

DAY  
**2**

WEDNESDAY  
26 October 2022

**SAHA  
EXPO**

25-28 OCTOBER 2022  
ISTANBUL TURKIYE



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**Barzan Holding:** "We are Engaged in Multiple Discussions with Different Companies in Türkiye for Future Cooperation"



## TÜRKIYE'S EXISTING FOOTPRINT IN SPACE ONGOING PROGRAMS & GOALS

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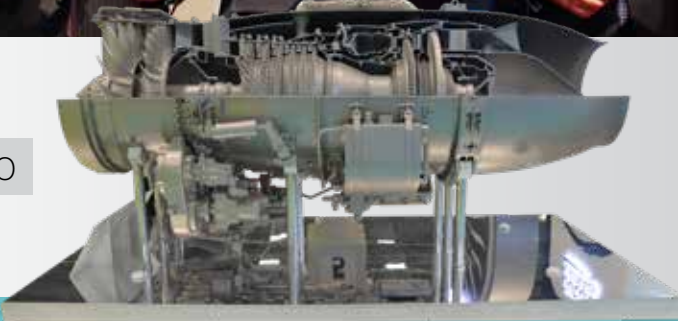


**SAHA EXPO 2022  
International Defense and  
Aerospace Exhibition  
Begins in İstanbul**



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# SAHA EXPO

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## SAHA EXPO 2022 International Defense and Aerospace Exhibition Begins in İstanbul

The 3rd edition of SAHA EXPO Exhibitions, where Turkey's domestic production potential in the defence, aviation, maritime and space industries are exhibited, is being held under the auspices of the Turkish Presidency during October 25-28, 2022, in 6 halls and 60,000 square meters area at the İstanbul Expo Center in Yeşilköy, İstanbul.

The official opening ceremony of SAHA EXPO 2022 International Defense and Aerospace Exhibition, which is organized by SAHA EXPO Fuarçılık Hizmetleri A.Ş and supported by 5 Ministries (Ministry of Foreign Affairs, Ministry of Interior, Ministry of National Defense, Ministry of Industry and Technology, and Ministry of Trade) and the Defense Industry Agency took place on October 25, 2022.

Prime Minister of Libya Abdul Hamid Al-DIBEIHEH, Minister

of National Defence Hulusi AKAR, Minister Industry and Technology Mustafa VARANK, Azerbaijan Minister of Defence General Zakir HASANOV, Azerbaijan Minister of Defence Industry Madat GULIYEV, Chief of Turkish General Staff (TGS) General Yaşar GÜLER, President of Turkish Defence Industry Agency Prof. İsmail DEMİR, President of the İstanbul Chamber of Commerce Şekip AVDAGIÇ and Chairman of the Board of SAHA İstanbul Haluk BAYRAKTAR were among the high-level participants of the SAHA EXPO 2022 Exhibition official opening ceremony.

President of the Republic of Türkiye Recep Tayyip ERDOĞAN issued a greeting message to the participants and guests of SAHA EXPO 2022 Exhibition. At his message President ERDOĞAN underlined that interest in the exhibition which brings together all

stakeholders of the sector, is increasing globally in tandem with the development of the Turkish Defence Industry. "With 876 companies and 24 universities, SAHA EXPO, the largest industrial cluster in Turkey and Europe, is increasing its success every year. We are very pleased that SAHA EXPO has quickly become an international platform where our country's domestic and independent production prowess is demonstrated," President ERDOĞAN said. President ERDOĞAN made the following statements in his greeting message; "I am confident that our exhibition, which brings together participants from 57 different countries of the world for four days, will help foster new collaborations and experience and knowledge exchange. I wish SAHA EXPO Defense and Aerospace Exhibition to be auspicious. I would like to extend my congratulations to everyone

who supported, contributed to, and took part in the execution of this significant organization, as well as all relevant institutions and organizations."

**As the first speaker, Chairman of the Board of SAHA İstanbul Haluk BAYRAKTAR delivered the following speech:**

"... The whole world needs to come together to stand against the injustices of the ongoing war between Russia and Ukraine, which is making the world a more difficult place to live in. The people in positions of authority, motivated by their desire to increase their status and wealth while sometimes mentioning their purported historical mission or their assertions that they are guiding the world toward democracy, only cause suffering and catastrophe in the geographies of others.

We cannot defend our own country against threats in such a world if the power is not in our hands, if the technology belongs to others, and if being "national" is nothing more than a dream. Dear participants, with a \$15.5 billion defense expenditure, Turkey ranks among the top 20 countries. With the power we gain from the indigenization goal we have strongly implemented, we are experiencing a significant breakthrough for full independence in the defense and aerospace industry, where advanced technological development is critical. At SAHA EXPO, which we hosted this year in 6 halls on an indoor area of 60,000 square meters, a total of 957 companies, including 390 foreign companies from 37 countries and 567 domestic companies, are exhibiting their most advanced and innovative products. More than 10,000 B2B, B2C and C2C meetings will be held between our participating companies with the infrastructure offered by the SAHA Match app. Throughout the exhibition, we will organize international panels, product/project presentations of companies and important signing ceremonies. We provide new and small businesses—who will become prominent business at our sector in the future—with the chance to present themselves and their products. We are making a breakthrough, launching a defense show in the Metaverse for the first time with SAHA EXPO. Distinguished guests, I would like to express my gratitude to our President for his support of SAHA EXPO 2022, to the Ministry of Foreign Affairs, the Ministry of Interior, the Ministry of National Defense, the Ministry of Industry and Technology, the Ministry of Trade, and the Presidency of Defense Industries for their support, and to our team who put in a lot of effort for this incredible organization. I would like to sincerely thank all our guests who came from abroad and participated in our exhibition, and all the companies taking part in the exhibition for their steadfast



support."

At his address President of the İstanbul Chamber of Commerce Şekip AVDAGIÇ underlined that SAHA EXPO Exhibition is more than simply a standard trade show because it gives us a chance to witness how far Türkiye's defence industry has progressed. "We also have the opportunity to see Türkiye's journey in industry and technology, especially in the last 20 years, and the level of domestic and national production," AVDAGIÇ added. AVDAGIÇ made the following statements at his address; "When we used to attend these fairs 25-30 years ago, we used to wonder if we would be able to accomplish something similar or get to this point. But this exhibition has developed into a platform where we can demonstrate to the rest of the world that our dreams have come true and that it is possible to produce

domestic and national technology. Therefore, this event is more than just an industrial exhibition or a defense industry fair. This expo is the outcome of an overall progress and move in the economy and industry in accordance with the law of compound containers. It demonstrates how far high-technology production has progressed."

Speaking at the Opening Ceremony of SAHA EXPO 2022, President of Defence Industry Agency (SSB) Prof. İsmail DEMİR underlined that with its growing number of participants each year, SAHA EXPO has contributed significantly to the industry. "In previous years, it has also facilitated the signing of numerous international agreements and the meeting of companies that did not know each other. Our event has developed day by day and is on its way to becoming

one of the most significant defense industry trade shows in the world. In particular, it has served as a platform for B2B, B2C, and C2C meetings and has been crucial in bringing our companies together," President of SSB DEMİR added.

**SSB President DEMİR gave the following speech:**

"I would like to express my gratitude to our President Recep Tayyip ERDOĞAN, who has always contributed to this process with his strong will and ideals and who has made it possible for our expo to be held under the auspices of the Presidency in order to elevate it to a higher level. If we look at the position we have reached today, the number of projects we are carrying out has exceeded 750, half of which have been initiated in the last 5-6 years. The value of our defense projects has exceeded





*Mustafa VARANK, Minister of Industry and Technology*

\$70 Billion, the number of companies operating in the defense industry has exceeded 1,600, which was around 60 in 2002, and we generate more than \$10 Billion in revenue. R&D is a very crucial concept; without R&D, these processes and technological developments would not be possible. For this reason, the budget allocated to R&D has surpassed \$1.5 Billion annually.

**Later on, the Minister of Industry and Technology Mustafa VARANK came to the floor and gave the following speech:**

"Distinguished guests, we are holding SAHA EXPO this year under the shadow of the Russia-Ukraine War. Türkiye is the only country that made the most sincere and realistic effort to resolve this crisis peacefully and to end the war as soon as possible. From the first day, we are making great efforts to keep the channels of dialogue open and to maintain diplomatic ties. Türkiye has been the pioneer of all concrete steps, from humanitarian aid to grain corridor and prisoner exchange. However, this tragic event has shown us once again that international cooperation is more important than ever. In this sense, SAHA EXPO,

one of the world's largest defense industry exhibitions with an indoor area of 60,000 square meters, is a very valuable fair. At SAHA EXPO, 567 companies from Türkiye and 390 companies from 56 different countries will exhibit their most popular solutions and most technological products."

**Delivering the last speech at the ceremony, Minister of National Defence Hulusi AKAR in summary said the following:**

"This important event organized by SAHA İstanbul creates significant awareness and impact in the sector, and thus, it will make

outstanding contributions to all participants in the medium and long term. Distinguished participants, we live in a period where the world and our region are going through a sensitive process due to various social, economic, political, military, technological, and environmental factors, and the balance of power, actors, and roles are constantly changing. We all see this. Countries are increasing their defense investments in several areas, from ensuring border security to protecting cyberspace and developing multi-faceted relations in the international arena. We have always respected the borders and sovereignty of all our

neighbors, and we continue to do so. Our only goal is to ensure the security of our country and nation. We also expect our neighbors to respect our sovereignty and act in accordance with international law, reason, and logic. In this context, despite all the provocative actions and rhetoric, we make great efforts to keep the dialogue channels with our neighbor Greece open, and we always extend our hand for peace for the stability of our region. While we were approaching the problems with peaceful solutions, some well-known Greek politicians invented a rhetoric called Neo-Ottomanism to cover up their dreams of Megali Idea. Yet, they accuse Turkey of expansionism. However, the real expansionist is Greece itself, which has expanded 3 times in 7 times since its establishment and has constantly provoked and threatened Turkey. These well-known Greek politicians are doing great harm to the Greek people with their statements taking into account their own personal ambitions and sabotaging and destroying the road to peace and the dialogue between the two countries. Despite all the approaches of Greek politicians that are far from reality, detached



*Hulusi AKAR, Minister of National Defense*



from reason and law, we will continue to continue our efforts for peace and stability under the leadership of our President, for the Aegean and the Mediterranean to be a sea of friendship, and for the fair sharing of all wealth. However, those who take pride in bringing the problems between us to the international level and believe that they will usurp our rights by seeking help from other countries should know very well that we have never allowed and will not allow fait accompli and impositions on our rights and interests. As in Cyprus, we are willing and able to protect our rights and interests in the Aegean and the Eastern Mediterranean. If Greece can see Turkey as a strong, reliable, and effective ally rather than a threat, it will be an excellent achievement for our country, region, and NATO. We hope that this will be understood and realized as soon as possible. As a matter of fact, the grain and POW agreements are the last two examples of what Türkiye can do.”

Following the opening speeches, the ribbon cutting ceremony was held with the participation of Prime Minister of Libya AL-DIBEIHEH, MoND AKAR, Minister VARANK, Azerbaijan Minister of Defence General HASANOV, Azerbaijan Minister of Defence Industry GULIYEV, Chief of TGS Gen. GÜLER, President of SSB DEMİR, President of the İstanbul Chamber of Commerce AVDAGIÇ, Chairman of the Board of SAHA İstanbul BAYRAKTAR. Following the opening ceremony, accompanied by the delegations and the Ministers officially invited to the Fair from the foreign countries Minister of National Defence AKAR visited the stands where he talked with company representatives to get information on the displayed products.





# Türkiye's Existing Footprint in Space, Ongoing Programs & Goals

by İbrahim SÜNNETÇİ

The Turkish Space Agency (TUA), whose administrative infrastructure took shape in 2018, announced the National Space Program that covers 10 missions/goals on February 9, 2021, within the framework of the policies determined by President Recep Tayyip ERDOĞAN. Prepared by considering global developments, with the aim to enable the coordinated and integrated execution of vision, strategies, targets and projects of Türkiye in line with national space policy, the National Space Program will allow Türkiye to join an exclusive club of only a handful of countries capable of executing complex space exploration projects on their own.

Over the past decade, Türkiye has also launched its defense industry into the space domain,

in pursuit of matching the fast-developing capabilities of its regional and global counterparts. In this context, by taking an important step in the field of reconnaissance and surveillance with the GÖKTÜRK I & GÖKTÜRK II Electro-Optical (EO) Reconnaissance and Surveillance Satellites, the Turkish Air Force (TurAF) will soon become one of the world's prominent Air Forces in space with the introduction of various indigenously developed and produced Military Communication and Earth Observation Satellites Systems such as GÖKTÜRK-III SAR, GÖKTÜRK Replacement Satellites, İMECE Satellite, TÜRKSAT-6A and TÜRKSAT-6M. In parallel to commercial and military satellite programs, that were launched under the coordination of the Turkish Defense Industries Agency (SSB), Türkiye also set things in motion

regarding independent access to space in 2012 and in 2013 ROKETSAN was awarded a contract by the Turkish Ministry of National Defense (MoND) for the development of the National Satellite Launch System (SLS), which would give it independent access to space. Thanks to its space related capabilities gained during the last decade and its first independent access to space that was achieved in 2017, Türkiye has joined the list of countries hoping to land a rover on the moon by the end of the decade.

In this article, we will look at the major ongoing military communication and earth observation satellite projects, TUSAŞ Space Systems Assembly Integration and Test Center (AIT), National Space Program, ROKETSAN's ŞİMŞEK Micro-Satellite Launching System (MSLS) Development Project and

Stepping into the space sector with its communication satellite program in the early 1990s, Türkiye is a fairly new but ambitious player in space. Having started its first space and satellite adventure with TÜRKSAT 1B, launched on August 10, 1994 and served for 12 years, Türkiye today becomes one of the 30 countries that owns satellites and has increased the number of active communications satellites in space to 5 (TÜRKSAT 3A, 4A, 4B, 5A and 5B) with the launch of 6th generation communication satellite TÜRKSAT-5B on December 19, 2021, and the total number of satellites has increased to 7 together with GÖKTÜRK I & GÖKTÜRK II Earth Observation Satellites.

Sounding Rockets, as well as DELTAV's National Hybrid Thrust System [HİS] that will be used on the spacecraft to be used in Moon Research Project-1 (AYAP-1).

## GÖKTÜRK-II EO/IR Reconnaissance and Surveillance Satellite

Featuring an 80% local content rate in terms of engineering and 40% in parts/hardware the GÖKTÜRK-II EO/IR Earth Observation Satellite was



Satellite image of Erdek, captured by GÖKTÜRK-II satellite



GÖKTÜRK-I



GÖKTÜRK-III

designed and developed by Turkish Aerospace (TUSAŞ) and the TÜBİTAK TÜBİTAK Space Technologies Research Institute (TÜBİTAK Space) to meet the 2.5m resolution satellite image requirements of the TurAF.

The EO/IR payloads of the satellite consist of; a multi-spectral imager (MSI) equipped with EOS-C panchromatic (PAN, at a 2.5m resolution) and EOS-C multispectral (MS, at a 5m resolution) electro-optical sensors developed by Satrec Initiative (SI) of South Korea, to capture high resolution images from anywhere in the world and additionally a Near Infrared (NIR) Satellite Camera named KUZGUN, developed by TÜBİTAK Space, with a 20m SWIR (Short Wave Infrared) resolution.

The satellite was integrated and tested at the TUSAŞ AIT facility in Ankara and transported to Jiuquan Satellite Launch Center (JSLC) in Gansu Province, China, in November 2012. The satellite launch took place on December 18, 2012, atop a Long March-2D (LM-2D) rocket. The GÖKTÜRK-II EO/IR Reconnaissance and Surveillance Satellite, which is controlled from a Satellite Ground Station in Ahlatlibel, Ankara, started to serve the TAF as fully operational in April 2013, and currently, the TurAF Reconnaissance Satellite Command is able to capture images from anywhere in the world without any restrictions through the GÖKTÜRK-II satellite.

Measuring 1.9m x 1.9m x 1.9m

the GÖKTÜRK-II is set at a sun-synchronous orbit at a distance of 686 kilometers from the ground and takes a turn around the earth every 98 minutes. The GÖKTÜRK-II Satellite, has a dry weight of approximately 409kg and a gross weight of 450kg, and because of its orbit, the satellite can only collect images during solar noon.

Launched on December 18, 2012, with a design life of 5 years, the GÖKTÜRK-II National Reconnaissance and Surveillance Satellite completed 10 years in orbit and as of October 21, 2022, and it continues its mission successfully.

### **GÖKTÜRK-I Reconnaissance and Surveillance Satellite System**

The project contract valued at €261.5 Million (satellite launch and insurance costs are also included in this figure) was signed between the Italian Telespazio SPA (TPZ) company and Turkish Defense Industries Agency (SSB) on July 16, 2009, and the contract became effective on July 19, 2010. The project includes: a satellite with an Electro-Optical (EO) camera, Main Ground Station, Mobile Backup Ground Station and the establishment of the TUSAŞ Space Systems Assembly Integration and Test Center (USET/AIT) on TUSAŞ premises.

The satellite is able to collect images (up to 902 images per day) from anywhere in the world without any restrictions in

Panchromatic (PAN, black and white, but sensitive to all colors) at a 0.5m resolution, and 4-band Multispectral (MS, full color) at a 2m resolution the GÖKTÜRK-I Electro-Optical (EO) Reconnaissance and Surveillance Satellite was sent to space from the Guyana Space Center in Kourou on December 5, 2016, with the Vega Satellite Launch Vehicle (SLV) of the ArianeSpace. Following the completion of necessary test activities that were performed within the scope of the in-orbit acceptance process, the GÖKTÜRK-I Satellite's final acceptance by the TurAF took place on December 4, 2018. Since then, the GÖKTÜRK-I Satellite has been commanded/controlled and operated by the personnel of the TurAF's Reconnaissance Satellite Command in Ahlatlibel, Ankara.

The dry weight of the GÖKTÜRK-I EO Reconnaissance and Surveillance Satellite, which is

based on the Proteus satellite bus with Thales Alenia Space (TAS) aluminum frame, is approximately 1,000kg according to TPZ data and its launch weight is stated as 1,060kg by ArianeSpace. Measuring 4.2m x 2.5m x 1.6m, the GÖKTÜRK-I Satellite, features a pair of solar panels and a very high-resolution EO camera weighing approximately 200kg.

The GÖKTRK-I Satellite was set at a Sun-synchronous polar low Earth orbit at an altitude of 689km, circling one complete orbit in 98 minutes, 14 times a day. The service life of the GÖKTÜRK-I Satellite was stated as 7 years and 3 months and the satellite will operate in various imaging modes such as point, strip, wide-area and stereo. According to the data of TPZ, the GÖKTÜRK-I Satellite has a revisit time of under two days over the Turkish territory.



USET/AIT (Assembly Integration and Test) Center

Established with an investment cost of around Euro 100 million the TUSAŞ Space Systems Assembly Integration and Test Center (AIT), one of Europe's and the world's largest and Türkiye's first satellite test facility, was opened officially by President Recep Tayyip ERDOĞAN on May 21, 2015, at the TUSAS Kahramankazan, Ankara campus.

The Center contains a 9,800m<sup>2</sup> closed area and a 3,800m<sup>2</sup> 100,000-Class Clean Room, mechanical, thermal, acoustic, and electromagnetic interaction environments. The same environments the satellites will endure during launch and in-space will be created at the center so that qualification tests can be performed. The Center is a critical infrastructure for the in-country production of future earth observation and communication satellites. The assembly, integration and test activities of multiple satellites up to 5 tons can be carried out at the same time and all these activities will be conducted by expert and trained technical teams of TUSAŞ.

Officially accepted in 2017, the AIT Center took part in the conformance and functional tests in accordance with the environmental conditions that the GÖKTÜRK-I Satellite would encounter in space. The AIT Center consists of: Thermal Vacuum Chamber, Compact

Antenna Test Chamber, Acoustic Room, Section for EMC/EMI Electromagnetic Compatibility Tests, Sections with mass and center of mass measurement instruments, vibration system, solar array deployment test and sections where insulation blankets protecting the satellite are manufactured.

### GÖKTÜRK-III Synthetic Aperture Radar (SAR) Satellite System

The GÖKTÜRK-III Project, which aims for the indigenous development of a space-based imaging capability in any weather condition in day and night by means of the Synthetic Aperture Radar (SAR) sensor, covers the procurement of a high-resolution locally built SAR Reconnaissance and Surveillance Satellite and mobile and fixed ground stations.

In the January 2013 Defense Industry Executive Committee (SSİK/DIEC, the highest decision-making body on defense procurement in Türkiye) Meeting; it was decided to initiate contract negotiations with TUSAŞ for the development of the GÖKTÜRK-III Satellite Project, which will have SAR imaging capability, with the support of TÜBİTAK Space and ASELSAN and as a result of the intensive studies carried out in this direction, the contract negotiations were completed and the GÖKTÜRK-III SAR Satellite System Development Project Pre-Design Agreement (Phase 1); was signed between the SSB and TUSAŞ in May 2013 during the IDEF '13 Fair and the



contract entered into force on November 26, 2013. The preliminary design work on the GÖKTÜRK-III was completed on May 17, 2016. Phase 2 has been planned to include the Detailed Design, Integration, Tests, Launch and Delivery of the Satellite to the end-user in orbit.

Within the scope of the contract signed between TUSAŞ and ASELSAN, the development activities of the SAR Mission Payload Sub-System, Communication Sub-System, and Fixed/Mobile Ground Stations to be used for the GÖKTÜRK-III SAR Satellite, were carried out by ASELSAN. As of the end of 2016, the final phase of the GÖKTÜRK-III SAR Satellite System Development Project, the

Pre-Design Review Phase was completed in accordance with the project schedule.

Under Phase-I, ASELSAN had initially proposed both AESA-based and reflector-based SAR Mission Payloads. Afterward, TUSAŞ, SSB, and the TurAF worked together and set the reflector-based SAR antenna design as the first target for the Mission Payload. However, the SSB, after consulting with the TurAF, gave up its reflector-based SAR antenna design and focused on an AESA-based antenna design, and in October 2016 published a Request for Information (RFI) for the procurement of an AESA-based SAR Mission Payload. In addition to the foreign companies,



Satellite image of Kastamonu, captured by GÖKTÜRK-I satellite



Satellite image of France, captured by GÖKTÜRK-II satellite



ASELSAN also responded to this RFI. According to the ASELSAN 2017 Annual Report, studies for Phase II were continued in 2017 and in this context, different solutions were created by using off-the-shelf platforms of local and/or foreign platform providers for the SAR Mission payload with

an Active Electronically Scanned (AESA) Array which was to be developed by ASELSAN, additionally, technical and budgetary studies were conducted for each solution.

Meanwhile, within the scope of the GÖKTÜRK-III SAR Satellite

System Development Project the SSB issued a Request for Proposal to local companies in October 2020.

Although it was originally planned to be launched into space in 2019, to be placed in a Sun-synchronous orbit at an altitude around 500km, GÖKTÜRK-III SAR Satellite's launch date was later announced as 2025 by the TurAF. However, according to the current schedule the GÖKTÜRK-III, to be equipped with an AESA antenna, will be launched into orbit in 2028.

According to publicized information GÖKTÜRK-III Satellite will have weight of 1,000kg and a service life of 7 years. It is stated that the GÖKTÜRK-III Satellite will not feature any hardware/systems subject to export restrictions (ITAR-Free), thus it can be launched into space with Russian or Chinese manufactured satellite launch vehicles. The operations of the GÖKTÜRK-I, GÖKTÜRK-II, and GÖKTÜRK-III EO/IR SAR Earth Observation Satellites will be carried out by the TurAF's

Reconnaissance Satellite Command. Türkiye, with the GÖKTÜRK-III SAR Satellite, will be able capture high-resolution SAR satellite images (<1m) from anywhere in the world without any restrictions in day and night in any weather conditions.

## GÖKTÜRK Replacement Satellites

Within the scope of the GÖKTÜRK Replacement Reconnaissance Surveillance Satellite System Development Project, that was launched by a DIEC Decree dated May 6, 2014, the formal contract was signed between the Turkish Defense Industries Agency (SSB) and the Main Contractor TUSAŞ on June 23, 2021. Under the contract, the first GÖKTÜRK Replacement Satellite, the GÖKTÜRK-1Y EO Reconnaissance & Surveillance Satellite (also known as GÖKTÜRK-IV), which will replace the GÖKTÜRK-I EO Satellite, will be manufactured at the TUSAŞ Space Systems Assembly Integration and Test Center (AIT). Within the scope of the project the Main Contractor TUSAŞ is cooperating with TÜBİTAK UZAY, TÜBİTAK BİLGEM, ASELSAN, PROFEN, SDT and CTech. Under the Project the Kick-Off Meeting was held in August 2021 with the participation of the TurAF, the SSB and TUSAŞ representatives.

According to the contract, the GÖKTÜRK-IV Satellite, which will be designed and manufactured with domestic resources and capabilities and to be equipped with a sub-meter resolution EO camera, is supposed to be launched in the 70th month following the contract award. In May 2021 it was disclosed that the GÖKTÜRK-IV/GÖKTÜRK-1Y EO Satellite will be launched into orbit in 2026. According to TUSAŞ, though it will have a design life of 7 years, the GÖKTÜRK-1Y Satellite will be able to operate up to 10 to 12 years.



GÖKTÜRK-1Y EO Reconnaissance & Surveillance Satellite



*TÜRKSAT-6A National Communication Satellite*



designed and manufactured electric propulsion system. Measuring 5,754mm x 3,283mm x 3,962mm the TÜRKSAT-6A will serve at 42° East Geosynchronous (Geostationary/GEO) orbit (36,000km) for the operation of the National Satellite Operator Company, TÜRKSAT. Assembly, integration and test activities of the TÜRKSAT-6A Satellite are being carried out at the TUSAŞ AIT Center. It is designed to provide commercial service for at least 15+1 years.

TÜRKSAT-6A was originally planned to be ready for launch in November 2019. However, the launch date was later updated as December 2020 and then December 2021. According to the current schedule the satellite will be launched into orbit in 2023 aboard the Falcon 9 SLV of SpaceX company.

Within the scope of the project, four different satellite models (Structural-Thermal Qualification Model, Electrical/Electronic Satellite Model, Engineering Model and Flight Model) have been produced so far. The fourth satellite model (Flight Model) will be launched into orbit. The

propulsion system, which is able to generate 1.5kW thrust developed with national capabilities under the HALE Project, will be used on TÜRKSAT-6A experimentally. The domestic and national components used in TÜRKSAT-6A are as follows: Flight Computer, Power Distribution Unit, Electrically Powered Thruster, Fuel Tank, Power Processing and Control Unit, Fuel Supply Unit, Star Tracker, Power Regulation Unit, Solar Sensor, Reaction Wheel, Chemical Propulsion, Thermal Control and Response Wheel Interface Units.

### **Turkish Space Agency (TUA) & National Space Program**

Established with the Presidential Decree No. 23 on December 13, 2018; the Turkish Space Agency (TSA) is a state institution which is responsible for the preparation of the strategic plans governing the medium and long-term goals on aeronautics and space technologies, basic principles and approaches, objectives and priorities, performance indicators as well as the methods to achieve these goals and the distribution

of resources. Based in Ankara, the TUA will report to the Turkish Ministry of Industry and Technology, but will coordinate and cooperate with other government ministries and agencies as required in the fulfillment of its mission. The TUA has prepared and carries out the National Space Program in line with the policies determined by the President of Türkiye. The TUA has financial and administrative autonomy as well as a special budget and will pave the way for the establishment of a competitive indigenous industry. The agency will also pursue multilateral and bilateral cooperation with its international counterparts while protecting Türkiye's rights at the United Nations. One strategic purpose of the TUA is to, "reduce external dependence in space and aviation science and technologies, to increase competitiveness in the international arena, to create a scientific and technological infrastructure and to develop new technology."

On February 9, 2021 President ERDOĞAN unveiled Türkiye's 10-year National Space Program

domestically produced space vehicle (Rover) on the Moon by 2023, with a soft landing and rover launch by 2028, the construction of a Turkish Spaceport, sending a Turkish astronaut to the International Space Station (ISS) in 2023 for a scientific mission and establishing a national GPS satellite constellation. The National Space Program will allow Türkiye to join an exclusive club of only a handful of countries capable of conducting complex space exploration projects on their own.

Türkiye plans to send a rover to the Moon by the end of the decade using a domestically built rocket engine that will first fly to the Moon in a test mission in 2023. The rover, which will be launched in 2028 or 2029, according to Serdar Hüseyin YILDIRIM, Head of the Turkish Space Agency, will land softly on the Moon and collect scientific data on its surface. The rocket that launches the Moon rover will be domestically built, using a hybrid engine that is currently being developed by DELTAV in Türkiye. According to YILDIRIM, the preliminary design of the

national space vehicle that will go to the Moon was completed and its production has started, Türkiye intends to send this two-ton vehicle into lunar orbit no later than 2024 in agreement with one of the international launch companies. "We intend to use our own engine to reach the Moon," YILDIRIM said. "But for this phase, our spacecraft will be brought to low Earth orbit with an international collaboration."

Within the scope of the 10-year National Space Program, Türkiye aims to send its first astronaut to space in 2023. For this purpose Türkiye has decided to cooperate with Axiom Space, a private space infrastructure company based in Houston, Texas that operates private missions to the International Space Station. In August 2022 an agreement was signed with the company at the International Astronautical Congress International in Paris. Türkiye (TUA) will cooperate with Axiom Space for the training and flight service of the Turkish astronaut whose selection process is ongoing.

### ŞİMŞEK Project & National Satellite Launch System

On July 17, 2013, ROKETSAN was awarded a contract by the Turkish MoND for the development of the ŞİMŞEK (Lightning) National Satellite Launch System (SLS), to be based on the requirements of the TurAF in order to acquire accessibility to space. Within the scope of the project; the Space Launch Vehicle (SLV) configuration used for the development of SLS, will be able to insert a payload with a mass of no less than 1,500 kg into a 700 km Sun Synchronous Orbit, was determined. The project also covered the foundation of the Satellite Launch Center.

According to the 2015 and 2016 Annual Reports of the Turkish MoND, the ŞİMŞEK SLS Project aimed to support the sustainability of current and planned satellite programs and provide independent access to space, when considering Türkiye's current and subsequent satellite needs. According to 2016 Annual Report the first launch within the scope of the Project would be performed in 2023.

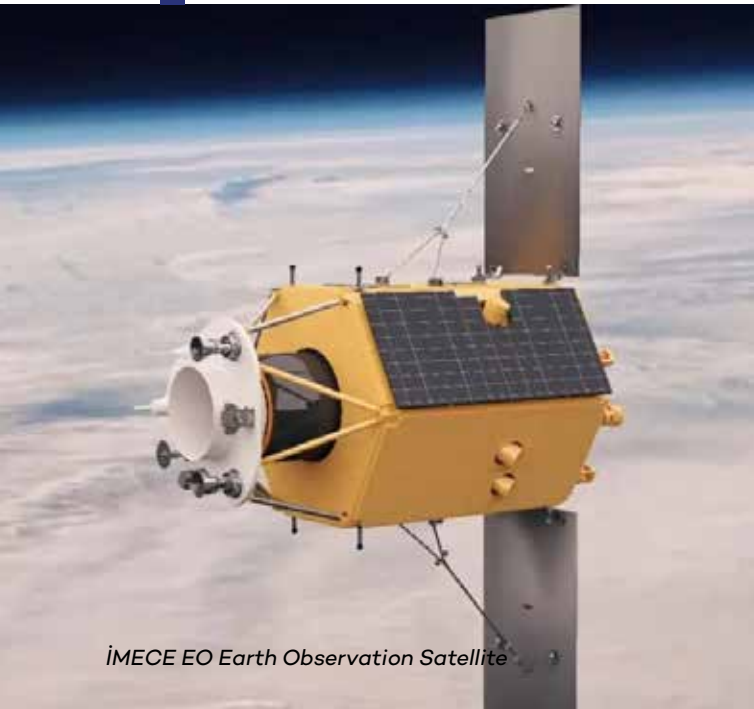
According to open sources the ŞİMŞEK SLV would consist of two separate stages, each with a liquid-fueled rocket engine. The first stage will incorporate a liquid-fueled rocket engine cluster and Oxidizer Tank, while the second will hold a liquid-fueled rocket engine and Fuel/Oxidizer Tank. The satellite would be carried within the Payload Fairing, which will be located in the nose section. Measuring 35m in height, the ŞİMŞEK SLV was envisaged to have a lift of mass of 160 tons and its main rocket engine to have a diameter of 2.5m.

Under the signed contract, the studies within the frame of the Pre-Conceptual Design Period (Period-I) carried out by ROKETSAN as the Main Contractor, were completed on December 31, 2014. In the meantime, alternative roadmaps were determined to reduce risks during the Design and Development Period and to acquire critical technologies for satellite launch systems at a maximum level. As part of the alternative roadmaps study carried out by the SSB Department of Air Defense and Space, technical support from abroad or international cooperation in Period-II were also evaluated.

The National SLV was envisaged to be used launching locally designed



Scale model of ŞİMŞEK Micro-Satellite Launching System



İMECE EO Earth Observation Satellite

## İMECE Sub-Systems Project

Based on the heritage and expertise acquired in the BİLSAT, RASAT and GÖKTÜRK-II Projects, the İMECE Program is set to satisfy Türkiye's future sub-meter resolution needs as well as to build related infrastructure and capability domestically. The İMECE Program consists of two main projects: The İMECE Satellite Sub-Systems Development Project and the İMECE Satellite Platform Development Project.

The İMECE Sub-Systems Project, which aims to develop sub-systems for High-Resolution Earth Observation Satellites in Türkiye and to create the necessary R&D integration and test infrastructures for this purpose, was initiated under the coordination of the

Ministry of National Defense (MoND) Department of R&D and Technology (MoND and the SSB R&D Departments merged under the SSB Department of R&D and Technology Management) with funding from the Presidency of Strategy and Budget in coordination with the SSB.

## Earth Observation Satellite Development (İMECE) Project

The İMECE Project Agreement, which was funded by the TÜBİTAK 1007 Program, was signed on December 21, 2016, between the SSB, TÜBİTAK, and TÜBİTAK Space. With the project, it is aimed to ensure the continuity of the skills acquired with the GÖKTÜRK Projects in the domestic space/satellite field, to provide space qualification for the satellite systems and

subsystems to be developed and to reduce the dependency on foreign countries.

The İMECE EO Earth Observation Satellite, designed and manufactured entirely by Turkish engineers, will be launched into orbit on January 15, 2023, from Florida in the USA and will be placed in a Sun-Synchronous orbit at an altitude of 680km. According to TÜBİTAK Space, the İMECE Satellite will be able to collect its first image 48 hours after its launch and will obtain high-resolution images from all over the world without any geographical restrictions. The design life of the İMECE Satellite, which can be used for civil and security purposes, is planned as 5 years. Featuring an indigenously developed and produced electric propulsion system for in-orbit maneuvering and station-keeping the İMECE Satellite will have a dry weight of 800kg and will be able to collect black-and-white images at an 88cm resolution and full color images at a 3.5m resolution. The satellite is intended to have high-speed data communication (DC) capable of downloading an approximately 1,000km image strip in one pass.

The İMECE Satellite features a 100% local content in terms of engineering (in design and manufacturing) and 60% in parts/hardware. TÜBİTAK Space carried out the design, analysis, manufacturing, and testing of the İMECE Satellite and many sub-systems including the onboard computer, power supply system and the High-resolution EO Satellite Camera, which was developed by the TÜBİTAK Space Optical Systems Research Laboratory (OPMER) and has a target orbit altitude of 540km and a 0.7m resolution, under the İMECE Sub-Systems Development Project. In addition to these various important sub-systems such as the Communication System, Solar Sensors, Star Tracker, Reaction Wheel, GPS, New Generation

Onboard Flight Computer, Payload Data Storage, Compression and Formatting Unit, Hall Effect Thruster (Electrically Powered Thruster) System, Steerable Antenna, Center of Optical Excellence and National Ground Station have been developed nationally under İMECE Sub-System Projects. The TUSAŞ AIT Center is being used for satellite tests before its scheduled shipment to the USA in November 2022.

## TÜRKSAT-6A National Communication Satellite

In order to fulfill the requirements of the Turkish Satellite Operator Company TÜRKSAT, the TL546 Million (around US\$241.6 Million, the project is expected to cost less than US\$250 Million, excluding launch costs) contract for the "Development and Production of the TÜRKSAT-6A Communication Satellite" Project, which was initiated under the coordination of the Scientific and Technological Research Council of Türkiye (TÜBİTAK), was signed on December 15, 2014. TÜRKSAT-6A, Türkiye's first indigenous communication satellite is being developed in cooperation with TÜBİTAK Space, TUSAŞ, ASELSAN and CTech. It features 16 active and 4 backup Ku-Bands and two active and one backup X-Band transponders. The TurkSat-6A National Communication Satellite with completely national software and design will be able to perform both commercial and military tasks. It will have a broad coverage area (Asia, Europe, North and Mid-Africa) in Ku-Band and X-Band. With TÜRKSAT-6A Türkiye's satellite coverage area will also expand to the eastern coverage area including India.

The production of the TÜRKSAT-6A started with a Project Kick-off Meeting held on January 29, 2015. TÜRKSAT-6A will have a dryweight of around 1,800kg and launch mass of approximately 4,250kg including fuel and is equipped with a nationally



A family photo taken after İMECE Satellite's shock test





# NAVAL ENGINEERING

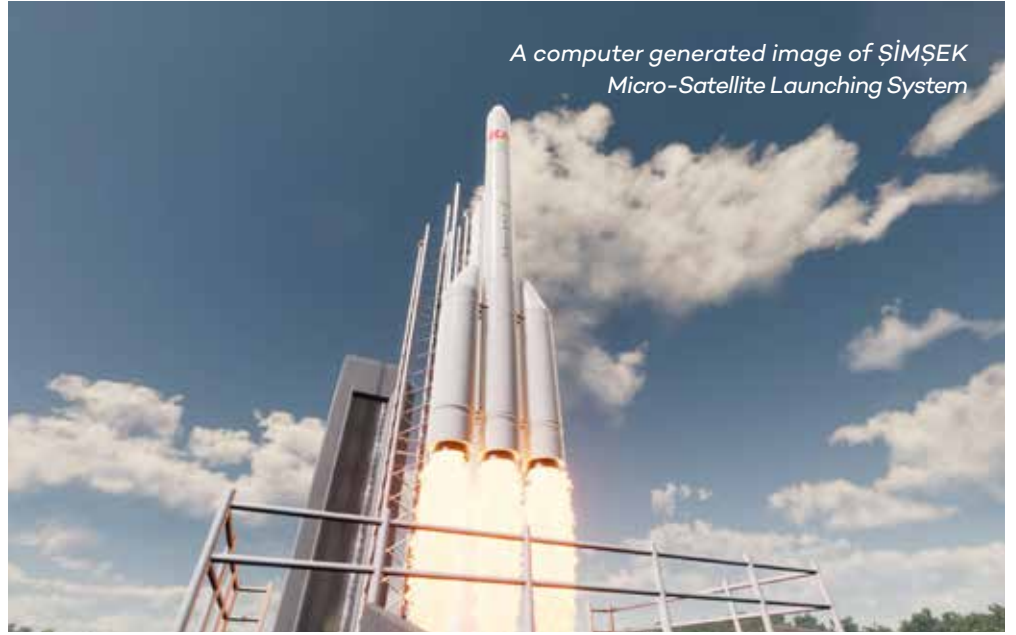


and manufactured Communication Satellites and EO/SAR-based Earth Observation Satellites into orbit. Thanks to the National SLV, indigenously designed and manufactured satellites can be placed into low Earth orbit (LEO) without any restrictions.

It seems that the ŞİMŞEK Project was transferred from the MoND to the Turkish Defense Industries Agency (SSB) and a new project dubbed "ŞİMŞEK Micro-Satellite Launch System Development Project" was launched by the SSB.

### ŞİMŞEK Micro Satellite Launch System Development Project

The Micro-Satellite Launching System (MSLS) that will give Türkiye independent access to space is being developed by ROKETSAN under a contract signed between the Turkish Defense Industries Agency (SSB) and ROKETSAN on November 5, 2018. Once the MSLS Development Project launched under the contract has been completed, it will be possible to put micro-satellites with a maximum weight of 400kg into a low Earth orbit (LEO) at an altitude of at least 550 kilometers. Under the Project, in addition to the development of the three-stage ŞİMŞEK Micro-Satellite Launching Vehicle (MSLV), ROKETSAN will also build testing and production facilities as well as a launch base/site (currently under construction at İğneada in Kırklareli, earlier reports suggested Türkiye could establish a spaceport in Somalia with a US\$350 Million investment). The ŞİMŞEK MUF S/MSLV Development Project has 7-year schedule. According to schedule ROKETSAN was supposed to execute a mission demo with the MSLV and to install a micro satellite into LEO in 2025. But according to the current schedule this launch will take place in late 2027.



*A computer generated image of ŞİMŞEK Micro-Satellite Launching System*

Within the scope of the ŞİMŞEK MSLS Development Project, in 2015 a Satellite Launch Space Systems and Advanced Technologies Research Center at ROKETSAN was established, and prior to producing the MSLV a Sounding Rocket was developed for the testing of space technologies and creating milestones for the systems, in just two years. ROKETSAN, Türkiye's primary rocket and missile manufacturer, has produced Sounding Rockets and has performed a total of 8 successful Sounding Rocket launches during 2017-2020 to test related technologies including: aerodynamic hybrid control driven by Thrust Vector Control,

electromechanically controlled propulsion, Liquid-Propellant Rocket Engine and Solid-Propellant Rocket Motor with Thrust Vector-Control, Stage Separation and Capsule Detachment in Space technology.

Turkish President Recep Tayyip ERDOĞAN announced in his speech during the ROKETSAN Satellite Launch Space Systems and Advanced Technologies Research Center inauguration ceremony held on August 30, 2020, in Ankara, that the first Sounding Rocket produced by using national technology has reached an altitude of 130 kilometers, passing the 100km Karman Line and therefore made

the first step to space. The first successful launch that passed the Karman Line was performed in 2017 with Sounding Rocket TP0.1, which was a one staged solid fueled rocket. According to ROKETSAN, 3 launches were performed in 2018 with Sounding Rocket TP0.2, also a one staged solid fueled rocket and it reached a 130km apogee and 2 launches were performed with Sounding Rocket TP0.3, again a one staged solid fueled rocket that reached a 106km apogee.

Within the scope of the MSLS Development Project, on during October 26-29, 2020, ROKETSAN successfully completed the testing of two



*SR 0.1-2 Sounding Rocket beign prepared for the launch.*

Sounding Rockets (SR.0.1 and SR.0.1-2) that were developed for the testing of space technologies. During the test launch that took place from the Sinop Test Range located in the Black Sea province of Sinop, Türkiye, the SR-0.1 – the first prototype sounding rocket – was launched into space using solid-propellant rocket engine technologies. The SR-0.1 was a two-staged Sounding Rocket, first stage was a solid engine, and second stage was pressure fed liquid fueled engine. During the test launch, the SR-0.1 Sounding Rocket reached an altitude of 136 kilometers and the payload capsule, which was required for scientific search, was successfully detached. The success of the tests not only contributed greatly to the development of the liquid-propellant rocket engines that will be required to meet the precise orbit placement needs of the MSLV Development Project, but also marked a first for Türkiye in its launch of scientific studies in space. This was the fifth time that ROKETSAN has reached space since 2017.

ROKETSAN plans to perform another suborbital sounding rocket launch in 2023 with a larger sounding rocket which will be used for the testing of Micro-Satellite Launch Vehicle (MSLV) technologies, with the ability to deliver payloads of up to 100kg to an altitude of 300km. The new two-staged sounding rocket (MSLV Test Rocket) is expected to have a height of around 15m and a diameter of 1.35m. Efforts are also underway to develop an MSLV configuration with greater capacity (payload and/or orbit altitude) in which the first stage of the MSLV is supported by side engines. Once the ŞİMŞEK MSLV Program, that currently underway at the Satellite Launch Space Systems and Advanced Technologies Research Center (SLSS&ATRC), is complete, as scheduled for 2027, it will be possible to place micro-satellites of up to 400kg in a Low Earth Orbit at an altitude of at least

550km. Türkiye will thus acquire launch, testing and manufacturing capabilities, and the ability to establish a spaceport, placing it among only a few countries in the world with the necessary knowhow and infrastructure.

ROKETSAN displayed the scaled (1/10) model of the ŞİMŞEK MSLV for the first time at IDEF '19 in May 2019 and then at Paris Air Show 2019 in June. The ŞİMŞEK MSLV will consist of three stages; including a solid-propellant motor cluster (with three rocket motors) at the first stage, a solid-propellant rocket motor at the second stage, and a liquid-fueled rocket motor (will operate at a 100-120km altitude, beyond the Earth's atmosphere, and take satellite/s up to a 550km altitude/orbit) at the third stage. The satellite itself will be enclosed in a metal shield known as a fairing at the third stage. The fairing provides protection for the satellite while it is being launched and makes it easier for the launch vehicle to travel through the resistance of the Earth's atmosphere. When the satellite reaches above the Earth's atmosphere, the fairing splits apart and burns up in the Earth's atmosphere. Measuring 19m in height and 1.35m in diameter, the ŞİMŞEK MSLV will have a launch mass of 32 tons and will be able to reach a speed of 7.7km/s.

### **DELTAV Successfully Tested Hybrid Engine for Moon Mission and Sounding Rocket System (SORS)**

DELTAV, a subsidiary of the SSB, plays a leading role in the National Space Program, and has successfully completed the first flight test of its hybrid engine technology (National Hybrid Thrust System [HİS]) that will be used on the spacecraft (also being developed by the company) to be used in the Moon Research Project-1 (AYAP-1) and which is planned to make a hard landing on the Moon in 2023,

within the scope of the National Space Program. As part of the flight test, the national hybrid engine was integrated into the Probe Rocket System (SORS). The SORS was launched from the Sinop Test Range on July 19, 2021, and successfully completed its first flight test. Mustafa VARANK, Minister of Industry and Technology also followed the launch test at the test center.

Developed by DELTAV the SORS features fast-burning and high-performance hybrid engine that uses liquid oxygen and paraffin fuel. According to Minister VARANK, using hybrid technology will result in a "significant" commercial advantage because it produces the same thrust at a fraction of the cost of competitors. "The ultimate goal here is to exceed an altitude of 100 kilometers (62.5 miles), the start of outer space, with hybrid engine rockets," Minister VARANK told Anadolu Agency (AA) on the sidelines of the tests in Sinop. DELTAV pushes ahead with its work to increase the altitude of the rocket. SORS will have more oxidizing capacity with an enlarged tank. This will enable the rocket to reach altitudes much higher than 100 kilometers. Ground tests of the enlarged oxidizer tank also took place in 2021.

DELTAV had previously successfully conducted the first test firing of the National Hybrid Thrust System (HİS) on April 11, 202, at its Rocket Engine Firing Facility located in İstanbul's Şile district. In parallel, a vertical firing test of the thrust system of the SORS, which will reach outer space, was also carried out on the same day.

On April 13, 2022, the Turkish Space Agency (TSA) disclosed that the first System Level Firing Test of the National Hybrid Thrust System (HİS) that will be used on the spacecraft to be used in AYAP-1 has been completed successfully. On August 22, 2022, Minister VARANK disclosed that

*A shot from SORS's first flight test took place from Sinop Test Range on July 19, 2021.*



the first space environment tests of the hybrid propulsion system to be used in AYAP-1 were successfully carried out.

As part of the Moon mission, the first launch into orbit will be made with international cooperation, after which the hybrid engine manufactured by DELTAV will take the Turkish spacecraft to the Moon's surface. In the second stage in 2028, according to the road map, Türkiye will launch its own rockets into space in the same way it did the probe.

# SAHA EXPO 2022 is a New Generation Fair with its Services and Advantages



SAHA EXPO 2022 was launched with the participation on official delegations, company executives and many participants from abroad and at home on 25th October.

As an industry-specialized fair, SAHA EXPO's primary objectives are to create an environment where industrialists can network and companies can interact with each other. In this context, SAHA EXPO 2022, which is designed as a fair that will break new ground, offers a series of services and advantages such as SAHA MATCH software with artificial intelligence that provides company-specific fair information to the participants, B2B & G2B free guide service, Silk Road concept, and free participation

to a Metaverse exhibition for all companies participating in the physical exhibition with a booth.

Exhibitors will be able to find potential customers and suppliers easily and schedule meetings at SAHA EXPO, a supply chain exhibition where industrialists meet industrialists, thanks to SAHA MATCH, an artificially intelligent program specially designed to match the needs and capabilities of participating companies to each other in order to increase potential partnerships, business development, and investment opportunities. Exhibitors at SAHA EXPO will be able to learn in advance which businesses they may meet with as potential customers and suppliers thanks

to SAHA MATCH, a service that is being introduced and has never been offered at any show before. For this purpose, SAHA Istanbul collects data on the products they sell, the products they supply to manufacture the products they sell, the sectors/fields they can cooperate with, their investment opportunities, etc., from all companies participating in the exhibition and matches them with SAHA MATCH. Thus, companies participate in the fair by knowing which product to discuss with whom, and the fair become more focused and more results oriented. Then, the participating companies have access to the SAHA MATCH digital interface, which will be able to offer some suggestions to them beyond a

typical B2B portal thanks to artificial intelligence. Using the data that has already been shared with them, the companies will create meeting requests, send confirmation emails to the other party as part of these requests and create meeting calendars.

Additionally, each foreign exhibitor at SAHA EXPO 2022 will be assisted by a guide (SAHA MATCH-Maker) who will help them organize and attend their meetings with domestic exhibitors in an effort to improve the export potential of domestic businesses. In this regard, sections have been created in each of the fair's exhibition halls, and corresponding tour guides have been assigned. As part of

the collaboration with Istanbul Technical University (ITU), a 200-person team made up of third-and-fourth year students proficient in English and professional tour guides have been established. These students will in charge of hosting and directing international delegations and exhibitors at the exhibition. These students will manage their B2B & G2B meeting traffic at the fair as if they were the staff of those companies. By doing this, the companies will be given access to an assistant who can speak their language in addition to contributing to the careers of these students.

### Another Novelty “Silk Road Concept”

The Silk Road concept is another novelty at the expo. This year, one of the top architectural firms in Türkiye built the exhibition halls in a “Silk Road” style that

has never been seen before in these types of fairs, with a highly unique perspective and urbanization logic. The entrances and doorways of the exhibition halls are quite important as they are the first points that visitors to exhibitions see. SAHA EXPO 2022 will be held in 6 exhibition halls, left and right, at the Istanbul Expo Center. In the new concept created with an Urban Planning and Architecture Office in order to make also the backside of the halls effective with the logic of an urban planner, a half elliptical hallway corridor called “Silk Road” has been designed from the entrance door of the first hall on the right to the entrance door of the last hall on the right. There will be squares on the “Silk Road.”

The main contractor companies will be the sponsors of these squares. They are named ASELSAN, ASFAT, BAYKAR, HAVELSAN, ROKETSAN,

SARSILMAZ, STM, TUSAŞ squares.

In total, there will be 8 different squares which will also add dynamism to the layout of the halls and make the backside of the halls more effective. The “Silk Road” concept, which will make it easier to access the booths, has been designed as a concept where people can interact, take photos, and explore the fair comfortably. SAHA Istanbul has started the process to obtain the intellectual property right of the “Silk Road” concept, which has attracted much attention.

Covering a broad eco-system, SAHA EXPO 2022 are also giving small enterprises and start-ups the opportunity to introduce themselves and showcase their products. Within the scope of the SAHA Initiative Project, 15 start-ups that were supported and reached a certain level were chosen and subjected to a mini-

orientation program. These businesses will start networking with investors at SAHA EXPO 2022. Additionally, a space has been allocated for these 15 start-ups in a conveniently positioned corner of the foyer. During the fair, these businesses will have the opportunity to meet many industrialists and investors while introducing themselves via the projects they will present.

SAHA EXPO 2022 will feature two separate panel areas and a signing ceremony area. Nine panels and two keynote speaker presentations are planned to be organized in the halls that will be converted into two separate panel areas after the opening ceremony in Hall 5. Signing ceremonies will be organized in the signing ceremony areas to be prepared in Halls 6 and 8. Signing ceremony information will be prepared before the fair, and time planning will be done for the two ceremony areas.



**TÜRKİYE'S LEADER  
AVIATION ENGINE  
COMPANY**



**TEI-TF6000**



## “We are Engaged in Multiple Discussions with Different Companies in Türkiye for Future Cooperation”

**SAHA EXPO Daily caught up Abdullah Hassan Al-Khater Barzan Holdings Vice-President and Chief Strategic Procurement Office during SAHA EXPO 2022 to discuss the Qatari approach to industrial development in defense. We also took the opportunity to ask him how he thought Qatar-Türkiye relations in the defense field and the major programs in which BARZAN Holdings currently cooperates with Turkish defense firms.**

**SAHA EXPO Daily: Could you take us for a brief walk through the history of BARZAN Holdings, which was established in 2016 as the strategic investment and procurement arm of the Qatari Ministry of Defense (MoD). What has it accomplished to date?**

**Abdullah H. Al-KHATER:**

Thank you very much and welcome to BARZAN Holdings here. As you now BARZAN Holdings was established in 2016 and prior to that there was no defense industry in the state of Qatar. So, there was a total absence of the defense industry. So, as a vision of the Qatar leadership and specifically his excellency Dr. Hamad Al-THANI and the Ministry of Defense, to establish a company that would be involved in the defense and security industry, and that company would work on the different aspects when it comes to defense and security, it's both an investment in that sector defense and security, R&D and also strategic procurement on behalf of the Ministry of Defense. So, these are the three different areas that BARZAN Holdings is focusing on. We are fully owned by the Ministry of

Defense of Qatar. We also serve the other sectors, whether it's the Ministry of Defense, the Ministry of Interior and other defense areas in the state of Qatar.

**SAHA Expo – Building a local Defense Industry from the scratch is a bit expensive endeavour. Can you elaborate on the financial support that the State of Qatar has provided to you?**

**Abdullah H. Al-KHATER:** There was financial support from the State of Qatar, but financial support was not the obstacle. The obstacle was the defense technology. Since we did not have a foundation for the defense industry in the state of Qatar, we had to partner with reliable international partners to work with us. And we have done that. We have partnered with different companies globally

and we have established a number of joint ventures in the state of Qatar and then also we have established a number of subsidiaries under BARZAN Holdings. And these are specialized companies in different areas. We have an excess of 13 companies between joint ventures and subsidiaries.

As an example, we have the joint venture with Rheinmetal from Germany, we also have another joint venture with Kongsberg from Norway, and we have also established also local companies, as we call them fully owned subsidiaries, in the state of Qatar and this is also working with different partners abroad, where we specialize in, for example we have BINDING which is a joint venture between Baretta of Italy and BARZAN Holdings where we make small pistols and the rifles.



**ÇAKIR**



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Also, we have international investments as you can see from the map. The white area this is where we have partners, either joint venture with companies from those countries or we have a local joint venture in that country. This can give you our footprint around the Globe.

In Nigeria for example, we have established a joint venture there...locally along with our partner, BARER Construction Investment Holding to establish a military textile local facility. And that

internationally, here in Türkiye and also we have some exhibitions in other international places where we are showing our footprint. In terms of providing the Ministry of Defense of Qatar, we are providing them with different types of solutions, meeting their requirements, working closely with them as we are fully owned by them, we get the requirements from them and we look at it and evaluate whether this is an investment case or this is something that we would like to produce locally, it

we meet and surpass the requirements of the state of Qatar, and also position ourselves in the global market where we can be a major player. We are taking different approaches to different areas, for example, one of the areas that we are focusing on is in the area of R&D. We believe that on the investment side we have made a strong approach in the past and now we are focusing more on the research and development aspect where we look at different requirements and with the new developments and with the change in the global market and the global needs, we need to position ourselves strongly in that area and now we can see that traditional warfare has changed. We can see that with the current situations, so we need to ensure that we are developing ourselves and equipping ourselves for the future.

when it comes to developing new technologies. Also another aspect is the position of BARZAN Holdings as one of the leaders in the global market when it comes to defense and security, this is where we see ourselves in 2030 and beyond.

The Qatar and Türkiye relationship is very, very, strong. We have a very strong relationship and based on that I would say we have a very special relationship when it comes to working with the defense industry here in Türkiye. At BARZAN Holdings we are working with multiple Turkish companies and also we have our own investment company here in Türkiye which is BARER Holdings, we own 70% and our Turkish partner owns 30% and this company was established here in Türkiye back in 2017, so this company is in İstanbul and this is our local presence here in the Turkish market. That's one aspect when it comes to investment. When it comes to having a direct relationship with defense companies in Türkiye BARZAN Holdings engages with more than 10 Turkish companies at the same time: I would say we have a very strong relationship with ASELSAN, HAVELSAN, NUROL, BMC a local company here with Qatar having almost a half share of that company, this is a local company here, so we're having a very strong relationship, we're buying a lot of defense projects, and we are supporting the defense sector here in Türkiye.



**SAHA EXPO Daily: Can you share any details about BARZAN Holdings' R&D figures?**

**Abdullah H. Al-KHATER:** Well, the figures are not disclosable, but we do have around 100 R&D engineers that are working at BARZAN Holdings. One of the main focuses is R&D and we have taken up a lot of challenges when it comes to R&D, and I would say we are having a lot of ongoing current activities.

**SAHA EXPO Daily: What can you tell us about the approach of BARZAN Holdings to Turkey, and how would you assess the current relations between the Qatar and Türkiye in the defense field?**

**Abdullah H. Al-KHATER:** The relationship between Qatar and Türkiye is excellent. We are brotherly nations. We are working on the R&D aspect of BARZAN, this is where we are trying to make this a strength area in the future. We have a lot of investments abroad and by that time would see our footprint in the global market become bigger and bigger. R&D by that time we would see a lot of maturity when it comes to projects,

is a joint venture between the state of Nigeria and BARZAN Holdings, represented by BARER Holding. So, this is what we are trying to do in different countries when we have local investments or sometimes, we do joint ventures with different countries around the world establish them in the state of Qatar.

**SAHA EXPO Daily: Can you elaborate on the importance of BARZAN Holdings for the Qatar Armed Forces and protection of Qatar? How would you position BARZAN Holdings in the global defense market?**

**Abdullah H. Al-KHATER:** Well, BARZAN Holdings as a company is a relatively young company. At first, I would say that we have an excellerated approach, where we can catch up and position ourselves regionally and then later on globally. So, in the region we believe that we position ourselves as one of the leaders when it comes to defense and security sectors. Now we are also exhibiting

makes a lot of sense, or is it a direct acquisition...a direct purchase from outside.

We do a thorough evaluation and we assess all the needs and requirements of the Qatar armed forces and jointly with our leadership we make the decisions to ensure that their requirements are met. And whether this is something that we believe is a strategic decision where we need the local industry or is it something that we can invest abroad and work with different countries, or if we should go directly outside and source it as a one-time source.

**SAHA EXPO Daily: What strategies define the BARZAN Holdings of today, and what are the targets for the near to long term? Where do you envision BARZAN Holdings to be 10 years from now?**

**Abdullah H. Al-KHATER:** We envision for BARZAN Holdings as a global leader in the defense and security area, where we believe that

**SAHA EXPO Daily: In what areas do you feel military and industrial cooperation between Türkiye and the Qatar may be increased? Do you have a plan or strategy to establish strategic partnerships or subsidiary JV companies with Turkish defense companies for joint production/sales to third countries worldwide?**

**Abdullah H. Al-KHATER:** Our investment company in Türkiye is not only made for the Turkish market. Although it is established



# YOUR AUTONOMOUS VANGUARDS

## BAHA

Autonomous Sub-Cloud UAV



## BARKAN 2

Autonomous UGV



here, that company also has a footprint in other countries. For example, BARER Construction Investment Holding, that company also has a global reach. It is based from here (Istanbul), it has a global reach. It has a factory for example in Sudan, it has also investment in Nigeria. There's potential discussions in Chad and Ghana—also an establishment Uzbekistan... And now we are having multi hundred million contract in Indonesia with plans to localize certain defense industry in Indonesia itself. So starting from here we have a global reach as well where I would say it is a future benefit for both countries.



**SAHA EXPO Daily: Can you elaborate on the major programs in which BARZAN Holdings currently cooperates with Turkish defense firms in the defense realm? BARZAN Holdings for example signed both procurement agreements and Letters of Intents (Lols) with Turkish defense companies such as ASELSAN, NUROL MAKİNA and YONCA-ONUK JV during DIMDEX 2022 Exhibition in March 2022.**

**Abdullah H. Al-KHATER:** What ever we can share it is already shared in the Media. However, there are discussions that are still not yet available for public release. Once they reach the final stage, we can share it, but we can tell you that we have signed during DIMDEX, a number of agreements with the companies as you have mentioned. Also, we have signed a number of Lol with other companies where we are still in discussion with these companies, when we reach a final agreement, we can announce it.

**SAHA EXPO Daily: For example, the contract with ASELSAN, as far as I know covers local production of ASELSAN's software defined radio systems and a national waveform?**

**Abdullah H. Al-KHATER:** For the software defined radio, I would say it's an early agreement, a plan where we

will explore with ASELSAN the development of software defined radio for the state of Qatar and also our national waveform. We had a discussion with ASELSAN earlier and we have an intention to further explore that area.

**SAHA EXPO Daily: What other areas of collaboration do you foresee with Turkish defense companies in the near term? Do you have any plan to expand your industrial and technological cooperation with Turkish defense firms to other areas of defense and also to space?**

**Abdullah H. Al-KHATER:** We just for example, in terms of programs, Anadolu Shipyard, just delivered a number of ships to Qatar. We just celebrated that just recently...that was a very successful project and that will also lead to future engagement to make sure that we do the maintenance, repair and overhaul for those existing systems. That means that we need to work also with Turkish companies to make sure these platforms are up and running and well maintain, so that's an agreement. When it comes to the aerospace program, it's early to comment on that. We haven't made a solid plan to engage in that area...however we have had discussions with different Aerospace companies, for

example TUSAŞ, to explore potential areas that we could work with them, and we have met with them at frequent events.

There are a lot of potential areas. We are engaged in multiple discussions with different companies in Türkiye for future cooperation. We have a current cooperation in the defense telecommunication aspect, we are also having a supply of armored vehicles from Türkiye, we are having a supply of simulation equipment from Havelsan. So, these are different companies that we are working with, and we are also in discussions with a lot of companies and once these discussions are final and we sign an agreement we can disclose it later on, but I can assure you that we have a number of future opportunities.

**SAHA EXPO Daily: Can you tell us about BARZAN Holdings' presence at SAHA**

**EXPO 2022, and what would be your message to the visitors/participants? What is your opinion of the SAHA EXPO 2022 Exhibition?**

**Abdullah H. Al-KHATER:** Türkiye is a very brotherly nation for Qatar, an important country for us, a strong ally of Qatar. It has a special place in our hearts as Qataris and we believe that participating in this event is something that we are very proud and very happy to be a part of. Although it is the first day, I haven't seen everything, it is very impressive, it's very well organized. The venue itself I like the layout, it is so simple for any visitor to visit different places, it's easy to navigate. It's easier than IDEF last year. I wish everyone all the success in this exhibition and we are very happy to be a part of it.

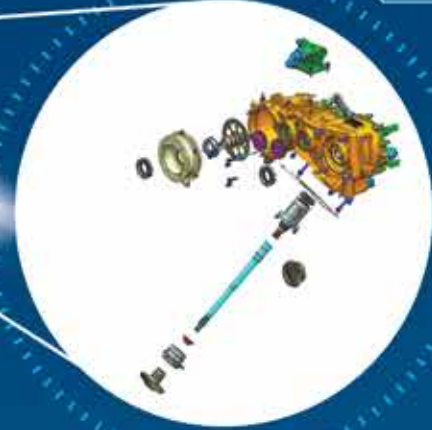
**SAHA EXPO Daily: Thank you for sparing your time for our readers.**





**VERTICALLY INTEGRATED PRECISION SUBSYSTEM MANUFACTURING  
SUBSYSTEM DESIGN, MANUFACTURING, ASSEMBLY, TEST & DELIVERY  
FOR ROTARY WING & FIXED WING PLATFORMS**

**DESIGN, MANUFACTURING,  
ASSEMBLY & TEST CAPABILITIES  
FOR TRANSMISSION GEARBOXES**



**ROTORS & GEARBOXES  
TAIL ROTOR DRIVE SHAFTS  
FLIGHT CONTROL SYSTEMS  
LANDING GEARS**

**DESIGN, MANUFACTURING,  
ASSEMBLY & TEST  
CAPABILITIES FOR  
LANDING GEARS**



# SANCAR AUSV READY FOR FUTURE MISSIONS



With developing technology, the frequency and variety of security threats have increased for global navies. Autonomous unmanned surface vehicles integrate modern technology into military units by sensing the environment using sensor systems, performing crucial tasks such as ISR (intelligence, surveillance, reconnaissance) and defense without personnel within the scope of digital battlefield requirements. In the upcoming period, armed unmanned surface vehicles will become an inevitable force multiplier for modern navies and especially in response to asymmetric threats. Addressing the needs of modern navies, HAVELSAN produced the SANCAR Armed Unmanned Surface (AUSV) Vehicle in cooperation with Yonca-Onuk Shipyard.

Since modular construction technology is used in the production of the SANCAR AUSV, additional payloads can be easily integrated into the platform to fulfill the expected duties while performing different tasks that may arise in the future. The sophisticated environment of the naval domain and the complexity of naval operations could be managed via tactical concepts of the autonomous vehicle.

The SANCAR AUSV has communication infrastructure without interruption, based on RF/GSM/SAT systems used all together. This enables it to perform operations on long distances effectively.

The SANCAR AUSV is the first unmanned

system using ADVENT ROTA (ADVENT C4ISR System that was designed for unmanned systems, which has come to life in many elements of the Turkish and International Navies) as a mission system. The SANCAR AUSV can be controlled from a mobile Ground Control Station, which has an ADVENT C4ISR mission system in accordance with NATO Interoperability Standards. Thanks to this, it provides the ability to be used on other naval platforms using ADVENT. Thus, SANCAR can transfer duties between different ships, performing network-centric operations with manned/unmanned platforms as a team and offering easy adaptability for swarm operations. In this respect, the SANCAR AUSV has a technology infrastructure that surpasses its global competitors.

Developed to autonomously fulfill the duties of port/base protection, search/rescue, intelligence, reconnaissance, surveillance, patrol, surface warfare, and mine countermeasures, the SANCAR AUSV will minimize the risks for human life, and it will enable many tasks to be carried out more cost and time effectively with modular payloads. As such, it has become one of the most versatile platforms designed.

It is developed using autonomous systems technologies such as artificial intelligence and data fusion. It has a length of 12.73 meters, a width of 3.3 meters, and a displacement of 9 tons. The platform can reach over 40 knots and has a cruising range of over 740 kilometers.

The platform, which can operate in up to 4 sea states, also provides convenience in integrating weapon and electronic systems of different types and purposes, thanks to its modular structure. Considering the weapon systems, the SANCAR AUSV has a 12.7 mm stabilized gun turret, and its defense capabilities can be increased by integrating a tactical missile system. A Mini Ship Data Distribution System is also integrated into the platform. Another factor that makes the SANCAR AUSV different is the integration of a telescopic mast with a navigation radar camera with a collision avoidance system. This pole structure again increases the modular structure and provides flexibility in using new systems.

The SANCAR AUSV, a superior platform with many cutting-edge technologies, will prepare the world's navies for future operational environments.



# CANiK

SUPERIOR FIREARMS

## VENOM LR 30



**Based on a combat proven design, The VENOM LR 30x113mm Low Recoil revolver autocannon, is now ready to enter into service with the Turkish Armed Forces along with the armed forces of friendly and allied countries on air, land and sea platforms.**

[www.aei-systems.com](http://www.aei-systems.com)

By **AEI** Systems

by İbrahim SÜNNETÇİ

TEI, the domestic and national source of power in Turkey's aviation industry, participates at SAHA EXPO with its indigenous products. Scale models of TEI-TF6000 Turbofan Engine, TEI-TS1400 Turboshaft Engine, TEI-PD170 Turbodiesel Aviation Engine, TEI-TJ300, TEI-TJ90, TEI-TJ60, TEI-TJ30 Turbojet Engines, TEI-PG50 2-Stroke Gasoline Aviation Engine, and T700-TEI-701D Turboshaft Engine awaits visitors at the company's booth.

The TEI-TF6000 is a Turbofan Engine with a total length of 2,250mm, a width of 860mm, and a height of 1,100mm. According to the product brochure, it has a Specific Fuel Consumption value of 0.70 (lbf/lbf.s), and a bypass rate of 1.08 (SLS, ISA).

There is a 2-stage axial fan at the front of the engine (it rotates at the same speed as the Low-Pressure Turbine). Behind the axial fan are two separate air ducts, one for the air bypassing the engine core (bypass duct) and another for the air going to the core through the high-pressure compressor. The TEI-TF6000 engine is designed to produce a total of 6,000 lbf dry thrust, approximately 4,000 lbf with the core engine, and 2,000 lbf with the bypass stream. However, like the TEI-TS1400 turboshaft engine, the TEI-TF6000 is expected to generate slightly higher thrust than the initially designed level.



# TEI-TF6000

## Low Bypass Turbofan Engine



The low bypass TEI-TF6000 turbofan engine has a 6-stage axial compressor behind the 2-stage axial fan. Both fan and compressor stages are manufactured with 'blisk' technology. In other words, instead of having the blades manufactured separately and stacked on a disc, the compressor blades and the rotor disk are manufactured as a single piece.

The combustion chamber (through-flow type) is located behind the compressor stages. The pressurized air from the compressor is mixed with fuel in the combustion chamber, and the hot exhaust gas is later fed into the turbine, causing the turbine blades to rotate.

Therefore, turbine blades must be manufactured with single-crystal technology to withstand high-pressure exhaust gas and operate at very high temperatures. TF6000 has a 1-stage High-Pressure Turbine (HPT) and a 1-stage Low-Pressure Turbine (LPT) behind the combustion chamber. The HP turbine rotates the compressor while the LP turbine rotates the fan. The hot air from the turbine is then mixed with the air from the bypass duct and is released from the nozzle at the back.

The Nozzle Guide Vanes (NVG) see the highest temperatures among the engine parts since the hot gases from the combustion chamber pass through them. Cooling of NGVs is extremely important to prevent the metal from melting and maintain its operating temperature. The NVGs are usually of hollow form and cooled by passing compressor delivery air through them to reduce the effects of high thermal stresses.

Designed in a modular way, the TEI-TF6000 turbofan engine also has an oil tank. It has a reserve oil level for the lubrication of the bearings. The oil and fuel pumps work with a starter generator connected to the gearbox.

While titanium is used in the cold section of the TEI-TF6000 engine (fan and compressor stages at the front), Nickel superalloy is used in the hot section (combustion chamber and turbine stages at the rear). The metal parts in the hot section are also covered with a thermal barrier coating made of ceramic.

TEI-TF6000 also features labyrinth seals at the back so that the circulating air inside the engine, which also cools the parts, does not escape outside. The exhaust is the last section of the engine. TEI continues to work on the afterburner design to be added behind the exhaust section. Thus, the afterburner will be developed and produced for the first time in our country for the TEI-TF6000 engine.

The production of parts for the TEI-TF6000 engine prototype has already started, and assembly work is expected to begin in the first half of 2023.

It is stated that the TEI-TF6000 can be converted into a turbofan engine comparable to F110-GE-129 by replacing the HP fan and LP turbine and rescaling the compressor, combustion chamber, and HP turbine. In our interview at the first day edition of SAHA EXPO Daily, President & CEO of TEI Prof. Mahmut AKŞİT also pointed out that if the radii of the relevant parts in the engine are expanded by 15 cm, the TEI-TF6000 can be converted into a turbofan engine similar to the F110-GE-129 which will also be used on MMU prototypes.

## 26 October 2022 - Wednesday

<b>10:00</b>	<b>Doors Open</b>
<b>10:30-18:00</b>	<b>Exhibitor Product and Start-Up Project Presentations</b> <i>Hall 8 Presentation Area</i>
<b>10:30-18:00</b>	<b>B2B Meetings</b> <i>Exhibitor Stands and B2B Area – Foyer</i>
<b>10:30-18:00</b>	<b>Signing Ceremonies</b> <i>Hall 6 and Hall 8 Signing Ceremony Areas</i>
<b>11:00-12:30</b>	<b>PANEL 1: Women in the Defence Industry</b> <i>Panel Area 1 - Hall 5</i>
<b>11:00-12:30</b>	<b>PANEL 2: Regional Cooperation Opportunities in the Defence Industry</b> <i>Panel Area 2 - Hall 5</i>
<b>15:00-16:30</b>	<b>PANEL 3: International Cooperation in the Defence &amp; Security</b> <i>Panel Area 1 - Hall 5</i>
<b>16:30-18:00</b>	<b>PANEL 4: Risks and Opportunities for the Defence Industry in the Changing Global Security Conjunction</b> <i>Panel Area 2 - Hall 5</i>
<b>18:00</b>	<b>End of Day 2</b>

## DAILY PROGRAM

# ASELSAN MİR Unmanned Surface Vehicle (USV)

**The ASELSAN MİR Unmanned Surface Vehicle was developed as part of Anti-Submarine Warfare and has a modular design that can perform variety of missions such as surface warfare, reconnaissance/surveillance, electronic warfare, base/port/critical ship-facility security, and amphibious operations with different payload configurations that will be integrated on it.**

It is equipped with redundant, cutting-edge communication and positioning systems for mission continuity under Electronic Warfare (EW).

It has the capacity to carry out joint operations and hybrid swarm missions with other manned/unmanned elements thanks to the autonomy system and software developed by ASELSAN with domestic and national capabilities.

Navigation Radar, Electro-Optical Reconnaissance and Surveillance System (ASELSAN Kırlangıç), GNSS (with anti-jamming, anti-spoofing features), Inertial Navigation System (INS), RF Communication, 4G/LTE Communication Unit, Satellite communication (L band

- narrow band satellite communication system, ASELSAN Ku Band Satellite Communication System), Dipping Sonar (DS), Obstacle Avoidance Sonar, Single Beam Echo Sounder, Diver Detection Sonar, Automatic Identification System (AIS) have been integrated on the USV. The Unmanned Surface Vehicle will be controlled via the ASW Boat Control Station, and commands for the boat and payloads are transmitted to the boat via the control station. Submarine detection activities will be carried out with the Dipping Sonar, which is dipped into the sea with a crane from the moonpool on the boat.

ASELSAN Light Torpedo, ASW Rocket

and Sonobuoy systems can optionally be integrated onto the pedestal on the boat.

The MİR Unmanned Surface Vehicle can be deployed to the mission area from ports or logistic support vessels with the ability to operate autonomously or remotely with other operational elements, and to successfully perform integrated mission execution with combat management systems.

As part of the development project, it is intended to develop submarine detection capabilities using dipping sonar aboard the USV for Anti-Submarine Warfare (ASW) and to demonstrate this capability at sea.







## Türkiye to Produce National & Unique 20 mm and 25 mm Cannons

Under the 20 mm Gatling Gun and 25 mm Chain Gun Development Projects initiated by the Defense Industry Agency (SSB), weapon systems procured from abroad subject to export licenses will be produced with domestic and national means. The 20 mm Gatling Gun will be used in the ATAK Helicopter and on various land, naval, and air platforms. The 25 mm Chain Gun will be integrated into Armored Combat Vehicles, Special Purpose Tactical Wheeled Armored Vehicles, and Remote-Controlled Weapon Stations.

SSB President Prof. İsmail DEMİR visited the Düzce facilities of TR Mekatronik, which was established under the TUSAŞ and Sarsılmaz partnership, and received information about the latest status of the projects and the capabilities of the systems. The main contractor TR Mekatronik will design, qualify, develop and manufacture the weapon systems procured from abroad, subject to export license, with indigenous capabilities.

Within the 20 mm Gun System Development Project, two prototype systems will be produced and delivered for the qualification process. The tests will start at the end of 2022 and last for 2 months. The systems will be subjected to Physical and Functional Control, High Pressure, High Temperature, Low Temperature, Full-Function Firing, Shock, and Vibration tests.

In the 25 mm Gun System Development Project, four prototype systems will be subjected to qualification tests beginning in January 2023. Two weapon systems that will pass several tests, such as First Inspection, Logistics Supportability, Inclined Shooting, Chemical Interaction, and Oil-Less Operation, will be delivered in July 2023.

### Technical Specifications of the Weapon Systems:

- Under the 20 mm Gun System Project, a turreted 20 mm Gatling-style rotary cannon will be designed and developed with local capabilities. The system has a fire rate of approximately 750 rounds/per min. The 20 mm Gatling Gun is suitable for land, naval, and air platforms and can use training, high-explosive incendiary, and armor-piercing ammunition types.
- 25 mm Chain Gun System is developed as the primary weapon of armored combat vehicles. It has an effective range of 1,500-2,500 meters depending on the ammunition type and can use training, armor-piercing discarding sabot (APDS), semi-armor-piercing, and high-explosive incendiary rounds.





## AEROSPACE ADVANCEMENTS IN TECHNOLOGY AND DIGITAL CAPABILITY

BAE Systems is delighted to be part of the SAHA 2022 exhibition. As a partner to the Turkish TF-X Fighter (MMU) programme BAE Systems is well known for its focus on technology development.

General Manager, Alistair Castle explains; "Our approach to technology development is about building a digital position, applying new methodologies to existing processes and improving the end result, in terms of pace of delivery and reducing time spent between iterations" "We're tapping into our advanced manufacturing and digital engineering expertise, applying a number of key

technologies, such as autonomy and Artificial Intelligence, and continually nurturing new ways of thinking and collaborations from across a UK ecosystem which includes industry, academia, SMEs and adjacent sectors"

"This approach is something we can explore as part of developing our partnership with Türkiye. BAE Systems is now pressing ahead with its application in the use of synthetic environments – using digital modelling to drive forward speed and efficiency, meaning fewer physical tests and a reduced design cycle meaning an ability to move from concept, design to

airframe is a much faster cycle time"

"We're also putting significant investment into extending a digital approach to how we design, develop and manufacture the future products at our 'Factory of the Future' at our UK Warton site"

"This fully digitally connected advanced Factory provides the capability to allow rapid reconfiguration and flexibility to respond to urgent requirements, with the ability to manufacture different products in the same area with rapid turnaround times, which could allow a switch from production of large-

scale combat aircraft to swarming drones, for example. In addition we are developing large-scale additive manufacturing capabilities that will benefit the development of next generation combat air platforms by driving down cost and driving up efficiency and pace"

"A good example is we have produced a Eurofighter Typhoon frame using large-scale additive manufacture, which reduced the time usually taken to complete from 100 weeks down to just 60 days – which will be vital in building the next generations of aircraft"



## SAHA EXPO 2022 from SaSaD's point of view

We are delighted to attend SAHA EXPO 2022, Türkiye's defense and aerospace industry gathering point.

This year, representatives from more than 50 countries are expected to attend SAHA EXPO 2022, which grows every year and captures the interest the entire world. I hope all parties will benefit from this exhibition, which will showcase our country's manufacturing prowess in the defense industry.

The globe is witnessing hot developments that started with the pandemic, followed by economic issues, and the war between Russia and Ukraine. Today we see that the vision of creating a domestic and national defense industry, which was put forward by accurately interpreting the signs of the global shift and transformation, has now become a source of pride. This achievement shows

that Turkish industrialists, young entrepreneurs, and academics can work together to accomplish anything. Naturally, there is still a lot of work to be done. We'll keep developing and producing. We'll continue devoting time and effort to serve our country.

As the Defense and Aerospace Industry Manufacturers Association - SaSaD, we play a significant role in the development of our country's defense industry. In order to improve domestic production, we are expanding and deepening cooperation in various areas, particularly information sharing. On behalf of SaSaD, I wish SAHA EXPO 2022 will be beneficial for our country and our industry, and I would like to express my gratitude to all institutions and organizations for their contributions.

**Osman OKYAY**  
SASAD Chairman of the Board



### BMC & BİTES Signed Cooperation Agreement

BMC Tactical Command Post Vehicle ATOK (Military Tactical Operation Kit) Project Contract Signing Ceremony was held on the first day of SAHA EXPO 2022 International Defence and Aerospace Exhibition on October 25, 2022 and attended by General Manager Uğur COŞKUN, BMC Chairman of the Board Murat YALÇINTAŞ as well as senior executives of both companies.

Under the contract, in order to gain friendly force/troops tracking and effective intelligence sharing capability in the operation field, the ATOK System of BİTES will be integrated into the KİRPİ vehicles manufactured by BMC and ensures the safe and speedy transfer of special forces units to operations.

Making a brief speech at the agreement ceremony, BİTES General Manager Uğur COŞKUN said: "With the first prototype, we signed in 2020, we completed the whole deliveries of 2020 in 2021. Afterwards, this is the first signing agreement ceremony where we have done the serial production content. This work, which we have developed in our country, which we have done with a high rate of domestic and national, will enter the inventory of our security forces, and the export potential will increase significantly in the future and will provide an environment for us to write new stories. Therefore, I would like to thank you very much for supporting us for these opportunities and for strengthening our Presidency of Defense Industry Agency for their support with their faith in this process."

In his address BMC Chairman of the Board Murat YALÇINTAŞ underlined that BMC is a platform manufacturer, but that the element that adds value to its vehicles is subsystems, YALÇINTAŞ added: "The more useful subsystems, we can equipped to our vehicles that our Armed Forces and Security Forces can use, the more valuable our vehicles will transform. I would like to take this opportunity to thank the BİTES team. After this signature, our vehicles will have both command and control feature and communication feature. It will utilize by the Turkish Armed Forces and Police Forces, as well as friendly and allied countries armed forces. This signature will be the first of many more projects we will do with BİTES. "



## “As Kale Arge, We Believe that We Meet a Very Fundamental Need of Our Country”

On the first day of the SAHA EXPO, SAHA EXPO Daily approached Cüneyt KENGER- General Manager of Kale Arge to get first-hand information about the products they display at their booth at SAHA EXPO 2022.

**SAHA EXPO Daily:** Mr. Cüneyt KENGER, first of all, what was your reason for participating in SAHA EXPO, and how is it going?

**Cüneyt KENGER:** Our Turbojet Engine development projects

have now become multi-dimensional. Already in 2012, we started to work in line with the task given to us by the Defense Industry Agency under the Turbojet Engines Development Project. The name of the project was not “Turbojet Engine” but “Turbojet Engines,” meaning more than one. In other words, it started with the vision of developing an engine family. Therefore, we have now diversified our first product, KTJ-3200, and added KTJ-1750. We are

exhibiting our new engine, KTJ-1750, at SAHA EXPO.

**SAHA EXPO Daily:** What else are you exhibiting?

**Cüneyt KENGER:** As you can see, next to the KTJ-1750, we are exhibiting our first engine, the KTJ-3200. As you know, its development phase has also been completed. We have an important milestone ahead of us, such as serial production. On the other hand, we started the serial production

phase of the KTJ-3200. That’s why we are exhibiting both KTJ-3200 and KTJ-1750 engines.

**SAHA EXPO Daily:** Are these mock-ups or real products?

**Cüneyt KENGER:** These are not mock-ups; we should mention that. These are real engines that run for hours in the development phase. We display real engines.

**SAHA EXPO Daily:** What can you share about your meetings



KTJ 3200

at SAHA EXPO? Did you have B2B meetings with foreign delegations or your local partners?

**Cüneyt KENGER:** At SAHA EXPO, both our domestic customers, especially our main customer ROKETSAN, and foreign delegations show great interest in our engines. We continue negotiations with these delegations.

**SAHA EXPO Daily:** This will be a general question, but can you give us some information about your activities abroad? Did you take any steps toward exporting your products?

**Cüneyt KENGER:** So, our engines are truly unique in the world. Both the KTJ-3200

and KTJ-1750. The KTJ-3200 is superior to its counterparts in terms of service life. So is the KTJ-1750. Since no other engine in the world offers such performance at that size, global missile manufacturers started to show more interest as they get to know these engines, and our negotiations continue. Currently, our international

contacts are at the initial stage. But as our customers get to know these engines better and see their superiority, I am sure that these talks will turn into an export potential.

**SAHA EXPO Daily:** So, is there any interest from foreign delegations for your engines?

**Cüneyt KENGER:** Yes, there is from the first day. Today, of course, is the first day, but despite that, we see a great interest in our engines from foreign delegations.

**SAHA EXPO Daily:** Do you have any messages after the first day?

**Cüneyt KENGER:** As Kale Arge, we believe that we meet a very fundamental need of our country with these engines, and we are very proud of that. With the knowledge and experience we have gained as Kale Arge, we will develop gas turbine missile engines much faster and more effectively, and we will continue to do our best in this field to meet the engine needs of our country.



KTJ 1750



## “HETMAN IVAN MAZEPA”

# Ukrainian First MILGEM Corvette Launched

“Hetman Ivan Mazepa” (F-211), the first corvette built under the Ukrainian MILGEM Project, which is carried out by STM -the main contractor- and includes the supply of a total of four corvettes, was launched on October 2, 2022, with a ceremony held at RMK Marine Shipyard. First Lady Olena ZELENSKA, wife of Ukrainian President Volodymyr ZELENSKY, Rear Admiral Oleksiy NEIZHPAPA, Commander of the Ukrainian Navy, Hulusi AKAR, Turkish Minister of National Defense and İsmail DEMİR, President of Defense Industries attended the ceremony, where the first steel of the second ship was also cut.

As it can be remembered, within the scope of the Ukrainian MILGEM Project, which was initiated under the contract signed between STM and the Ukrainian Ministry of Defense in December 2020, a corvette design was developed based on the design of the ADA Class Corvette serving in the Turkish Naval Forces Command, and the construction of the first corvette in the project, which consists of four corvettes in total (1+3), started in April 2021 at RMK Marine Shipyard.

President of Ukraine Volodymyr ZELENSKY announced the start of the construction of the first corvette in July 2021, the keel laying

ceremony of the first ship was held on September 7, 2021, at RMK Marine Shipyard with the participation of Commander of the Ukrainian Navy Rear Admiral Oleksiy NEIZHPAPA, and in August 2022, the ship was named “Hetman Ivan Mazepa” by President of Ukraine ZELENSKY with the decree No: 586/2022. President ZELENSKY also noted in the same statement that the Ukrainian Navy personnel who will serve on the first ship, which will be outfitted in Ukraine and completed by the end of 2023, are being trained in Türkiye. The Ministry of National Defense also announced on its official account Twitter account on November 2, 2021, that Ukrainian Navy soldiers were given “Naval Internship” training on the TCG Kinaliada Corvette and shared a few photos

about the training. I had the opportunity to photograph the corvette from the flight deck of the TCG Anadolu and from the shipyard during the TCG Anadolu LHD Ship Press Tour held at SEDEF Shipyard on September 17, 2022, just before the launching ceremony of the “Hetman Ivan Mazepa” (F-211) Corvette.

In the project, it was planned that the first ship’s hull construction and partial outfitting would take place at the RMK Marine Shipyard in Istanbul while the remaining outfitting activities and tests would take place in a shipyard in Ukraine. Accordingly, the first ship to pass the Harbor Acceptance (HAT) and Sea Acceptance Tests (SAT) after the outfitting activities would enter service in 2024.





## ASPİLSAN ENERGY TAKES ITS PLACE AT SAHA EXPO

ASPİLSAN Energy is participating in SAHA EXPO 2022, which is organized under the auspices of the Presidency of the Republic of Türkiye by SAHA Istanbul, Türkiye's and Europe's largest Defense, Aerospace and Space Industry cluster, on 25-28, October 2022, with its cutting-edge technology and the most recent products developed indigenously.

Ferhat ÖZSÖY, General Manager of ASPİLSAN Energy, expressed his pleasure to participate in SAHA EXPO 2022,

which gathers all stakeholders of the defense and aerospace industry, from top defense industry companies to SMEs, academies, suppliers, and R&D centers, and to meet with sector representatives. "As ASPİLSAN Energy, one of the subsidiaries of the Turkish Armed Forces Foundation, we aim to offer solutions that will minimize our country's foreign dependency on energy systems in every effort we have been exerting for 41 years. As part of our mission, ASPİLSAN Energy has achieved a domestic and

national breakthrough in the field of energy storage with the cylindrical lithium-ion battery production facility, which started serial production in June. I would like to highlight that the cylindrical batteries produced in our factory are used in radios and in all kinds of portable systems in the defense industry; from vacuum cleaners to electric bicycles in the civilian field; from telecommunications to energy storage systems, and electric vehicles. As ASPİLSAN Energy, we are bridging a significant gap by producing batteries for

many businesses engaged in e-mobility, the recently growing sector. We have also assumed a critical role in the conversion of lead acid batteries in the base stations of our telecommunication companies to lithium-ion batteries. We are delighted to showcase our latest technologies at SAHA EXPO, which gathers a comprehensive ecosystem under its roof. I want to express my gratitude to everyone who has contributed to the event."



## Fifth P-72 Maritime Patrol Aircraft Delivered under MELTEM-3 Project

The MELTEM-3 project's deliveries are still in progress. As part of the project, the fifth P-72 Maritime Patrol Aircraft was delivered.

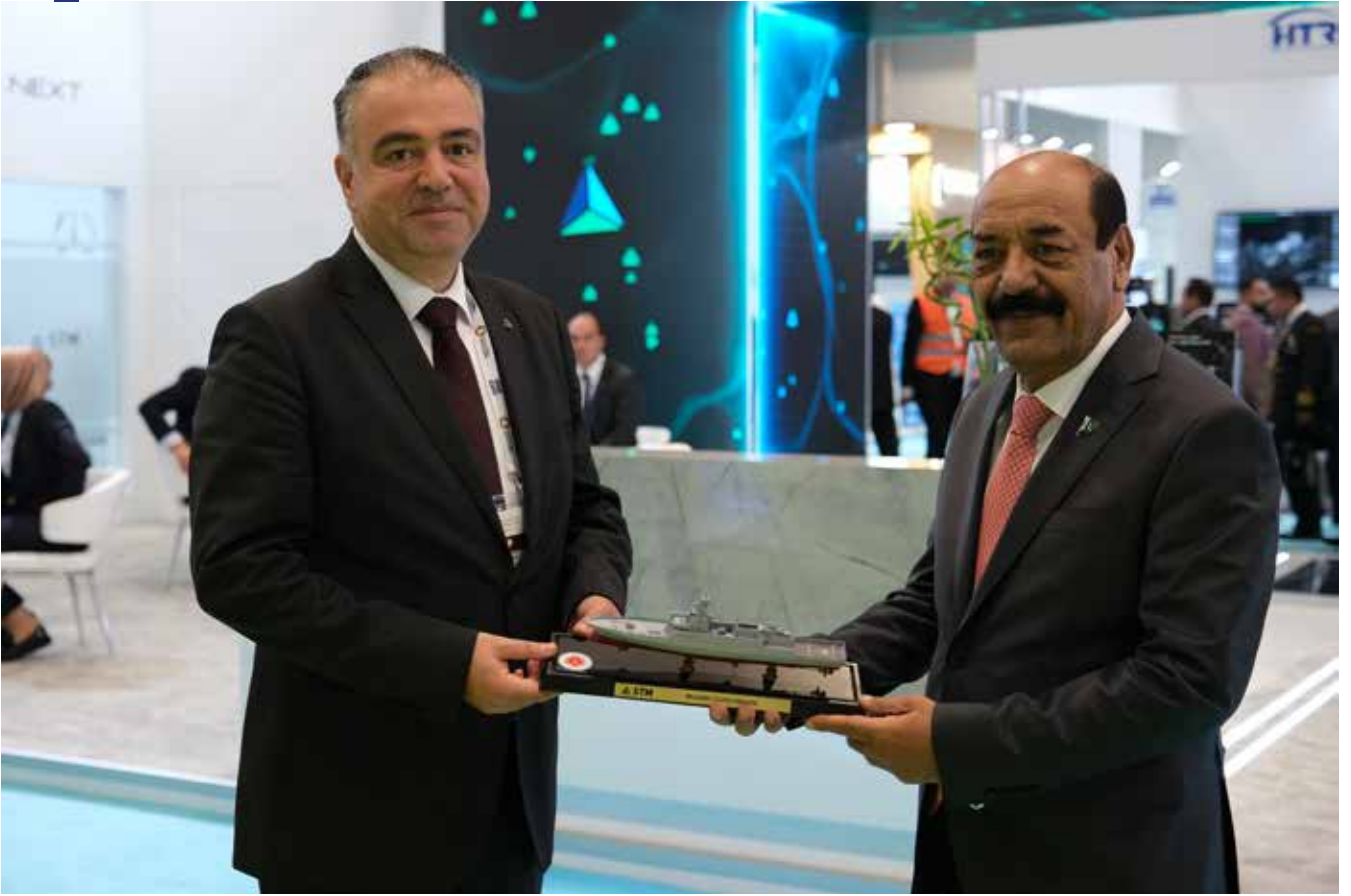
Regarding the recent delivery, President of Defense Industries Prof. Dr. Ismail DEMİR said, "Our P-72 Maritime Patrol Aircraft, the fifth of which we have delivered, will be one of the strategic elements of our Naval Forces for the protection of the Blue Homeland. Within this scope, we also intend to provide the necessary support to our Naval

Forces Command in the operation and maintenance of the mission systems of our Maritime Patrol Aircraft by initiating three-year logistical support services in 2023. We will keep strengthening the Turkish Armed Forces with our new platforms."

The project is being carried out with broad involvement of the Turkish defense industry. TUSAŞ provides detailed parts production, aircraft modification (structural and electrical modifications and system tests), material supply, ground and flight test support, and Integrated Logistics Support

(process certification and training plan preparation, periodic maintenance of aircraft). ASELSAN provides system/device supply. The aircraft are equipped with Link 11 and Link 16 systems developed by Milsoft, while the Maritime Patrol Ground Station was upgraded by HAVELSAN to support the P-72 aircraft.

Following the delivery of the fifth Maritime Patrol Aircraft, the final Maritime Patrol Aircraft is scheduled to be delivered to the Turkish Naval Forces Command in the first half of 2023.



## STM Aims to Further Expand Its Presence in the Global Market

STM participated in SAHA EXPO with its wide product portfolio, and for the first time at a domestic exhibition, STM introduced the STM500, a small-sized submarine that it designed with domestic resources and recently started production. Other products on display at STM booth are the scale mock-ups of MİLGEM İstif (I) Class Frigate, Pakistan Navy Fleet Tanker, and CG-3100 Coast Guard Ship; KARGU, Türkiye's first attack

rotary-wing UAV, which has been used effectively in the field by Turkish security forces for more than 4 years and exported to different geographies, TOGAN UAS that recently started serving for the Turkish Armed Forces, and ALPAGU, the fixed-wing loitering munition system that will enter the Turkish Armed Forces' inventory by the end of this year.

On SAHA EXPO Day 2, Özgür GÜLERYÜZ, STM General

Manager, made statements to Show Daily about STM's activities and projects in the international arena: "The experiences of the Turkish Armed Forces in the field lay the groundwork for the development of critical technologies and capabilities by the Turkish defense industry to. This involves a wide range of actors, from design to technology, and to the involvement and capacity building of domestic industrial organizations. As STM, we provide high-tech engineering solutions in the fields of ship design, construction, and modernization, especially in military naval projects. Our engineering experience and design expertise in these fields provide us with the capacity to produce custom solutions as per customer

needs. From design through delivery, we execute all phases of construction and modernization projects for a variety of naval platforms as the main contractor."

**GÜLERYÜZ:**  
**"We Provide Our Customers with Key Solutions and Long-Term Service Support."**

GÜLERYÜZ stated that STM provides long-term service support and key solutions to its customers with turnkey solutions, and added, "Our turnkey solutions cover project management, ship design, system-system/system-platform integration design engineering, subcontractor selection, outfitting activities, testing, delivery,





after-sales services, and Integrated Logistics Support (ILS) including training. We offer our international customers the opportunity to work in all competent shipyards in Türkiye regarding shipbuilding and modernization activities, as well as the flexibility to work in shipyards in their own countries, offering advantages to maximize domestic contribution. While providing our security forces with innovative and indigenous systems, we also regard the cooperation we establish with friendly and allied countries in exports as partnerships, meaning not only selling products or solutions, but also contributing to the development of the technology and production capabilities of these countries, which we consider our partners, in the field of defense industry, engaging in joint production, and transferring our know-how in this field there. We make a difference by providing products and capabilities to the navies of countries in a way that will not be impacted by any possible embargoes, with long-term service support and indigenously developed weapon systems. All our international business partners should know that we will unquestionably develop the engineering solution needed to satisfy their requirements at the appropriate time, on budget, with the proper planning, and on time. Our ultimate objective is to top the global defense industry's list of engineering companies."

### **GÜLERYÜZ: "We Have Launched Ukraine's First Corvette"**

Underlining that they carry out collaboration, export,

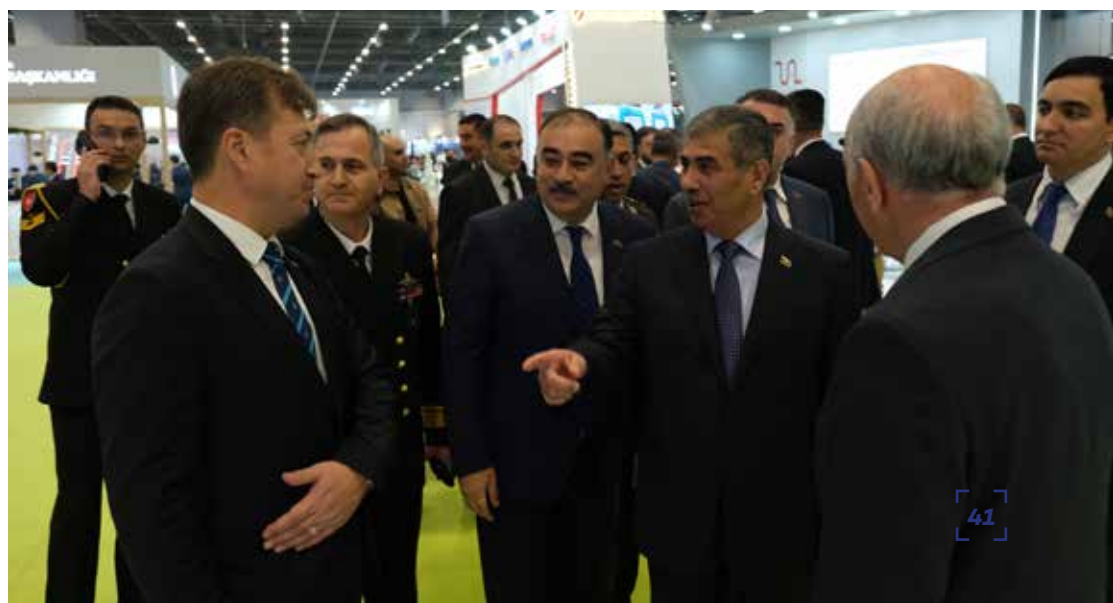


and business development activities in more than 20 countries from South America to the Far East in the international market, GÜLERYÜZ also made statements about their ongoing projects worldwide. "As part of the cooperation agreement, which also includes technology transfer, we started the construction of a corvette for the Ukrainian Navy in 2021 and held the launching ceremony on October 2, 2022, in Istanbul. The project is progressing according to the plan. The greatest military shipbuilding project Türkiye has ever undertaken abroad was the Pakistan Navy Fleet Tanker PNS MOAWIN, which we designed for the Pakistan Navy and built and delivered in Karachi in 2018. We are still working on modernizing the Pakistani navy's French-built Agosta

90B Khalid Class submarines. The first submarine in the project has been delivered, while the modernization activities on the remaining two submarines are still ongoing. With this project, STM has established itself as the main contractor in a foreign country's submarine modernization project for the first time in Türkiye. Because of the success of these projects, we are now participating in Türkiye's four Ada Class Corvette Projects, providing the engineering expertise for the supply and integration of the main propulsion system. Our small-sized submarine STM500, which we have started to produce with domestic capabilities, has a significant export potential and we are in discussions about it. In terms of Tactical Mini UAVs, KARGU, which we added to the inventory

of the Turkish Armed Forces achieved export success last year. KARGU has so far been exported to two countries in Asia and South America after successfully demonstrating itself on several battlefields. TOGAN and ALPAGU are also in high demand from different countries. We are currently in negotiations with a number of countries over this. Our primary objective at this point is to generate 50% of our revenue from exports by 2023."

On Day 1 of the exhibition, STM hosted the Chief of General Staff of Kazakhstan, Indonesian Coast Guard Commander, the Romanian Gendarmerie Delegation, the Deputy Minister of Defense of North Macedonia and many other domestic delegations.





### Nurol Exhibits Right-Hand Drive Version of Yörük 4x4 at SAHA EXPO

Global armored vehicle manufacturer Nurol Makina is participating in the SAHA EXPO 2022 fair held at the İstanbul Expo Center between October 25-28. The company will exhibit its Ejder Yalçın 120mm Mortar Vehicle and the right-hand drive Yörük Vehicle for the first time at its booth 8C - 04 at the SAHA EXPO 2022 Fair, which Nurol Makina attended for the first time.

The Ejder Yalçın Mortar Vehicle, which is integrated with the 120 mm mortar system, will meet the important operational needs of the Turkish Armed Forces and Gendarmerie

General Command, as well as the users abroad. The mortar vehicle, the new configuration of the Ejder Yalçın armored vehicle family, is equipped with Aselsan's Alkar 120 mm mortar system. Nurol Makina has delivered over 1200 Ejder Yalçın vehicles to approximately 9 countries so far.

Another vehicle exhibited at SAHA EXPO 2022 is the Yörük 4x4 right-hand drive version. Yörük 4x4, which can reach a maximum speed of 140 km/h, offers scalable ballistic protection from level 1 to 4, as well as mine/IED protection beyond what is expected from a vehicle in its segment. The Yörük 4x4, which was exhibited for the first time at the 2019 IDEF fair, has been contracted for export to 4 countries, one of which is a European country.



### KAPGAN, Türkiye's Heavy Class Unmanned Ground Vehicle was Unveiled at SAHA EXPO

KAPGAN, a heavy class unmanned ground vehicle developed by HAVELSAN, was unveiled at SAHA EXPO 2022, the International Defense and Aerospace Exhibition hosted by SAHA İstanbul.

KAPGAN's launch ceremony was held at the HAVELSAN booth with the participation of Prof. Dr. İsmail Demir, President of Defense Industry Agency, and Dr. Mehmet Akif NACAR, President & CEO of HAVELSAN.

HAVELSAN has produced its fourth autonomous vehicle in the past three years following the Digital Unity Technologies R&D activities initiated

in 2019. Following the production of BARKAN, a middle-class autonomous unmanned ground vehicle produced in 2020, HAVELSAN produced BAHA, a sub-cloud unmanned autonomous aerial vehicle with vertical take-off and landing capability in 2021. This year, HAVELSAN successfully launched two more members of the Digital Unity family.

Following the introduction of SANCAR, a surface unmanned autonomous naval vehicle, HAVELSAN has now developed KAPGAN, a Heavy Class Unmanned Ground Vehicle. HAVELSAN has thus become the first company to have autonomous product family for land, air, and sea. KAPGAN, a heavy class autonomous unmanned ground vehicle, is also a first in Türkiye with its 30X113



# KAPGAN

## Türkiye's Heavy Class Unmanned Ground Vehicle was Unveiled at SAHA EXPO



the day and at night. The vehicle's wired or wireless drone integration enables the use of the vehicle as a relay in cases of insufficient range, uninterrupted communication through the modern integrated drone can be ensured, out-of-sight locations can be easily monitored. Thus, the vehicle's capability for reconnaissance, surveillance, and operation will be improved in this way.

provide the support needed in residential operations, as well as for reconnaissance, surveillance, patrol, and tactical deployments thanks to its high maneuverability, and most importantly, meet the requirements of digital battlefields.

mm automatic gun system with an effective range of 2 kilometers.

### 30x113 mm Automatic Gun System

KAPGAN, a heavy class unmanned ground vehicle, stands out with its 30x113 mm automatic gun system. This weapon will have an effective range of 2,000 meters and armor-piercing capabilities against ground and air targets. Weapon systems of various types and calibers can also be integrated into KAPGAN, which will weigh up to 2 tons with its weapon system.

payloads to be used in the tactical field, there will be interfaces to carry payloads on the platform when required.

### 5 Km Tactical Data Link

Thanks to its 5-kilometer tactical data link, GSM and satellite communication infrastructure, 4-meter elevatable perimeter surveillance mast, and sophisticated sensor systems, KAPGAN will provide visibility and operation both during

### Robotic Arm Integration

KAPGAN's robotic arm integration, as well as its ergonomic and modular ground command and control stations, will enable law enforcement officers to increase their strike capability.

### Mixed/Swarm Mission Capability

Developed in accordance with the mission execution of mixed/swarm digital unity, KAPGAN will provide effective solutions against asymmetric threats, perform automatic target tracking,

Thanks to its indigenous software and modular architecture, KAPGAN will also be configurable to fulfill various missions in different sizes and types for various requirements.

KAPGAN will have superior operational capability in all weather and terrain conditions as well as in varying visibility levels thanks to its wheeled structure, which allows for high maneuverability. In addition to other





## CANiK Debuted its 30x113 mm Autocannon at SAHA EXPO

CANiK, one of the world's leading small arms manufacturers and a subsidiary of Samsun Yurt Savunma (SYS), takes part in SAHA EXPO Defense and Aerospace Exhibition, which opens its doors at the Istanbul Expo Center on October 25-28, with its latest products and accessories. The medium caliber 30x113 mm autocannon is also on display for the first time.

Commenting on their participation in the exhibition, C. Utku ARAL, General Manager of SYS, said, "With its recent growth in the defense industry, Turkey is garnering much attention worldwide. We are proud of our country when we witness how Türkiye is advancing in the defense industry with each passing day and attaining a critical milestone. We are watching with interest our country's transition to a position that minimizes its foreign dependency in this field and progresses towards full independence and exports its products to other countries. SAHA EXPO Defense and Aerospace Exhibition also greatly

contribute to promoting our Turkish defense industry both at home and abroad."

### 30x113 mm Automatic Gun on Display for the First Time

Emphasizing that CANiK exhibits many new products for the first time at SAHA EXPO, C. Utku ARAL said, "We have made CANiK M2 QCB, Turkey's only and biggest qualified 12.7x99 mm Heavy Machine Gun, ready for use by friendly and allied countries, especially our country. In addition, the tests of CANiK M2F, the faster version of our domestic and national combat-proven CANiK M2 QCB, have been finalized, making the new member of the CANiK M2 family ready for duty. We have made a significant investment in manufacturing medium caliber machine guns, which are crucial for naval, air, and land platforms, by acquiring the British business "AEI Systems," which manufactures 30x113 mm autocannon and is among the top five in the world in its field. We are also

excited to exhibit our 30x113 mm autocannon, which we call VENOM LR 30, for the first time at this exhibition."

*ARAL: "We keep a close eye on all developments in the global defense industry."*

C. Utku ARAL said the following about the VENOM LR 30 autocannon, which made its debut at SAHA EXPO: "It is possible to utilize VENOM LR 30 30x113 mm guns with reduced recoil in a variety of platforms, including 4x4 and 8x8 vehicles, tracked vehicles, naval platforms, and air platforms. The 30x113 mm guns, which can be used as both armor-piercing and high-destruction explosive ammunition, can function as a 12.7 mm heavy machine gun and a 40 mm automatic grenade launcher, and a single weapon can easily perform the tasks of two weapons so that it can be utilized in all land, naval, and air vehicles. We are one of just five producers worldwide and the sole company in

Türkiye capable of producing this product. Additionally, we can integrate various systems for 30x113 mm guns since we have an ecosystem with our subsidiaries UNIROBOTICS and UNIDEF. We have developed the TARGAN turret for the 12.7 mm gun for the Turkish Naval Forces Command under HAVELSAN, the main contractor. Now we are introducing the TRAKON 30 remote-controlled turret, which is the version of this turret compatible with 30x113 mm guns. As you know, we recently displayed the TRAKON 30 integrated into Nurok Makine's EJDER YALÇIN 4x4 vehicle at a fair held in the UK and received positive feedback. With the 30x113 mm VENOM LR 30, we anticipate additional growth in our export figures. We keep a close eye on all developments in the global defense industry. We at CANiK are also putting great effort into unmanned land vehicles. We aim to establish a solid reputation in the following years with our 30x113 mm gun system, VENOM LR 30, in both manned and unmanned vehicles."



## Roketsan Takes its Place at SAHA EXPO *with Wide Range of Products*

Roketsan is participating in the SAHA EXPO Defense and Aerospace Exhibition, which is held at the Istanbul Expo Center on October 25-28, 2022, with its experienced staff and numerous products.

In his statement about their participation in the exhibition, Roketsan General Manager Murat İKİNCİ said, "Türkiye's developing and growing defense and aerospace industry is attracting great attention from around the world. Previously an importer in the defense sector, Türkiye is now on the path to become a fully independent country and exports its goods its products to the world. SAHA EXPO Defense and Aerospace Exhibition, which functions almost like a 'showcase,' significantly contribute to the promotion of the Turkish defense industry both domestically and internationally.

Emphasizing that Roketsan also took its place at SAHA EXPO with many of its products, İKİNCİ said, "This expo, where we have the chance to showcase our products to participants from home and abroad and connect with the vast SAHA ecosystem, hosts crucial advancements and new collaborations for us. I would like to take this opportunity to welcome all SAHA EXPO participants to learn more about our missile systems and munitions, which are a source of pride for Türkiye."

Roketsan General Manager İKİNCİ will take part as a speaker in two panels to be held as part of SAHA EXPO. İKİNCİ will present his evaluations in the panels titled "Regional Cooperation Opportunities in the Defense Industry" on Wednesday, October 26, and "From Game-Changing

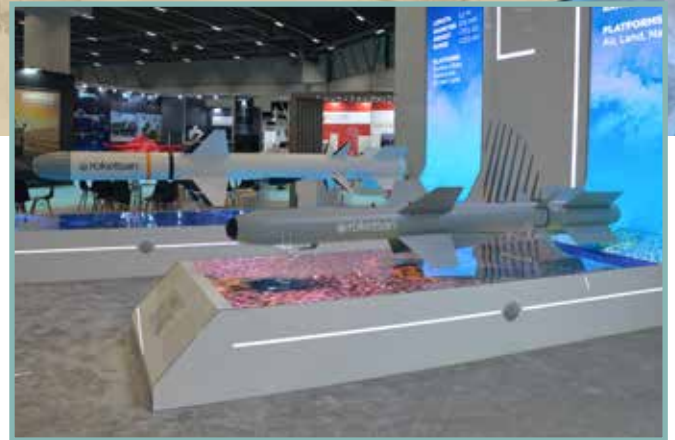
Technologies to Game-Setting Technologies" on Thursday, October 27.

Numerous Products from Missiles to Munitions on Display at Roketsan Booth

Participants and visitors can closely examine Roketsan's new generation and cutting-edge products in Hall 7 - Booth C12.

Products on display by Roketsan at SAHA EXPO 2022: TRLG-122 and TRLG-

230 missiles, CİRİT Laser Guided Missile, Laser Guided Long Range Anti-Tank Missile System (L-UMTAS), Medium Range Anti-Tank Weapon System (OMTAS), SOM Stand-Off Missile, TEBER-82 Guidance Kit, Mini Smart Munitions MAM-L, MAM-C, and MAM-T, HİSAR-O Air Defense Missile System, SUNGUR Air Defense Missile System, KARAOK Short Range Anti-Tank Weapon, ATMACA Anti-Ship Missile and Navigation Systems.





LIVE

## SAHA EXPO 2022 Panel 5

27 Oct Tuesday 11:30-12:30

The future of Unmanned Naval Systems and Turkey's potential

### Moderator

**Tolga ÖZBEK**  
Journalist Editor

### Panelists

**Cenk Cumhur KIYKIM**  
Head of Department Naval Platforms -  
Turkish Defence Industry Agency

### Samet BİLEN

Planning Manager Yonca-Onuk Shipyard

### Mustafa L. ÇİVELEK

Manager - Strategic & unmanned Systems -  
SEFINE Shipyard

### Murat MELÜL

TEAM LEADER HAVELSAN

### Ahmet AKYOL

Deputy General Manager - ASELSAN

**PANEL**

## THE FUTURE OF UNMANNED NAVAL SYSTEMS AND TURKEY'S POTENTIAL

**AHMET AKYOL**  
DEPUTY GENERAL MANAGER - ASELSAN

**MUSTAFA L. ÇİVELEK**  
MANAGER - STRATEGIC AND UNMANNED SYSTEMS - SEFINE SHIPYARD

**YAVUZ UBAS**  
GENERAL MANAGER - YONCA-ONUK SHIPYARD

**MODERATOR**  
**TOLGA ÖZBEK**  
CONTENT CREATOR, DEFENSE AND AVIATION EDITOR

**CENK CUMHUR KIYKIM**  
HEAD OF DEPARTMENT NAVAL PLATFORMS - DEFENCE INDUSTRY AGENCY (DIA)

**DENİZ REMZİ DÜMLÜ**  
DIRECTOR - R&D AND PLATFORM INTEGRATION - HAVELSAN

**PANEL AREA 1**

**LIVE**

October 27, 2022 11:00 - 12:30 Istanbul Expo Center

**SAHA EXPO**

## SAHA EXPO 2022 Panel 6

27 Oct Tuesday 11:00-12:30

From Game-Changing Technologies to Game-Setting Technologies

### Moderator

**Prof.Dr.Faruk Yiğit**  
Vice President of Turkish Defence Industry Agency

### Panelists

**Prof.Dr.Haluk GÖRGÜN**  
Chairman & General Manager - ASELSAN

### Prof. Dr. Temel KOTİL

President & CEO Turkish Aerospace

### Murat İKİNCİ

General Manager - ROKETSAN

### Dr.M.Akif NACAR

General Manager - HAVELSAN

### Prof. Dr. Mahmut Faruk AKŞİT

General Manager - Turkish Engine Industries (TEI)



LIVE

**PANEL**

## FROM GAME-CHANGING TECHNOLOGIES TO GAME-SETTING TECHNOLOGIES

**MURAT İKİNCİ**  
GENERAL MANAGER - ROKETSAN

**PROF. DR. TEMEL KOTİL**  
PRESIDENT & CEO - TURKISH AEROSPACE

**MODERATÖR**  
**PROF. DR. FARUK YIĞİT**  
VICE PRESIDENT OF TURKISH DEFENCE INDUSTRY AGENCY

**PROF. DR. HALUK GÖRGÜN**  
CHAIRMAN & GENERAL MANAGER - ASELSAN

**DR. M.AKİF NACAR**  
GENERAL MANAGER - HAVELSAN

**PROF. DR. MAHMET F. AKŞİT**  
GENERAL MANAGER - TEI

**PANEL AREA 2**

**LIVE**

October 27, 2022 11:00 - 12:30 Istanbul Expo Center

**SAHA EXPO**



LIVE

**PANEL**

**THE IMPACT OF THE  
RUSSIA-UKRAINE WAR  
ON THE GLOBAL DEFENSE INDUSTRY**



**SİNE ÖZKARASHAHİN**  
SECURITY AND  
DEFENSE ANALYST  
EDAM

**DR. CAN KASAPOĞLU**  
SECURITY AND DEFENSE  
STUDIES PROGRAM DIRECTOR  
EDAM

**MODERATOR  
TAYYAR SÜNGÜ**  
RETIRED MAJOR GENERAL

**CENGİZ KARAAĞAÇ**  
ENGINEERING AND  
CONSULTING  
DIRECTOR-STM

**ELISABETH  
GOSSELIN-MALO**  
DEFENSE  
REPORTER

**PANEL AREA 2**

**LIVE**

October 27, 2022 16:00 - 17:30 Istanbul Expo Center

**SAHA  
EXPO**

## SAHA EXPO 2022 Panel 7

27 Oct Tuesday 16:00-17:30

The impact of the Russia-Ukraine war on the global defense industry

### Moderator

(R) Maj.General Tayyar SÜNGÜ

### Panelists

**Cengiz KARAAĞAÇ**

STM Engineering and Consulting Director - STM

**Dr. Can KASAPOĞLU**

Security and Defense Studies Program Director - EDAM

**Sine ÖZKARASHAHİN**

Security and Defense Analyst - EDAM

**Elisabeth Gosselin MALO**

Defence Reporter

## SAHA EXPO 2022 Keynote

27 October Thursday 13:00 - 14:00

Türkiye's Next Generation Communication Satellites, Gains and Future Outlook


### Panelists

**Dr. Selman Demirel**

TÜRKSAT Deputy General Manager

**KEYNOTE SPEAKER**

**TÜRKİYE'S NEXT GENERATION  
COMMUNICATION SATELLITES,  
GAINS AND FUTURE OUTLOOK**



**DR. SELMAN DEMİREL**  
DEPUTY GENERAL MANAGER - TÜRKSAT

**PANEL AREA 2**

**LIVE**

October 27, 2022 13:00 - 14:00 Istanbul Expo Center

**SAHA  
EXPO**



LIVE

**KEYNOTE SPEAKER**

## DEVELOPMENTS IN SPACE TECHNOLOGY



**BÜLENT ALTAN**  
CEO - MYNARIC

**PANEL AREA 1**

**LIVE**

October 27, 2022 14:00 - 15:00 Istanbul Expo Center

**SAHA EXPO**

### SAHA EXPO 2022 **Keynote**

27 Oct Thursday 14:00-15:00

Developments in Space Technology

**Moderator**

**Bülent Altan**  
CEO - MYNARIC



LIVE

### SAHA EXPO 2022 **Keynote**

27 Oct Thursday 14:00-15:00

Türkiye's Place in the Space Ecosystem

**Moderator**

**ASSOC. PROF. ARİF KARABEYOĞLU**  
DELTA V SPACE TECHNOLOGIES

**KEYNOTE SPEAKER**

## TÜRKİYE'S PLACE IN THE SPACE ECOSYSTEM



**ASSOC. PROF. ARİF KARABEYOĞLU**  
GENERAL MANAGER  
DELTA V SPACE TECHNOLOGIES

**PANEL AREA 1**

**LIVE**

October 27, 2022 15:00 - 16:00 Istanbul Expo Center

**SAHA EXPO**



LIVE





Cooperation Protocol Signing Ceremony between ASELSAN & TURKSAT on Satellite Payload Equipment Development Project



Letter of Intent Signing Ceremony between ASELSAN & ROMANIA C.N. ROMARM S.A. Regarding 35mm & 40mm Smart Ammunition and 120mm ALKAR Mortar Weapon System



National Cooperation between ASELSAN and KOSGEB to Support Defence and Electric/Hybrid Automotive Sectors with National Technologies



Collaboration Protocol between TÜBİTAK and TUA (Turkish Space Agency) on Developing Software, Data Security, and Artificial Intelligence for Cube satellite Technologies



**TRTEST - Ceremony**  
for the TURQUM Certificate of Conformity Held

BVS Bülbüloğlu Inc., Sistem Teknik Inc., Keramik Makine Inc., and Intecro Robotik Inc. were evaluated by TRTEST Test and Evaluation Inc. for their competence in all areas of activity and service, including the production line, foreign/domestic sales services, and after-sales support, and awarded with the TURQUM certificate, which is a quality indicator in the domestic and international markets.

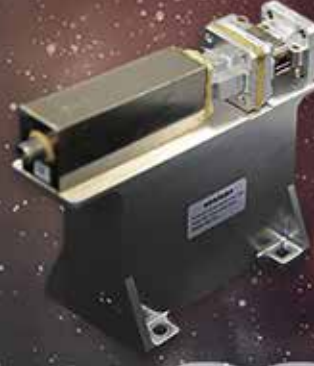


Agreement between BMC and HAVELSAN on Vehicle Electronics and Control System (AEKS) Development Project. Bringing together the platform-level know-how and engineering capabilities of BMC and HAVELSAN companies and transforming them into products, the agreement is of great importance for potential customers and the sector in terms of strengthening the parties and competition. By combining HAVELSAN's engineering capabilities and BMC's know-how at the platform level, the vehicle control system, which is one of the most critical subsystems in armored vehicles, will be developed and qualified locally.

Ku-Bant  
Almaç



Ka-Bant  
Düşük  
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aselsan

## ASELSAN Spot On with Devices in Space

*ASELSAN devices on the Türksat 5B satellite have become Türkiye's first space devices to reach technology readiness level 8 in 36 thousand kilometer geostationary orbit.*

The first signals of the Türksat 5B satellite, which had been on its journey to its orbit in space for some time, and the ASELSAN device on board, were received from the ground control station as the satellite reached its orbit.

ASELSAN Ku-Band Receiver (comprising Low Noise Amplifier and Frequency

Downconverter) and Ka-Band LNA (Low Noise Amplifier) on the Türksat 5B satellite, which underwent orbital tests after the initial signals were transmitted to the earth, successfully passed the tests, and proved their operability in the space environment. Such devices became Türkiye's first space equipment that has achieved technology readiness level 8 in 36 thousand kilometer geostationary orbit.

ASELSAN devices were totally designed and manufactured using domestic resources and integrated into the Türksat 5B satellite after environmental/performance tests. The satellite was launched with a Falcon-9 rocket on December 19, 2021.

## Facility Opened to Test HÜRJET's Fuel Systems

TUSA has completed the establishment of a test facility designed entirely with domestic resources to carry out the tests of HÜRJET's fuel systems. Accordingly, the fuel system of HÜRJET, Turkey's first jet trainer, will be safely flown and tested on the ground before its maiden flight. The tests of engine feeding, fuel ventilation, and fuel filling/discharging systems, along with leakage testing, will all be conducted at this facility with HÜRJET's original fuel tanks and fuel system.

With the experience gained from this facility, which will remain in operation throughout HÜRJET's lifespan, the necessary work has already started to establish a new facility where the fuel systems of the Turkish Fighter will also be tested. The company will also benefit from the test data to be obtained from these facilities for platform design improvements. Thanks to the facility, the company now has the capacity to test aircraft fuel systems, which will save time and money.

Commenting on the facility where fuel systems will be tested, Prof. Dr. Temel KOT L, CEO of Turkish Aerospace, said, "As we develop the platforms that our country needs in the field of aerospace, we



continue to invest in the development and expansion of test capabilities. With the recently opened HÜRJET Fuel Systems Test Facility, we have created the first facility in our country and one of the few in the world in this field. As a result of the expertise gained from this facility, we have started working to build a similar facility for the Turkish Fighter. I would like to thank my colleagues who have contributed to this project."

Turkish Aerospace has stepped up its efforts for the HÜRJET Jet Trainer, which will make its maiden flight on March 18, 2023, the company's 50th anniversary of establishment. For the HÜRJET project, where the fuselage assembly is still ongoing, the Iron Bird Test Facility, where the tests of moving surfaces will be conducted, and the HÜRJET 270 Engineering Simulator were also realized with domestic resources.

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