and has been assessed as very positive and promising.

However, activities being performed toward increasing export potential of products should not sacrifice quality. The possibility of local requirements reaching a saturation point is of consideration, however it should be noted that a high volume of exports may be achieved by presenting the highest quality product with the most economical and competitive price in the market. The idea of performing separate product studies for domestic sales and exports should not be considered. This issue is a topic that must be considered by corporations that carry out activities that support exports and those that direct the defense industry.

Elopsis, Consideration of its Own Activities

As Company Management has always aimed to improve itself and its customer portfolio, since its foundation in 1995, Elopsis places importance on the availability and activities of our country that are aimed toward improving and directing the defense industry toward achieving high level and strong domestic participation. Within this framework, Elopsis endeavours to work with our country's defense industry organizations and corporations, within common studies all over the world; especially in Middle east, Caucasia and Europe, we would like to increase our export ambitiously.

18th Public Quality Symposium: "Managing Change"

The 18th Public Quality Symposium was held with the cooperation of the Undersecretariat for Defense Industries on March 23, 2017 with a theme of "Managing Change". Participating as speakers were the Minister of Development, Mr.Lütfi Elvan and Undersecretary for Defense Industries, Prof. İsmail Demir.


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At his speech during the Symposium, Undersecretary for Defense Industries Prof. İsmail Demir said that the institutions need to identify dynamic strategies in order to be able to keep pace with the competition and pursue their productivity in the competitive environment. "Even though the only thing that does not change is change itself, we observe that human beings are resistant to change consciously or unconsciously. In our daily lives, sometimes it is difficult to change even routine things. When we consider this from a broad perspective, setting a will for change and accomplishing it could not be that easy and possible. As per the theme of today, we need to establish an infrastructure in order to manage change and dynamism in the public sector. All institutions, organizations and companies carry out important studies to raise awareness. We thank KALDER for its incentives and efforts in this regard.

Adapting to the changes in the world and the ability to lead such changes by foreseeing them have become a very significant factor. I observe that several brainstorming activities are being realized at public platforms to achieve this and I am pleased to see the ideas, plans and determination of public executives at various levels of meetings we have attended to this end. Especially during this period in which the sectors where industrial transformation is accelerating are connected to each other, the institutional failure to keep up with this change can be a parameter that slows down the entire chain. Some institutions may be more conservative due to their internal dynamics, while others may have completed their transformation. In this context, I would like to emphasize that some studies have been initiated under the coordination of the Prime Ministry Undersecretariat. Efforts are ongoing for establishing a single structure for the interoperability of the public services."


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Mr. Lütfi Elvan - Minister of Development

The present and the future of the SEEs were discussed within the scope of the quality studies performed during the Panel on Quality and Efficiency in the Public Sector Companies within the scope of the 18th Public Quality Symposium. Within the context of the Innovative Implementation Panel for Improving the Citizen's Quality of Life, the innovative practices of the Social Security Institution and AFAD were communicated by the presidents of the institutions.

The studies of Azerbaijan's State Agency for Civil Service and Social Innovations (namely Asan Service Center), established by the Azerbaijani Presidency for the purpose of managing public services from a single center, coordination of public sector personnel working at service centers, mutual integration of databases of state institutions, and the regulation and development of electronic services were discussed at the symposium.

The future of the defense industry was discussed in the panel "Executives Managing the Change in Defense and IT Sectors" with the participation of Havelsan General Manager Ahmet Hamdi Atalay and Meteksan Savunma General Manager Tunç Batum under the chairmanship of Deputy Undersecretary for Defense Industries Dr. Celal Sami Tüfekçi.

In the panel "Change Management and Leadership in the Public Sector", change and leadership issues in public administration were discussed with public and private sector perspectives.


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Prof. İsmail Demir - Undersecretary of SSM ; Mr. Lütfi Elvan - Minister of Development


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Prof. İsmail Demir - Undersecretary for Defense Industries

Amphibious Landing Ship Tank Bayraktar (L-402) Takes Its Place in the Inventory of the Turkish Naval Forces Command

The first vessel within the scope of Amphibious Ship Project, which is Turkey's greatest platform built by the private sector, the initial delivery of L-402 Bayraktar was realized to the Turkish Naval Forces Command on 14 April 2017 following the accomplishment of all tests. Following the initial delivery the L-402 Bayraktar was delivered to the Turkish Navy with the official ceremony on April 22nd, and attended by National Defense Minister Mr.Fikri Işık and Naval Forces Command Admiral Bülent Bostanoğlu and numerous defense and military officials.

National Defense Minister Mr. Fikri Işık, who made a speech in the ceremony, said: "Up until now, there are close to 40 platforms that we have built in military and private shipyards and delivered to the Naval Forces Command. More than 20 of the contracts currently under construction are still undergoing platform construction work. We will deliver the second ship L-403 Sancaktar in October, following the commissioning of the second ship."

Admiral Bülent Bostanoğlu, Commander of the Turkish Naval Forces, explained that they are carrying out modernization and procurement projects with the aim of reinforcing the amphibious power, stronger than before the Cyprus Peace Operation, stating that they are taking into account the political and military developments that have taken place throughout the world. He said that they are developing it according to the requirements of the modern age. First and foremost, was the production of fast amphibious ships with short-range power transmission capability.

Admiral Bülent Bostanoğlu - The Commander of Turkish Naval Forces

L-402 "Bayraktar" LST

The project which envisaged the construction of Bayraktar and Sancaktar from the most modern amphibious platforms of the modern age, will develop our ability to be a regional power. Finally, construction has begun on the Anadolu, the Landing Helicopter Dock, which will bring many new capabilities to the Naval Forces. TCG Bayraktar, which is one of the key steps on this road map, will enter our Naval Forces inventory and will increase our non-war activities as well as our ability to transfer power. This acquisition is also important in terms of having the ability to provide stronger assistance to friendly and allied nations when necessary."

As part of the program, the command control capabilities, designed with a high-degree combat management system, integration and tests of the amphibious ship equipped with modern sensors and weapons were accomplished seamlessly by Havelsan. During the Sea Acceptance Tests (SAT) of the vessel, all combat functions of the ship were tested successfully and direct hits were achieved throughout the firing over the combat management system to air, land and surface targets. In a short period of 35 months after the ceremony held on 13 May 2014 for Bayraktar's sheet cutting, all tests were completed successfully. Thus, the ship was completed within 46 months including the design activities as well.

Havelsan's Genesis Combat Management System was developed as part of the LST requirements and in addition to the Combat Management System, new capabilities such as the integrated multiple datalink capability and amphibious operation capability were added to the platform. The Ship Information Distribution System enabling the management of Bayraktar's data sources and users and the Closed Circuit Television System (CCTV) which was adapted for the military working environments in order to contribute to the security of the ship were integrated to the vessel. Moreover, TSK-NET, NATO-WAN and INTERNET connections of the ship that was equipped with the Ship Information Distribution System that was accomplished by Havelsan as part of the project.

While the construction of the LST-Amphibious Ship consisted of


© Turkish Naval

70.68% local industry participation, the breakdown ratio of SME's in domestic industry participation was approximately 48%. All superstructures and ship's bridge windows are designed with ballistic protection, while the ship is constructed as a mono-hull, displacement type and with fully steel construction. The ship also has full personnel protection for nuclear, biological and chemical attacks.

These amphibious ships, the largest and most technologically advanced naval ships built by private sector shipyards in Turkey, were built entirely of steel with local and unique design. The vessels being built under the supervision of the SSM and Türk Loydu in accordance with the Turkish Loydu Military Ship regulations will again be certified by Türk Loydu.

At the stern of the ship there is a hatch cover for allowing loading / unloading operations and a flight deck that enables the landing and take-off operations of a 15 ton general utility helicopter. The ship also has 4 LCVP (Landing Craft, Vehicle, Personnel) amphibious vehicles capable of carrying 8 tons of cargo or 40 mariners and capable of a vessel speed up to 20+ knots.

The second ship of the program "Sancaktar" is planned to be delivered to the Turkish Naval Forces with the completion of the marine acceptance tests in the last quarter of 2017.

Hürkuş-C Light Attack Aircraft Right on Target with LUMTAS Missile Demonstration

The LUMTAS Missile Firing Demonstration of the Hürkuş New Generation Basic Trainer Aircraft was held in Konya-Karapınar on April 7, 2017 at the Ministry of National Defense Firing Test and Evaluation Group Command with the participation of National Defense Minister Mr. Fikri Işık, Land Forces Commander General Salih Zeki Çolak, Undersecretary for Defense Industries Prof. İsmail Demir, defense attaches, military and defense officials.

Developed within the scope of the "Turkish Primary and Basic Trainer Aircraft Project" initiated by the Undersecretariat for Defense Industries (SSM), Hürkuş Aircraft, with its armed configuration designed by TAI to support various scenarios is being developed for pilot training, as well as performing light attack and armed reconnaissance missions at a low cost and with high precision. The Laser-Guided Long Range Anti-


© TAI

Tank Missile-LUMTAS Missile used in the shooting demonstration is being developed to be used with Roketsan's anti-personnel warhead as an alternative to the anti-tank (tandem) warhead. The missiles, which are already integrated into the Atak helicopter, can also be launched from fixed-wing aircrafts, UAVs as well as land and sea platforms.

Hürkuş, which will be armed with Roketsan's guided ammunitions LUMTAS / UMTAS / Cirit / TEBER, and has an armored structure, self-protection systems, night vision compatible full digital cockpit, data link, electro optical camera with laser marking capability and advanced avionics system, will have 5 external load stations and a payload carrying capacity of 1500 kg.

The Turkish Air Force (TAF) is expected to acquire the first lot of Hurkus-C Light Attack Aircraft in 2018.

Double Digit Growth Expected in the Drone / Counter-Drone Cat-and-Mouse Game, Ranging $500-$1 Million Annually

by Mike Blades, Senior Industry Analyst, Frost & Sullivan

As global demand for small drones has rapidly increased over the past 5 years, so has the concern for the privacy they are perceived to invade and the safety norms they are perceived to violate. This concern has been elevated to downright anxiety with the recent revelation that ISIS has been increasingly utilizing off-the-shelf drones, purchased via the internet. First used as a method for conducting reconnaissance and recording terror attacks from the air to be displayed on social media outlets as propaganda, drone use by insurgents has quickly expanded to dropping improvised explosive devices (IEDs) on US military and other counterinsurgent forces.

Cheap, consumer drones are also seen as a threat to domestic government interests as well as several commercial businesses. Sensitive sites such as nuclear power plants and military bases can be easily monitored by anyone with the will to launch their flying camera into restricted airspace. For-profit companies worry that "bad actors" could launch drones to covertly conduct corporate espionage by spying on operations from the air. Owners of large stadiums and sponsors of mass public events are becoming increasingly anxious that drone operators could either organize airborne attacks or, worse in their eyes, provide live video to an online audience that generates no revenue.

In response, dozens of companies have established a nascent, and increasingly competitive, market by developing systems that provide a defense against unsolicited drone intruders. These anti-drone systems, commonly referred to as counter unmanned aerial systems (C-UAS), utilize a wide range of technologies to deter, or defeat, this new and expanding threat.

Detect, Identify, Track, Mitigate

There are several approaches for describing C-UAS functionality but Detect, Identify, Track, and Mitigate seems to cover all scenarios. Most systems are not designed to accomplish all 4 tasks. In fact, the systems that can accomplish all 4 steps are almost distinctly relegated to use by governments, or the militaries, because of legal limitations when using certain technologies in a public arena. For instance, Battelle's DroneDefender, a handheld radio frequency (RF) disrupter, is currently only offered for sale to the US government.

First, a C-UAS must detect a potential threat. The most common detection methods include the using radars, RF detectors, acoustic sensors, electro-optical (EO) imagers, lasers, thermal/infrared (IR) cameras, or a combination of sensors. Each sensor type has advantages and disadvantages driving most C-UAS developers to utilize a multi-layered approach for an optimal spectrum of detection. Historically, these detection methods were not developed to locate low-flying aircraft with small radar cross-sections (RCS) because there was not an associated threat profile. Therefore, C-UAS developers have been adapting existing and/or developing new technologies that specifically search for small RCS objects that fly low and slow. As part of detection, the system must also "recognize" that the target is a machine and does not exhibit biological movements, like a bird would. The ability to recognize reduces the possibility of false alarms.

Basic systems will provide an alert via email or text after a positive detection is made but more advanced systems can actually identify the type of drone and state-of-the-art systems can even analyze payloads to better assess the threat. Identification of the drone type can be accomplished in several ways. Systems using acoustic sensors rely on a database of known drone sound profiles. Systems that utilize RF can identify drones by using the same information passed to the controller, if the drone is being flown remotely. However, this can require operations that may be illegal since they likely entail gaining unauthorized access to a Wi-Fi computer network. Some companies even advertise the capability to use RF for pinpointing the drone controller location so law enforcement agents can apprehend the remote operator. The most sophisticated systems utilize a slew-to-cue capability where, once a drone threat is detected, an EO/IR camera focuses in on the target. This allows a human or machine to identify the drone type visually and provides the ability to analyze any payloads.

Tracking can be accomplished by any of the commonly used C-UAS sensors, but each has its pros and cons. For instance, radars can track targets at great distances but they don't work well in urban environments and are relatively expensive. Conversely,

acoustic sensors are inexpensive but have a limited range. The ability to track a potential threat becomes invaluable in an environment where laws prohibit frequency jamming or interruption. Keeping track of the target allows the information to be passed to agencies that have permission to engage. Tracking is also important when considering multiple targets. The more targets a C-UAS can track, the more demand it will generate as swarm technology expands the small drone threat in the future.

Finally, C-UAS aim to mitigate small drone threats. Mitigation can be kinetic or non-kinetic, however, kinetic mitigation, or destroying the drone with some sort of projectile, is generally not an option in the commercial environment. Techniques for mitigation are numerous and most have legal considerations. RF can jam or overwhelm drone control frequencies making the aircraft land or return home. Some C-UAS can even take control of drones. But many regions of the world have laws against these types of actions. There are guns and drones that fire nets designed to entangle intruding drones causing them to fall to the ground. However, in the US, it is illegal to shoot down anything defined as an aircraft and the Federal Aviation Administration (FAA) has included drones in the definition of aircraft. Determining acceptable methods for mitigating small drone threats will continue to be a challenge as the regulatory and threat landscapes change.

C-UAS Market

The C-UAS market is still relatively nascent, but growing rapidly. There were about 20 companies, mostly in the defense sector, involved in the market 2 years ago but that number has blown up to over 90 companies, and is still expanding. There have been a slew of recent sales, both in the defense and commercial sector. Companies like Syracuse Research Corp. (SRC), Battelle, Aveillant, Dedrone, Droneshield, Blighter/Liteye, Black Sage (in partnership with SpotterRF), and IAI have all won contracts for their C-UAS systems. Analyzing these sales reveal that market revenues for C-UAS equipment is likely in the $500 million to $1 billion dollar range annually and poised for double digit growth over the next several years. Competition is fierce and more market entrants seem to arrive weekly.

And while the market for drone defense is rapidly growing, an even newer market for circumventing anti-drone systems is emerging. This “hardening” of drones to make them less susceptible to C-UAS includes technologies such as anti-jammable GPS antennas, unhackable operating systems, and passive noise reduction. We are only at the beginning of the drone/counter-drone cat-and-mouse game.

Conclusion

C-UAS is a nascent market that will experience significant growth over the next several years. Systems that utilize more than one sensor type will lead the market because they are best suited for countering future threats, the most urgent being drones that are sent in swarms and guided by methods that do not require the emission of radio signals. As it grows, expect the C-UAS market to mirror the commercial UAS market in many ways with more strategic partnerships, small companies struggling to stay in business, and an emergence of 2-3 top companies that have the best and most cost-efficient C-UAS for passive detection, legal mitigation, and the capability to easily upgrade and integrate with existing security systems.

Link 16 Data Link Processor Card for SOM-J to be Manufactured by Meteksan Defense

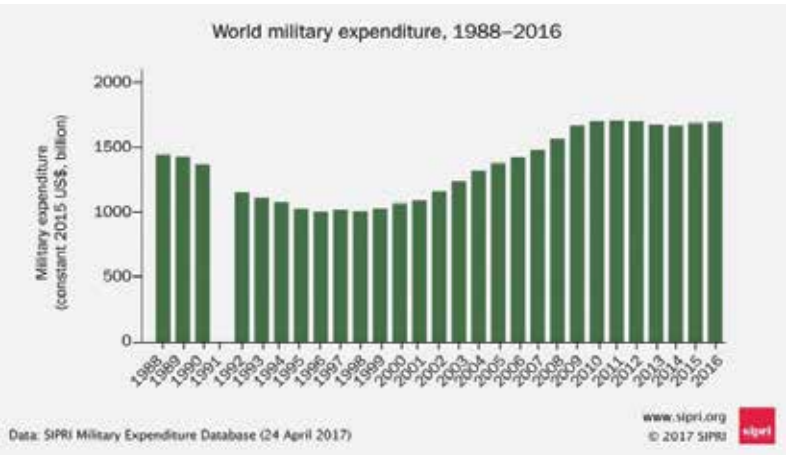
With the “Link-16 Data Link Card Procurement Contract” signed between TÜBİTAK SAGE and Meteksan Savunma in December 2016, the Link-16 Data Link Processor Card of SOM-J ammunition to be developed for the F-35 Joint Strike Fighter (JSF) will be manufactured by Meteksan Defense.

SOM-J, a high-precision cruise stand-off missile, will cater to cruise missile requirements for the F-35 Joint Strike Fighter (JSF) of the Turkish Air Forces, will be used by various allied countries, and will be one of the most important striking forces of the F-35 fighter jets. Within the framework of such requirements, the Link-16 Data Link Processor hardware solution required for the network enabled ammunition feature, which is critical cruise missiles, will be added to the SOM-J by Meteksan Defense. In this context, the first national tactical data link processor hardware will also be produced. The relevant hardware will be delivered in a closed box and the ammunition will have features that meet the requirements of peripheral conditions.

World Military Spending: Increases in the USA and Europe, Decreases in Oil-Exporting Countries

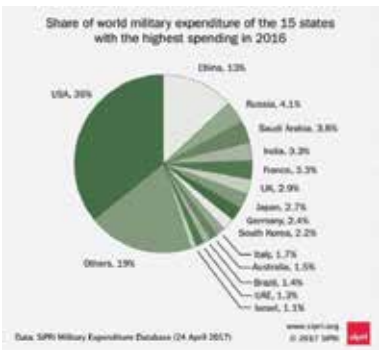
Total world military expenditure rose to $ 1686 billion in 2016, an increase of 0.4 per cent in real terms from 2015, according to new figures from the Stockholm International Peace Research Institute (SIPRI). Military spending in North America saw its first annual increase since 2010, while spending in Western Europe grew for the second consecutive year.

World military expenditure rose for a second consecutive year to a total of $ 1686 billion in 2016—the first consecutive annual increase since 2011 when spending reached its peak of $ 1699 billion. * Trends and patterns in military expenditure vary considerably between regions. Spending continued to grow in Asia and Oceania, Central and Eastern Europe and North Africa. By contrast, spending fell in Central America and the Caribbean, the Middle East (based on countries for which data is available), South America and sub-Saharan Africa.



The Top 15 Military Spenders In 2016

The top 15 countries with the highest military spending in 2016 were the same as those in 2015, although there were some changes in their ranking. The 15 largest spenders account for $ 1360 billion, or 81 per cent, of total global spending. Between 2007 and 2016, China has seen the biggest growth in military spending, with an increase of 118 per cent, followed by Russia (87 per cent) and India (54 per cent). In the same period, Italy (–16 per cent), the United Kingdom (–12 per cent) and the United States (–4.8 per cent) were the only countries in the top 15 to see their military expenditure fall. In 2016, total US military expenditure of $ 611 billion is over one-third (36 per cent) of world military expenditure. This is nearly three times the level of China's spending, which is ranked second. US military spending grew by 1.7 per cent between 2015 and 2016, the first increase after five consecutive years of decline. Despite this slight growth, US military spending remains 20 per cent lower than its peak in 2010. The small upturn in 2016 can be attributed to legislation adopted in 2013 and 2015, which eased the budget limits imposed in 2011. However, given the context of the presidential election and the inability of the US Congress and the White House to reach agreement on a budget to be implemented on 1 October 2016, there is uncertainty about short-term developments in the country's military expenditure. As a result of an unexpected increase in Russia's military expenditure in late 2016 and large cuts to Saudi Arabia's military budget, Russia moved above Saudi Arabia to the position of third largest spender in 2016. India moved from 7th to 5th place after its largest annual spending increase since 2009. Meanwhile, both the UK and Brazil dropped one place in the rankings.

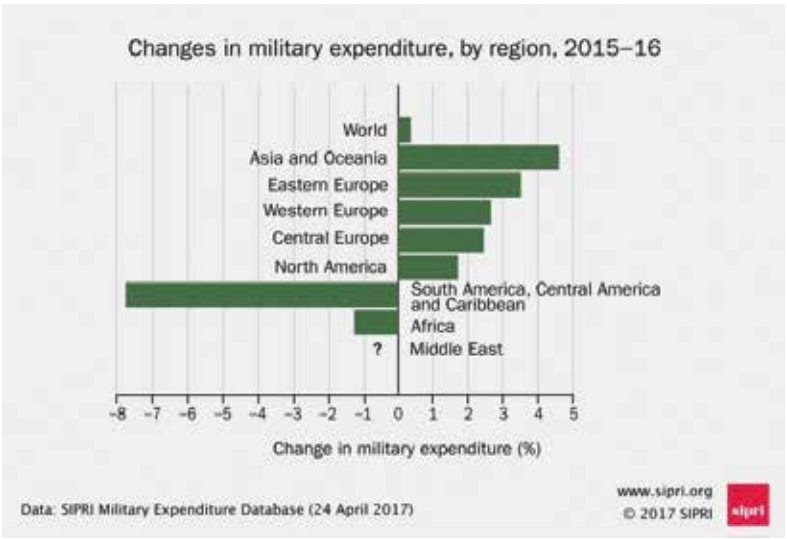


The UK fell from 6th to 7th—a move largely attributed to the devaluation of the British pound following the result of a referendum on the country's membership of the European Union. In Brazil, which went from 12th to 13th position, failure to revitalize an economy deep in recession has seen the country's military spending decline by 7.2 per cent.

The USA's Spending Returns to Growth; Saudi Arabia's Spending Falls Significantly

The United States remains the country with the highest annual military expenditure in the world. US military spending grew by 1.7 per cent between 2015 and 2016 to $ 611 billion. Military expenditure by China, which was the second largest spender in 2016, increased by 5.4 per cent to $ 215 billion, a much lower rate of growth than in previous years. Russia increased its spending by 5.9 per cent in 2016 to $69.2 billion, making it the third largest spender. Saudi Arabia was the third largest spender in 2015 but dropped to fourth position in 2016. Spending by Saudi Arabia fell by 30 per cent in 2016 to $ 63.7 billion, despite its continued involvement in regional wars. India's military expenditure grew by 8.5 per cent in 2016 to $ 55.9 billion, making it the fifth largest spender.

The growth in US military expenditure in 2016 may signal the end of a trend of decreases in spending, which resulted from the economic crisis and the withdrawal of US troops from Afghanistan and Iraq. US spending in 2016 remained 20 per cent lower than its peak in 2010. "Despite continuing legal restraints on the overall US budget, increases in military spending were agreed upon by Congress," said Dr Aude Fleurant, Director of the SIPRI Arms and Military Expenditure (AMEX) program. 'Future spending patterns remain uncertain due to the changing political situation in the USA.'



Asia and Oceania Military Spending is Ascending in 2016

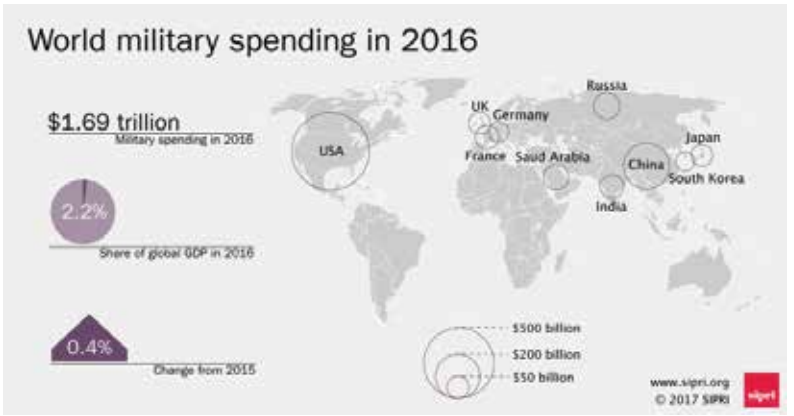
Asia and Oceania Military spending in Asia and Oceania amounted to $ 450 billion in 2016, an increase of 4.6 per cent on 2015. This is a slightly lower rate of growth than in the previous two years. This lower rate is partially related to the slowdown in the growth of Chinese military spending, which has historically tracked China's GDP growth. Regional spending increased by 64 per cent between 2007 and 2016, and all but three countries increased their spending. Between 2015 and 2016, military expenditure grew in all sub regions, ranging from a 1.7 per cent increase in Oceania to a 6.4 per cent increase in Central and South Asia. Between 2007 and 2016, East Asia had the largest increase of all sub regions, raising spending by 74 per cent. Five of the top fifteen global spenders in 2016 are in Asia and Oceania: China, India, Japan, South Korea and Australia (in ranked order). China had by far the highest military spending in the region: an estimated $ 215 billion, or 48 per cent of regional spending. This amount is almost four times that of India's total, which is the second largest in the region at $ 55.9 billion. There are many ongoing tensions in the region: in the Korean Peninsula, between North Korea and South Korea; between China and Japan, over claims in the East China Sea; between China and several South East Asian countries, over claims in the South China Sea; between India and Pakistan; and between India and China. Such tensions help governments to continue to justify the need to modernize their military capabilities, and to drive military spending upwards. On the other hand, economic growth in the region has generally continued, even if sometimes at a lower rate than in previous years, which makes it possible to increase military spending without increasing the military burden on the economy (i.e. its percentage of the GDP). Almost all the countries in the region have kept their military spending as a percentage of GDP at the same level since 2012.

Increases in Europe Linked to Growing Threat Perceptions

Military expenditure in Western Europe rose for the second consecutive year and was up by 2.6 per cent in 2016. There were spending increases in all but three countries in Western Europe. Italy recorded the most notable increase, with spending rising by 11 per cent between 2015 and 2016.

The countries with the largest relative increases in military spending between 2015 and 2016 are in Central Europe. Overall spending in Central Europe grew by 2.4 per cent in 2016. 'The growth in spending by many countries in Central Europe can be partly attributed to the perception of Russia posing a greater threat,' said Siemon Wezeman, Senior Researcher with the SIPRI AMEX program. 'This is despite the fact that Russia's spending in 2016 was only 27 per cent of the combined total of European NATO members.

Europe at $ 334 billion in 2016, Europe's military spending accounted for 20 per cent of global military expenditure. The figure is an increase of 2.8 per cent compared with 2015 and is only 5.7 per cent higher than in 2007. Spending increased in all sub regions: Central and Eastern Europe's military expenditure increased by 2.4 and 3.5 per cent, respectively, in 2016, while in Western Europe spending rose by 2.6 per cent (see table 5). Four of the fifteen largest military spenders in the world—France, the UK, Germany and Italy in ranked order—are in Western Europe. Together, they account for 10 per cent of global military expenditure. In 2016 neither France nor the UK achieved the planned increases in military spending announced in 2015. Germany raised its military spending by 2.9 per cent in 2016, a direct result of Chancellor Angela Merkel's efforts to push through an increase in the military budget. Italy increased its military spending by 11 per cent. This can be partly attributed to its support for its local arms industry by funding domestic procurement. Central European countries continued to collectively increase their military spending, which was up by 2.4 per cent in 2016 compared with 2015. This represents a return to the level of the sub region's average 10-year growth rate after a 14 per cent increase between 2014 and 2015. The 2015 increase is explained by a one-off payment for arms procurements made 10 years ago by Poland, the sub region's largest spender (44 per cent of Central European military spending). Many of the European countries with the



largest relative increases in military spending between 2015 and 2016 are in Central Europe. Given the wider regional slowdown, this ongoing rise suggests that the perception of an increased threat from Russia following the Ukraine crisis persists. At 44 per cent, Latvia's increase in military expenditure in 2016 was the highest in Europe, while Lithuania's military expenditure rose by 35 per cent (see table 6). In Eastern Europe, Russia's military spending in 2016 was $ 69.2 billion, an increase of 5.9 per cent over 2015 and 87 per cent compared with 2007. Spending in 2016 was 5.3 per cent of GDP—the highest proportion since Russia became an independent state and the seventh highest military burden globally. This increased spending and heavy burden on the economy comes at a time when the Russian economy is in serious trouble due to low oil and gas prices and the economic sanctions imposed since 2014. It was originally expected and planned that the Russian Government would reduce its spending, including military spending. However, late in 2016 actual spending was pushed substantially higher by a decision to make a one-off payment of roughly $ 11.8 billion in government debt to Russian arms producers. Without this debt repayment, Russia's military spending would have decreased by 12 per cent.

Ukraine's military expenditure in 2016 was $ 3.5 billion, a decrease of 3.8 per cent. Between 2007 and 2016, its military expenditure increased by 28 per cent. The small fall in 2016 was due to a reduction in the overall intensity of the conflict in the country. However, fighting flared up several times in 2016 and military spending is planned to increase in 2017, in part for acquisitions of new equipment. Despite ongoing clashes between Armenia and Azerbaijan, military spending in both countries fell for the first time since 2011. Armenia's spending decreased by 5.5 per cent. Azerbaijan's military expenditure was heavily affected by low oil prices and fell by 36 per cent to $ 1.4 billion in 2016.

Turkey Increased its Military Spending by 9.7 percent Between 2007 and 2016

Middle East SIPRI is not publishing an estimate of military spending for the Middle East for 2016 as data is unavailable for Lebanon, Qatar, Syria, the UAE (which was the second largest military spender in the region in 2014) and Yemen. For those countries for which data is available, their combined total military expenditure in 2016 showed a decrease of 17 per cent compared with 2015 but a 19 per cent increase compared with 2007. The decrease in 2016 came despite the fact that all countries except Oman were militarily involved in at least one armed conflict in the region. This demonstrates the impact of the fall in oil prices on the economies of several of the region's major military spenders. The military burden is particularly high in the Middle East. Military spending as a share of GDP, for those countries in the region for which data is available, averaged 6.0 per cent in 2016—almost triple the global average of 2.2 per cent. Oman had the highest military burden in the world, at 17 per cent, followed by Saudi Arabia at 10 per cent. Saudi Arabia's estimated budget of $ 63.7 billion in 2016 makes it by far the largest military spender in the region and the fourth largest in the world. While Saudi Arabia had been increasing its military spending year-on-year since 2002, its spending in 2016 was a 30 per cent decrease on 2015. By contrast, Iran's military expenditure decreased by 7.3 per cent between 2007 and 2016, but rose by 17 per cent between 2015 and 2016. The lifting of international sanctions has benefited the Iranian economy, improving incomes and giving the government the freedom to increase military spending. Israel was the 15th largest military spender in the world in 2016. Its expenditure grew by 19 per cent between 2007 and 2016 to $ 18 billion. This figure excludes about $ 3.5 billion in military aid from the USA. Turkey increased its military spending by 9.7 per cent between 2007 and 2016. At $ 14.8 billion, it is the 18th largest military spender globally. However, the figure for actual spending in 2016 is uncertain. Since the attempted military coup in July 2016, detailed data on Turkish military expenditure has become more difficult to find.

Large Falls in Military Expenditure in Many Oil-Exporting Countries

'Falling oil revenue and associated economic problems attached to the oil-price shock has forced many oil-exporting countries to reduce military spending,' said Dr Nan Tian, Researcher with the SIPRI AMEX program. 'For example, between 2015 and 2016 Saudi Arabia had the biggest absolute decrease in spending of $ 25.8 billion.'

The largest cuts in military expenditure in 2016 related to falling national oil revenues were in Venezuela (–56 per cent), South Sudan (–54 per cent), Azerbaijan (–36 per cent), Iraq (–36 per cent) and Saudi Arabia (–30 per cent). Other notable decreases were seen in Angola, Ecuador, Kazakhstan, Mexico, Oman and Peru. Only 2 of the 15 countries with the largest falls in spending in 2016 are not oil exporters. However, a minority of oil-exporting countries, such as Algeria, Iran, Kuwait and Norway, are better equipped economically to deal with oil-price shocks and could continue with their existing spending plans in 2016.

Serial Production of Wing Assisted Guided Kits to Launch

Following the Precision Guided Kit previously developed by TÜBİTAK SAGE, the Wing Assisted Guided Kit has also been developed through local resources. The delivery of the first lot of this new guided kit to be included in the inventory of the Air Forces Command will launch in early May

TÜBİTAK President Prof. A. Arif Ergin announced that the delivery of the first lot of the "Wing Assisted Guided Kit" developed by TÜBİTAK Defense Industry Research and Development Institute (SAGE) through domestic resources will launch in early May. Stating that the manufacturer for the industrial enterprise was determined for the serial production activities, Prof. Ergin expressed that they reached a contract stage. "In this way, the transformation process from the 'R&D to Serial Production' for the new guided kit to be included in the Air Forces Command's inventory would be completed", said Prof. Ergin and added that the Precision Guided Kit, which was previously developed by TÜBİTAK SAGE, had been included in the inventory of the Air Forces Command and it was being utilized actively in cross border operations.

Prof. A. Arif Ergin stated that the certification process of the Wing Assisted Guided Kit for the F4-2020 aircrafts was completed in January and for F16 fighter jets was accomplished in March. Sharing on the technical features of the Wing Assisted Guided Kit, Prof. Ergin said, "The Wing Assisted Guided Kit developed and manufactured local content, transforms the general purpose bombs of 250 kg and 500 kg weights at Air Forces Command's inventory into air to ground long-range smart ammunition. The flight range of the Wing Assisted Guided Kit - a new member of the Guided Kits family - reaches up to 110 km. With the help of this flight range and striking capability, our aircrafts equipped with the Wing Assisted Guided Kit become capable of destroying the targets in zone by striking them to avoid contact with the threat".

Prof: Ergin: "It creates high destruction at the target and collateral damage"

Prof. Ergin underlined that the Guided Kit does not require any propulsion systems for the long-range flight and continued, "This kit transforms the energy it gains through the firing altitude and speed into long-range flight by using its exterior geometry in the most efficient manner. The Wing Assisted Guided Kit, making a difference with the longest flight range among the inertial guided kits in similar class, takes its precise firing feature through the integrated guidance capability of the Inertial Navigation System and Global Positioning System. Firing its target under a precision of 6 meters provides high destruction at the target while causing collateral damage.

Underlining that they achieved important accomplishments with the Precision Guided Kit developed by SAGE in previous years, Prof. Ergin added that the kits were serially produced by various defense industry manufacturing companies through the technology transfer method. Prof. Ergin also expressed that they wish to advance their experience gained by SAGE in the kit projects in 'from R&D to Serial Production' transformation process and that they wish to reflect the aforementioned experiences to the manufacturing of the Wing Assisted Guided Kits. Noting that during the final stage of the design and development process of the Wing Assisted Guided Kit, Ministry of National Defense, Air Forces Command and SAGE conducted technology transfer and industrialization activities, Prof. Ergin added that the low level initial production was launched as a result of the activities last June.

Prof. Ergin: "We will continue to make successful leaps in our Defense Industry"

Mentioning that upon the successful development and manufacturing processes, the delivery of the first lot of the Wing Assisted Guided Kits will be realized in the beginning of May, Prof. Ergin noted that the manufacturer for the serial production activities was identified and that they reached the contract stage. Pointing out that the transformation from 'the R&D to Serial Production' in concern with the Wing Assisted Guided Kit to be included in the inventory of the Air Forces Command will be completed in this way, Prof. Ergin added that they will continue to make gainful leaps forward in order to increase Turkey's success in the defense industry.

Indemnity Claims are Bound to Increase due to Cyber-Attacks

Private sector and academia meet to tackle the Cyber-agenda.

Participants in the "Cyber-Security Scenario Analyses for Retail and E-Commerce" event, jointly organized by Kadir Has University, Atos, Marsh, and Unsal Gunduz Law Firm, discussed the potential losses due to cyber-attacks getting more complicated everyday with the rise of artificial intelligence.

While the technological advancements change the rules of the game in the business world, they also create a whole new agenda: "Cyber security". Atos, one of the leading IT companies of the world, Marsh, a leading insurance brokerage and risk management company, and Unsal Gunduz Law Firm, came together at an event in Kadir Has University, in order to tackle the concept of cyber security, which has become an important problem encompassing a wide range of areas such as government policies, corporate and industry agendas, and consumer vulnerabilities.

With the help of a simulation program prepared specifically against the cyber attacks in retail and e-commerce industries, participants searched answers to some important questions such as: "How should the crisis management and strategic communication be carried out?", "What should we do to adopt a common language in such attacks?", "How should we construct the technological infrastructure?" in the event organized by the Cyber Security and Critical Infrastructure Protection Society of Kadir Has University.

Artificial Intelligence Will Make Everything More Difficult

Mr. Ahmet Salih Bicakci, a faculty member at Kadir Has University said: "We need actions and measures on a national level in order to increase cyber-awareness." Reminding that the cyber-attacks are becoming more complex and sophisticated every day, he added: "The anti-virus technologies are not sufficient to overcome this challenge. It is possible to break into all types of systems."

Mr. Bicakci stated that the attacks were becoming more advanced by the day, and he noted: "Because of this, we need flexible and manageable solutions. In case of a crisis you have to inform your stakeholders about it. We are now discussing the concept of security through transparency."

Mr. Bicakci indicated that their aim was to show methods for establishing institutions with flexible and resilient structures, and up-to-date business continuity plans. He added: "In the era of big data and artificial intelligence, the only way to fight with these threats is to come up with a different perspective. As Kadir Has University and its stakeholders, we have set on this journey with this target in mind."

Attacks are Most Frequently Encountered in the Olympics

Mr. Yalcin Dizdar, the Big Data and Security Solutions Country Leader of Atos, a global leader in security solutions with more than 4500 specialists, emphasized that the company translated the cyber-security know-how obtained in the Olympics into business processes.

"We have been developing, administering, and protecting the IT infrastructure of the Olympics since 2004. Especially recently, the Olympic games became a major target of cyber-attacks. I would like to emphasize that with the expertise of Atos, none of these attacks have been successful". Mr. Dizdar added:

"Constant monitoring of the systems with various automation tools and analysis methods, and the ability to take immediate action against the alarms make it possible to neutralize or minimize the attacks before they can create an effect. This can only be provided by professional and advanced Security Operation Center (SOC) services. Atos is one of the most successful service providers in this field..."

Having said that the negative repercussions of cyber-attacks are not limited to the IT department, Mr. Dizdar added: "Close coordination between various departments is required, such as: legal, finance, risk management, and even corporate communications, sales, marketing, and operations management. Cyber-attacks do not only create material losses, they also undermine the trustworthiness and reputation of the companies.

Crisis at Our Door...

Ms. Hande Bilgisu, Marsh Risk Consulting Turkey Country Leader, underlined that the possible IT interruptions that could arise from cyber-risks should be analyzed. She added: "Actions such as cyber-security audits carried out by critical service providers, enhance the resilience and flexibility of the companies against unexpected events." Ms. Bilginsu stated that the cyber-security management should be holistic, and company-specific cyber-scenarios should be envisaged by considering their respective probabilities and effects. She added:

"If companies cannot cope with cyber-crisis, they will have to deal with indemnity claims. There is a long list of possible losses, such as: loss of business, loss of customers, administrative fines to be issued by the regulators due to the breach of personal data confidentiality. Also third parties whose personal data was disclosed, could claim indemnities, on top of which there could be legal fees to be paid."

Lines are Blurred Between the Digital and Analogue Worlds

Mr. Burcak Unsal, one of the partners in Unsal Gunduz Law Firm, underlined the importance of the subject: "Lines are blurred between the digital and analogue worlds. Cyber-risks impose on us new responsibilities towards the state, our customers, and all of the third parties with whom we do business. We offer solutions to legally manage and minimize these risks."

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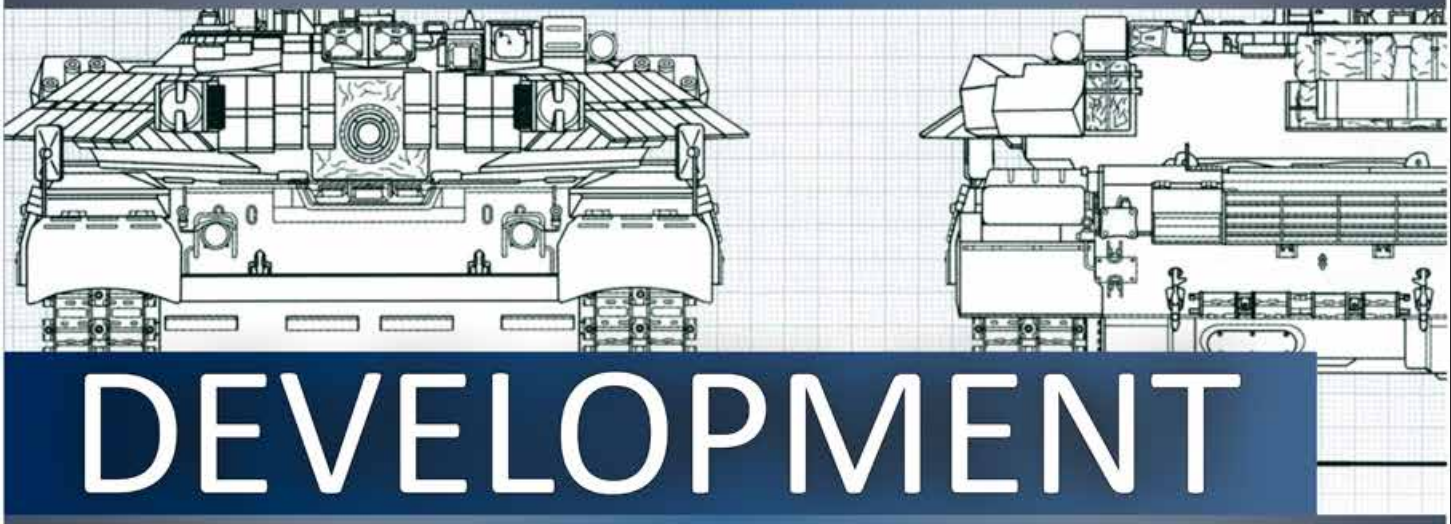

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