

DEFENCE TURKEY


FARNBOROUGH
INTERNATIONAL

AIRSHOW
16-22 JULY 2018

VOLUME 12 ■ ISSUE 84 ■ YEAR 2018
ISSN 1306 5998



**THE TURAF'S FIRST TWO F-35S
DELIVERED TO TURKEY**

**BRIGHT FUTURE FOR BAE SYSTEMS
PARTNERSHIPS IN TURKEY**

**T129 ATAK HELICOPTERS AND ADA
CLASS CORVETTES SALE TO PAKISTAN**

**A CLOSER LOOK AT THE TURKISH DEFENCE
INDUSTRY'S FIXED WING AIR PLATFORMS SECTOR**

**AZERBAIJAN DISPLAYED MOCK-UP OF
SOM-B1 MISSILE AT PARADE**

for global security



Indigenous design and products like aircraft, helicopter, satellite systems, aircraft and helicopter components, aircraft engines, armored land vehicles, vessels and motor boats, missiles, rockets, launching platforms, light arms and ammunition, electronic systems such as radios, command control systems, simulators, sensors and application software and logistic support products such as field hospitals, military clothing and uniforms, engineering and technology transfer, modernization and modification services

TURKISH DEFENCE INDUSTRY

Turkey
Discover
the potential



ssi.gov.tr | turkishdefenceindustry.gov.tr



Command Control & Information Systems

NETWORK ENABLED SOLUTIONS FOR LAND WARFARE

Operations
Intelligence
Fire Support

Air Defense
Electronic Warfare
Army Aviation

Military Engineering
Logistics
Personnel

www.aselsan.com.tr



ASELSAN is a Turkish Armed Forces Foundation company.

aselsan

Proven Technology

DEFENCE TURKEY

VOLUME: 12 • ISSUE: 84 • YEAR: 2018

ISSN 1306 5998

Publisher

Hatice Ayşe EVERS

Publisher & Editor in Chief

Ayşe EVERS

a.akalin@defence-turkey.com

Managing Editor

Cem AKALIN

cem.akalin@defence-turkey.com

Editor

İbrahim SÜNNETÇİ

ibrahim.sunnetcici@defence-turkey.com

Administrative Coordinator

Yeşim BİLGİNOĞLU YÖRÜK

y.bilginoglu@defence-turkey.com

International Relations Director

Şebnem AKALIN

sebnem.akalin@defence-turkey.com

Advertisement Director

Yasemin BOLAT YILDIZ

yasemin.yildiz@defence-turkey.com

Translation

Tanyel AKMAN

info@defence-turkey.com

Editing

Mona Melleberg YÜKSELTÜRK

Robert EVERS

Graphics & Design

Gülsemin BOLAT

Gökem ELMAS

info@defence-turkey.com

Photographer

Sinan Niyazi KUTSAL

Advisory Board

(R) Major General Fahir ALTAN

(R) Navy Captain Zafer BETONER

Prof Dr. Nafiz ALEMDAROĞLU

Cem KOÇ

Asst. Prof. Dr. Altan ÖZKİL

Kaya YAZGAN

Ali KALIPÇI

Zeynep KAREL

DEFENCE TURKEY

Administrative Office

DT Medya LTD.STİ

Güneypark Kümevleri (Sinpaş Altınoran)

Kule 3 No:142

Çankaya Ankara / Turkey

Tel: +90 (312) 447 1320

info@defenceturkey.com

www.defenceturkey.com

Printing

Demir Ofis Kirtasiye

Perpa Ticaret Merkezi B Blok

Kat:8 No:936 Şişli / İstanbul

Tel: +90 212 222 26 36

demirotiskirtasiye@hotmail.com

www.demirotiskirtasiye.com

Basım Tarihi

Temmuz 2018

Yayın Türü

Sürekli

DT Medya LTD. ŞTİ.

© All rights reserved.

No part of publication may be reproduced by any means without written permission.

6



18



26



28



32



6 Lockheed Martin Opens F-35 JSF Production Base to Turkish Journalists

18 The TurAF's First Two F-35s Delivered to Turkey

26 Bright future for BAE Systems Partnerships in Turkey

28 T129 ATAK Helicopters and ADA Class Corvettes Sale to Pakistan

32 A Closer Look at the Turkish Defence Industry's Fixed Wing Air Platforms Sector

70 AKINCI Attack UAV System

72 KTJ-3200 Turbojet Engine Tests Ongoing

73 Aselsan Signs a New Export Contract for AselPOD

74 Turkey Increases Defence Exports in the First Half of 2018

74 Sefine Shipyard Wins DIMDEG Contract

75 Aselsan Receives Additional Orders for SERHAT HTR

76 Azerbaijan Displayed Mock-Up of SOM-B1 Missile at Parade

78 BMC Received Contract for Series Production of ALTAY MBT and Its Power Pack

79 Turkish Defence and Aerospace Sector Participates at Eurosatory 2018

82 FNSS Launched PARS 4x4 Anti-Tank Vehicle Developed for ATV Project at Eurosatory 2018

85 Otokar Debuted its Light Tank in Paris

86 STM Unveiled 'Stand - Off Through the Wall Target Acquisition System' (UHTES) at 2018 Eurosatory

88 Cyber Security Cluster Introductory Meeting held in Ankara

90 Turkey Speeds up Long-Range Air Missile Defence System Studies with Eurosam

91 Aselsan Secures Lucrative Contracts in the First 7 Months of 2018

92 SAVTEK 9th Defence Technologies Congress

96 Turkey's Defence Industry Meets at "SAHA EXPO 2018"

98 High Technology Solutions from CES Advanced Composites (CES)

99 A Contract Awarded for the Electromagnetic Launch System Field Prototype

99 Turkish Aerospace Selected Dassault Systèmes for the TF-X National Combat Aircraft Program

100 Laser Gun from Aselsan Against Bomber UAVs

101 Boeing Awards Contract to Turkish Aerospace (TA) to Produce 737 MAX

102 SEDEC Event Held in Ankara

104 New Era for the Presidency of Defence Industries and Türk Loydu

104 Turkish Aerospace Debuts New Logo

105 First Batch of TGGC's BAYRAKTAR TB2-S Block 2 UAVs Delivered

106 Boeing and Turkish Technic Announce Global Fleet Care Supplier Agreement

106 Peli Products Announces its Expansion in Turkey

107 Aselsan's Submarine Intercept Sonar System ASIST Installed On-Board Three Ay Class Submarines

108 HSwMS Gotland Relunched After Mid-Life Upgrade

109 Roketsan and Raytheon Partnership Continues with Excellence Award

109 ODTÜ Teknokent Defence Industry Cluster (TSSK) New Board of Directors

110 A 20-Year Track Record of Success Continues

111 Iveco Defence Vehicles is Awarded Contract to Deliver Amphibious Platform to the US Marine Corps in Partnership with BAE Systems

112 Leonardo to Supply the Next-Generation BSA Heavy Torpedo to the Italian Navy

112 Bell Boeing to Begin U.S. Navy CMV-22B Production Work Under \$4 Billion Contract

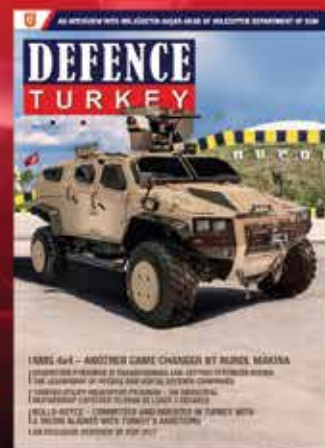
113 KMW and Nexter Join Forces on Main Ground Combat System

113 Lockheed Martin Delivered 300th F-35 Aircraft

114 Boeing and Embraer to Establish Strategic Aerospace Partnership to Accelerate Global Aerospace Growth

115 EMBT Showcased at Eurosatory 2018

116 Contract Worth 200M NOK, Naval Strike Missile for Norway and Germany



The latest defence and aerospace news, interviews, reports and articles on our Website, Mobile Applications, Twitter, Facebook, Youtube and LinkedIn.

defenceturkey.com - linkedin.com/company/defence-turkey-magazine
youtube.com/thedefenceturkey - facebook.com/DefenceTurkey - twitter.com/defenceturkey



Turkey and F-35 JSF Program

Ayşe EVERS
Publisher & Editor in Chief

The F-35A was selected as the New Generation Fighter Jet of the Turkish Air Force (TurAF) upon the Decree of the Defence Industry Executive Committee (DIEC) dated December 12, 2006. Turkey has a plan to procure as many as 116 F-35As, conventional take-off and landing (CTOL) variant, until 2031 for the TurAF to replace the ageing F-4E 2020s and F-16C/D Block 30s and Block 40s.

Turkey has participated in the F-35 Joint Strike Fighter (JSF) Program starting from Concept Demonstration Phase (CDP), in which Turkey invested US\$6.2 Million. As a Level-III Partner of the Program Turkey has committed US\$175 Million to the F-35 JSF System Development and Demonstration (SDD) Phase, under the agreement awarded on July 11, 2002. On January 25, 2007, with a MoU Turkey participated the Production, Sustainment and Follow-on Development Phase (PSFD) of the JSF Program, and pledged around US\$700 Million to aircraft production. According to U.S. Defence Secretary Jim MATTIS, so far Turkey has invested US\$1.25 Billion in the F-35 development phase.

10 Turkish Defence and aerospace companies (Alp Aviation, Aselsan/MİKES, AYESAŞ, Fokker Elmo, Havelsan, Kale Aero, Kale Pratt & Whitney Engine Industries, Roketsan, TÜBİTAK-SAGE and Turkish Aerospace) have been supporting the development and production phases of the F-35 JSF Program. The Prime Contractor of the JSF Program LM declared that F-35 Production Industrial Participation opportunities for Turkish companies (in total for LM and P&W) are expected to reach more than US\$12 Billion by the end of the Program.

The rollout ceremony for Turkey's first F-35A aircraft AT-01 (serial 18-0001), was held at Lockheed Martin's Fort Worth facility in Texas on June 21, 2018. The ceremony was attended by Vice President of Defence Industries Serdar DEMİREL, representing the Turkish Government, and Major General Reha Ufuk ER, representing the Turkish Armed Forces (TAF). The F-35A Lightning IIs destined to the TurAF are expected to remain in the U.S. at least until November 2019 and will be utilized in TurAF pilot and maintenance personnel training.

F-35A Lightning II is not just about the aircraft, but the entire air system and remains crucial to the continued modernization of TAF and Turkey's ability to preserve Turkish and allied security and interests. It will add a wide range of capabilities to the Turkish Armed Forces that Turkey has never had before.

According to the SSB as of June 22, 2018, Turkey has placed an order for a total of 30 F-35As. By the end of 2023 TurAF is expected to receive a total of 30 F-35As, which have been ordered in two batches, and all will be deployed at the 7th Main Jet Base (MJB) located in Akçadağ, Malatya.

Enjoy the issue...■

Lockheed Martin Opens F-35 JSF Production Base to Turkish Journalists

by Cem AKALIN

We touched down at the Dallas Airport on June 19 to witness a historic moment, the delivery of the first F-35 JSF of the Turkish Air Forces with a teeming group of Turkish journalists who were on task after a long flight, in anticipation of the scheduled events and ceremony. Lockheed Martin prepared a busy schedule for us on June 20 - a day before the ceremony.

Nearly 20 thousand employees work at the production facilities of Lockheed Martin - Dallas Fort Worth where F-35 Joint Strike Fighters are manufactured. We were informed that this facility, one of the most crucial production facilities of the American Air Force and the Army since World War II, has been conducting production for the United States Army since 1941 without interruption. All processes are being executed in a planned and complete management capability at the production and assembly lines which is 1.6km in length. There is no room even for a tiny mistake in this multi-partnered program. We once again witnessed the flawless

organization and management capabilities of Lockheed Martin as we toured the facilities.

The Lockheed Martin facilities press tour started quite early in the morning of June 20. Following our entrance to the facilities, Lockheed Martin Communications VP Joe LAMARCA shared the overall rules to be followed at the facilities as well as the flight to be executed with the F-35 simulation and the conference to be held with the F-35 pilots in general terms, and after this general information, the Vice President of F-35 Business Development and Strategy Integration, Jack CRISLER delivered information to the press members on the development and production process of the F-35 program, its capabilities, the milestones of the program, their strategies for the upcoming period and the cooperation between Turkey and US in the industry.

CRISLER: "First F-35B STOVL Aircrafts were Recently Deployed at the USS-WASP and USS-ESSEX LHD Vessels"

Starting his speech by mentioning that they attained crucial milestones in the program in the previous year, CRISLER said: "We delivered the first three aircraft to the Norwegian Air Forces at the beginning of 2018. They received four more aircrafts since then and the number of the delivery to the Norwegian Air Forces reached seven. Also, the U.S. Marine Corps has completed their first deployment. Recently, the first F-35B STOVL aircraft have been deployed at the USS-WASP and USS-ESSEX LHD Vessels. We have completed the flight test portion of the system design and demonstration phase and we have begun the initial operational test and evaluation phase (IOT&E) of F-35 program. We will move onto full capacity production upon the completion of the IOT&E".

Underlining that they delivered the 300th F-35A aircraft manufactured as part of the program to the United States Air Force in the beginning of June, CRISLER added that they will be



continuing to focus on achieving more affordable aircraft production.

CRISLER also stated that one of the delivered F-35 aircraft has recently been utilized operationally under combat conditions.

As per the foreign based news of May 22, 2018, it was claimed that the F-35 ADir in the Israeli Air Forces inventory conducted sorties to the determined targets in Beirut, Lebanon and that the F-35 aircraft was first utilized operationally in combat conditions.

In addition to the developments relayed by CRISLER, many breakthroughs were experienced as part of the program in 2018. These are;

- › On April 18, U.S. Navy Strike Fighter Squadron 147 Executes First F-35C Flight,
- › F-35 Aircraft Make Their Debut in Germany For ILA Berlin,
- › On April 30 Pentagon and Lockheed Martin Finalize 2018 F-35 Sustainment Contract To Enhance Readiness And Reduce Cost,
- › On May 2, F-35A Training Equipment Delivered to RAAF Base Williamtown, Australia,
- › On May 24, First Two Republic of Korea Aircraft Arrive at Luke Air Force Base, Arizona,
- › On May 28, Five Japanese F-35As Arrive Home to Misawa Air Base, Japan,
- › On June 6, F-35Bs Arrive Home to the United Kingdom at RAF Marham

F-35 Manufactured in Three Different Configurations

Stating that they conducted production in three different alternatives within the scope of the program, CRISLER continued, "We are executing production in a total of three different alternatives, the F-35A CTOL (Conventional Take-off and Landing), F-35B STOVL (Short Take-off and Vertical Landing) configuration and the F-35C Carrier variant manufactured for the United States Navy. As I mentioned earlier, we have delivered the 300th aircraft two weeks ago (in early June). These aircraft are being used in different regions of the world, at 15 air bases. Within the scope of the program, we reach 620 pilots and over 5,600 maintainers training and over 140,000 thousand cumulative flight hours".



The Managing Editor of Defence Turkey Magazine, Cem AKALIN

Noting that they jointly conducted this program with eight partner countries, among which the United States of America and Turkey also remained, CRISLER added that Israel, Japan and the Republic of Korea will be procuring aircraft through Foreign Military Sales (FMS) program and that they externally contributed to the program.

A Total of 442 Aircraft to be Produced in LRIP 12 -14 Productions

Within the scope of the program in which development and production in three different configurations are being conducted; the U.S. Air Force and Navy Forces have a commitment for a total of 2456 aircraft (USAF 1,763 F-35A and DoN 693 F-35B and F-35C configurations). One of the most

crucial partners of the Program, the United Kingdom placed a commitment of purchasing 138 aircraft for the utilization of the Royal Air Forces and the Royal Navy. The aforesaid countries are followed by Turkey and Australia with an order of 100 F-35A aircraft, Italy with an order of 90 aircraft (60 F-35As/ 30 F-35Bs), Canada ordered 88 F-35 JSF, Norway placed an order of 52 F-35As, Netherlands ordered 37 F-35As and Denmark placed an order of 27 F-35As. In light of the information provided by Lockheed Martin, the number of aircraft committed to be purchased by the program nine partner countries in the beginning of the program was 3088; Israel, Japan and the Korean Republic joining the program externally and declared to procure 132 F-35As (Israel 50 F-35As, Japan 42 F-35As, the Republic of Korea 40 F-35As). The total number



Vice President of F-35 Business Development and Strategy Integration, Jack CRISLER



of aircraft committed to be procured by the nine partner countries and three other countries declaring their purchase through the FMS program is recorded as 3220 in the shared information, while the exact number of orders is expected to increase in 2019.

Clarifying the aforesaid issue during the briefing meeting Jack CRISLER said, "Currently we are conducting the production of the LOT-10 and holding various negotiations with the partner countries for the production of LOT-11 as well. Countries plan their budgets annually. For instance, Turkey approved the productions of LOT-12 and LOT-13. When we move onto Full Rate Production (according to the procurement process of the United States of America, full production rate is projected to commence with the LOT-13), we will initiate to multi-year contracts with many other countries".

According to Jack CRISLER's presentation, a total of 141 aircraft will be produced in various configurations in the LOT-11 production phase expected to be completed within the last quarter of 2019. The total number of aircraft to be delivered also in different configurations in the Block Buy (LOT 12 - 14) production phase will be 442.

The IOT&E stage that started in the first quarter of the year 2018 is expected to be completed in the first quarter of 2019. A significant amount of increase in production is planned with Full Rate Production

which is envisaged to be launched in 2020. With the launch of the mass production phase, the countries are projected to increase the number of their final orders as well. The total aircraft quantities manufactured and to be manufactured during the LOT-1 and LOT-11 production phases were declared as 358; and according to the delivery schedule of Lockheed Martin production line, 266 aircraft were delivered to the aforesaid countries in 2011 - 2017. Following the delivery of 91 aircraft are planned to be accomplished in 2018, a substantial increase in production is expected with the year 2019. In accordance with the data provided by Lockheed Martin, 130 aircrafts will be produced in 2019, 145 aircraft will be manufactured in 2020, 150 in 2021, 150 in 2022 and 160+ aircraft will be rolled out of the factory in the year 2023.

Previously, the unit cost of the F-35A in LRIP-10 production was declared as US\$ 94.3 million, the cost of the F-35B was stated as US\$ 122.4 million, and the cost of the F-35C configuration was announced as US\$ 121.2 million, in the written statement made by Lockheed Martin in July 2018, it was noted that upon the contract signed for the sale of 141 aircraft between US Government and Lockheed Martin in 2017, the unit cost of the F-35A configuration for per aircraft reduced by 6%. Where the cost of the F-35 in LRIP-10 production was US\$ 94.3 million, with this new contract, the unit cost for per aircraft was reduced

to US\$ 89 million. With the increase of the mass production phase which is expected to be launched in 2020 and the increase of the final orders of the countries, the unit cost of the F-35A is expected to be lowered to US\$ 80 million by the year 2020.

Stating that Lockheed Martin has made critical investments to the production line, CRISLER continued, "We prepared a blueprint in order to establish more convenient production conditions in 2015. We invested US\$ 170 million through our own resources. We determined the production technique to be adopted, the materials and processes to be utilized in order to decrease the unit flyway costs. Blueprint for Affordability is delivering projected savings of more than US\$ 4 billion over the life of the program and the US Government has initiated the second phase of the blueprint for affordability and is projected to save an additional US\$ 2 billion over the life of the program. We always focus the affordability. We focused on the process following the launch of the operational service of the aircraft that is the sustainability process after the production as well. Similarly, we have been striving to lower the life cycle costs. With the assistance of the data collected via these aircrafts, in terabyte sizes, we are capable of identifying when the aircraft would be requiring spare parts. These data also enable us great advantage in reducing the faults emerged in a cost - efficient manner as well".



Maximizing your vision is our vision.

At Rockwell Collins, we're always looking forward – and so are our solutions. For instance, our head-worn technologies fuse sensor imagery to provide military pilots with unprecedented situational awareness. It's just one of the many ways we help you see the right information at the right time, every time.

rockwellcollins.com/maximizingvision

© 2013 Rockwell Collins. All rights reserved.

**Rockwell
Collins**

Building trust every day



© Lockheed Martin

TurAF is Expected to Declare IOC for Its First F-35A Squadron in 2020

In his presentation, CRISLER also informed the participants on achieving the initial operational capability (IOC) of the delivered F-35 aircraft. Stating that the U.S. Marine Corps notified that they reached IOC in respect to the aircrafts they received, in 2015, CRISLER added that the USAF declared their achievement of the IOC in 2016 whereas the Israel Air Force (IAF) reached the IOC in the first months of 2018, a year after they received the F-35 ADir aircraft entering the inventory of the Israel Air Force. CRISLER added that they expected the Turkish Air Forces to attain the IOC regarding the F-35 aircraft within 2020.

F-35 Production Line Tour

A tour was made at the assembly line following the briefing presentation. During this tour, F-35 Business Development Representative Kevin MCCORMIK provided comprehensive information on the processes for the aircraft on the final assembly line, wing line and integration areas.

Noting that in the 1.6 km long assembly line, the part of the aircraft being manufactured in any configuration for any client

and the completed portion of the manufactured part could be monitored in real-time in detail from the displays, MCCORMIK added that all the configurations and all the aircraft of every country remained in the same assembly line. Underlining that the aircraft moved from one section to another in three-day cycles, MCCORMIK shared that as of July 2018, the duration of these cycles would be reduced to two days.

MCCORMIK: “The Monthly Production Capacity is Aimed to be Increased to 15 - 17 aircraft in 2020”

MCCORMIK noted that presently they are executing the production of eight - nine aircrafts per month, but as they launched the full rate production in 2020 they aimed to increase the monthly production capacity to 17 aircrafts.

Commenting that the facility at Fort Worth was built in 1941, MCCORMIK expressed that they

have launched activities to reinforce the foundation with steel structures for establishing an infrastructure strong enough to carry the F-35 aircraft, and additionally they are continuing the construction activities to add 12 new stations to the final assembly line.

Emphasizing that they will make a transition to a daily cycle as of January 2019, MCCORMIK added that they are conducting a three-shift operation at the facility each day. MCCORMIK said that the period for the rollout of the aircraft from the production line, so to speak start and finish of the aircraft until the start of the customer's possession took 36 months and continued, “The procurement of parts, systems and sub systems is accomplished for each aircraft to be produced within the first twelve-month period. The remaining 24 months are composed of the processes of assembly, system integration, test and delivery of the aircraft to the end users. Although

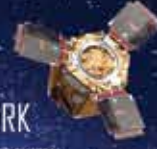


© Lockheed Martin

TF
TURKISH FIGHTER



GÖKTÜRK
LEO SATELLITE SYSTEM



HÜRJET
ADVANCED JET TRAINER &
LIGHT ATTACK AIRCRAFT



ANKA
MULTIROLE UAV SYSTEM



**TURKISH
AEROSPACE**

TG25
MULTIROLE HELICOPTER



HÜRKUŞ
ADVANCED TRAINER
AIRCRAFT



T129 ATAK
MULTIROLE COMBAT HELICOPTER



THE SKIES AND BEYOND

We develop civil and military products in the aerospace industry with innovative approaches and perfectionist production concept by getting inspiration from our new logo. Our passion for our profession is far beyond the sky!

we had accomplished to reduce this process from 24 months to 18 months, we still declare this period as 36 months as a precaution for unpredictable delays”.

The products and components manufactured by companies such as Turkish Aerospace, AYESAŞ, KALE Aerospace and Alp Aviation were displayed over the aircraft to the participants at the tour, and the Turkish journalists closely examined the wing production of the AT-3 and AT-4 aircraft of the Turkish Air Forces in the wing production line.

Turkey is a “Level 3” Partner

Catering to the the fifth generation fighter aircraft requirement of the Turkish Air Forces, Turkey, joined the concept development phase of the Joint Strike Fighter program in 1999. Within the following stage, Turkey was involved in the program’s system development and demonstration phase as a “level-3” partner which was valued at US\$175 million in 2002.

The Presidency of Defence Industries (SSB) and Lockheed Martin signed a contract to procure the commitment of the 100 F-35A Aircraft in 2007.

The Presidency of Defence Industries (SSB) was given the authority to order the first two F-35A aircraft with a Block 3F configuration within the coverage of Low Rate Initial Production (LRIP 10) in May, 2014 and in January, 2015 a decision was made to place the order of an additional 4 F-35A Lightning II aircraft.

So far, Turkey placed an order of 30 final F-35A configurations (2+4+8+8+8). In late October 2016, the Defence Industry Executive Committee met and approved the Block Buy for 24 aircraft over three contract years.

Presently, within the scope of the international production process of the F-35 Lightning II, Alp Aviation, AYESAŞ, Fokker Elmo, Havelsan, Kale Aerospace, Kale Pratt & Whitney Engine Industries, MIKES and Turkish Aerospace companies are assigned. The financial size of the business packages acquired by Turkish companies assigned in the Project is declared as approximately US\$12 billion throughout the JSF



© Turkish Aerospace

The ceremony of the First Turkish F-35 Center Fuselage Delivery program.

Turkish Aerospace is the Single Source in the Production of the F-35 Aircraft Center Fuselage Apart from the United States

Executing the production activities as part of the JSF/ F-35 Program since the year 2008, Turkish Aerospace assumed the production of one of the most complicated structural parts of the aircraft, the F-35A Waist as the single source, besides the US, and realized its first delivery on December 11, 2013 at the ceremony held at Turkish Aerospace premises to the Northrop Grumman and Lockheed Martin companies that were its customers in the project. The “AT-1 Center Fuselage” of the first F-35 Aircraft of the Turkish Air Forces delivered on June 21, with the tail number 18-000 was delivered to Lockheed Martin and Northrop Grumman at a ceremony held at the TA premises on July 12, 2017 and the “very first Turkish JSF/F-35” launched its test flights with the delivered “AT-1 Center Fuselage” in May 2018 at

the facilities of Lockheed Martin. TA is planned to accomplish the production and delivery of a total of 400 waists until the year 2027. Moreover, TA conducts mass production of the Composite Components for the F-35A CTOL, F-35B STOVL and F-35C CV aircraft, and the mass production of the waist sub units, metallic waist components and rear air inlets for the F-35As. The business share remaining low during the Low Rate Initial Production stage is expected to increase gradually especially with the launch of the mass production stage. According to the figures shared by TA, the company is expected to receive an order exceeding US\$ 4 billion throughout the program.

Kale Aerospace has been supporting the F-35 since 2005. In conjunction with Turkish Aerospace, they manufacture and produce F-35 airframe structures and assemblies. Kale Aero also supports Heroux Devtek as the sole source supplier for all three variants landing gear up lock assemblies. Additionally, Kale Aerospace has also established a joint venture in İzmir with Pratt & Whitney and is manufacturing



© Turkish Aerospace



go on a cruise, does it have to be at sea level?

Flying cruise liners –
a dream our software could bring to life.

Innovative thinkers everywhere use the **3DEXPERIENCE** software platform from Dassault Systèmes to explore the true impact of their ideas. Insights from the 3D virtual world enable aerospace and defense companies to define new experiences. How long before the sky becomes the destination?



3DEXPERIENCE

It takes a special kind of compass to understand
the present and navigate the future.

Discover our Industry Solution Experiences:

Winning Program

Co-Design to Target

[3DS.COM/AEROSPACE-DEFENSE](http://3ds.com/aerospace-defense)

DS **DASSAULT
SYSTEMES**

IF WE ask the right questions
we can change the world.

production hardware for the F135 engine. Moreover, Kale Aerospace is the manufacturer of the most critical structural parts for the Lockheed Martin, with the parts it produces for the F-35s. Kale Aerospace provides support to the program with nearly 500 different hull, wing, cockpit parts and assembly group deployment. Kale Aerospace delivered 58,000 parts in 800 different types since 2010 up until July 2017 and accomplished the delivery of 18,000 parts in 370 types in 2017.

On the other hand, within the scope of the JSF program, one of the ten Turkish companies contributing to the production of F-35s since 2004, Alp Aviation is conducting the production of structural components and assembly parts for the main contractor Lockheed Martin Aero, executes the production of the F-135 engine titanium alloy Integral Blower Rotors (IBR) and also the detailed components and assembly parts with a market share of 70% for the engine contractor Pratt & Whitney, nearly 300 landing gear parts for the contractor in charge of the landing gears UTC Aerospace Systems/Landing Gear, fuel pump body units for the sub system contractor UTC Aerospace Systems with its sub systems, and manufactures the brake system parts for the sub system contractor Honeywell Aerospace.

AYESAŞ – Sole Source Supplier for Missile Remote Interface Unit and Panoramic Cockpit Display Electronic Circuit Board.

AYESAŞ within F-35 Program together with GE Aviation, designed, developed and manufactured one of the critical subsystems of the aircraft the Missile Remote Interface Unit (MRIU) which manages weapons unique interfaces converting them to the MIL-STD-1760 standard weapon interface.

AYESAS has delivered more than 500 MRIU ship sets as sole source and also together with L3 Technologies, have also developed various Panoramic Cockpit Display software packages. As being the only Turkish company involved in Software development in the program, AYESAS has carried out validation and verification activities in accordance with DO-178B Level A.



AYESAŞ has been the single supplier of F-35's Panoramic Cockpit Display Components, Circuit Card Assemblies. More than 600 PCD-EU (Electronic Modules) ship sets have been shipped to date. As a result of successful sustained performance and quality, AYESAŞ has been awarded for the production of PCD Power Supplies as well.

Havelsan is anticipated to assume a pioneering role in respect of the development of the Turkish F-35 Integrated Pilot and Maintenance Training Center [ITC] and relative training systems in Turkey in the future.

MIKES has supported the F-35 Program during SDD delivering

F-35 aircraft components and assemblies for BAE Systems and Northrop Grumman.

Fokker Elmo manufactures 40 percent of the F-35 Electrical Wiring & Interconnection System (EWIS) and will also deliver and support TA with all center section wiring systems. Fokker Elmo is also developing the EWIS for the F135 engine, for which a major share is produced in Fokker Elmo Turkey in Izmir.

Roketsan and TÜBİTAK-SAGE are the Turkish joint leadership team who strategically manage the development, integration, and production of the advanced precision-guided Stand-off Missile (SOM-J) which will be carried



The Only Turkish Company Involved in

Design & Manufacturing of Electronics and
Software Development in the
JSF F-35 Program

ayesas
www.ayesas.com



internally on the 5th Generation F-35 aircraft. Additionally, Lockheed Martin Missiles and Fire Control has partnered with Roketsan, through a teaming agreement, to jointly develop, produce, market and sell the advanced, precision guided Stand Off Missile.

The Defence Industry Executive Committee called upon the development of precision guided smart missiles compatible with the F-35 JSF aircraft in 2012 through national facilities, towards the utilization of the SOM (Stand-Off Missile) developed and manufactured by Roketsan and the design update activities of the SOM-J were launched to this end in 2014. The platform integration activities were launched by Lockheed Martin and as the design activities are being completed presently, the product qualification and integration activities continue.

Additionally, Turkish Industry is going to have a significant Industrial Participation role in supporting Lockheed Martin and Pratt and Whitney for F-35 aircraft sustainment and F135 engine production and sustainment. Turkey has been given the approval to build its own F135 engines and was also selected to have the first European Regional F135 Engine depot overhaul capability. Both the engine production and overhaul will take place at the 1st HIBM in Eskisehir. Additionally, TA has also been assigned to represent the organic depots of the Turkish Armed Forces within the Autonomic Logistic Global Sustainment (ALGS) system and Havelsan has been assigned as the Turkish Integrator for the National Integrated Training Center (ITC).

Following the Factory Tour, a test flight in accordance with a scenario including the destruction of two air threats was executed at the F-35 flight simulator, accompanied by Mark BOSLEY followed by a conference where the F-35 test pilots conveyed their experiences regarding the aircraft.

F-35 Test Pilot Billie FLYNN shared that the F-35 Fighter Jet executed a flight demonstration before the public for the first time in June 2017 and added: "The maneuver capability of the F-35 aircraft has been discussed for



F-35 Test Pilot, Billie FLYNN

more than ten years and there were no positive approaches within this scope. We conducted a demonstration flight of six minutes with the F-35 at the Paris Air Show, and in terms of maneuver capability, we left behind all the performances revealed up to date and became the aircraft with the best maneuver capability within the six-minute flight demonstration. We did not only aim to show off the maneuver capabilities of the aircraft when we attended the Paris Air Show. We wished for everyone to see how good the fighter jet was before they discuss it with us. Actually, we aimed to show what a young pilot candidate could achieve with a fifth generation fighter jet".

Stating that the stealth and center fusion capabilities of the F-35 aircraft stood out in terms of the characteristics, FLYNN continued, "While the stealth capability brings invincibility, sustainability and lethality features, the center fusion enables us the visibility of everything. We are capable of observation in the air, sea and on the land within an area of 300 km from 360 degrees angle over an altitude of 10,000 meters. While the stealth capability brings us invisibility, the power it enables to its user at the combat environment is unbelievable. We are at the very beginning of the

life cycle and are newly learning the limits and capabilities of the aircraft".

Sharing the training duration of a young pilot in concern with the Fifth Generation Fighter Jet, FLYNN said, "Flying an unexperienced young pilot, who has not ever aviated a Fifth Generation Fighter Jet, with these aircraft would be quite risky. As one of the first pilots of the Canadian Air Forces aviating the first F-18C fighter jets 34 years ago, I recall that half of the pilots conducting these flights with the fourth-generation aircraft that were not quite recognized in those times were experienced ones, while the other half were composed of inexperienced pilots. This constituted a risk for the inexperienced, young pilots yet these inexperienced pilots became the best pilots of the fleet in three years. As the senior pilots do not know the flying techniques, the young pilots seized the lead positions in the Canadian Air Forces. The same cycle will be experienced in the next 20 - 30 years and young, inexperienced pilots will stand out again. The pilots will learn how to fly this aircraft with the state-of-art helmet and by using the head up display. This will offer numerous potentials and novelties to the young pilot candidates" ■



SOM-J

JSF UYUMLU STAND OFF MÜHİMMATI

LOCKHEED MARTIN 



 **roketsan**



The TurAF's First Two F-35s Delivered to Turkey

The first F-35 aircraft with the tail number "18-0001" was delivered to the Turkish Air Force with a ceremony held at Lockheed Martin's Dallas Fort Worth facility, within the scope of the JSF program where Turkey has taken part as a consortium member since 1999 starting from the conceptual design phase and committed to procure 100 F-35A Lightning-II aircraft. The first orders for the first two aircraft in Block-3F configuration and manufactured within the frame of LRIP 10 Low Rate Initial Production were given in the SSIK meeting held in May 2014.

Serdar DEMİREL – Vice President of the Presidency of Defence Industries SSB (former name Undersecretary for Defence Industries) and Major General Reha Ufuk ER from the General Staff Plans and Policies Department represented Turkey at the ceremony held at the production base of Lockheed Martin located in Fort Worth, Texas and Lockheed Martin CEO Marillyn HEWSON, Turkish company representatives holding workshares in the JSF program and many journalists from the Turkish media were present at the ceremony, on June 21.

In his speech Orlando P. CARVALHO - Lockheed Martin Executive Vice President Aeronautics thanked all participants at the ceremony and conveyed information on Lockheed Martin's deep-rooted history and production capacity. CARVALHO: "Our facility here is one that is rich with history. Here our world class team has designed, produced and delivered more than 7,000 cutting-edge military aircraft since 1942. From bombers during World War-II to early fighters in the 1960's and the 1970's, to the game changing F-16 Fighting Falcon which our guests from Turkey have operated for many years. Today you'll get a first-hand look at the next generation of that legacy when we celebrate the technology, the capabilities, the partnership and the skilled craftsmanship that has culminated in this first F-35 Lightning II for the Republic of Turkey.

Before we get to the F-35 reveal it is my honor to introduce our official party. First our guests from the Republic of Turkey, from the Vice President of Defence Industries at SSB, Serdar DEMİREL. From the Turkish General Staff, the Head of Force Development and

Funds Management, Airforce Major General, Reha Ufuk ER. From Lockheed Martin, our Chairman, President, Chief Executive Officer, Marillyn HEWSON.

In our audience today, I want to extend a welcome to our guests from the Presidency of Defence Industries, the Turkish General Staff, the Turkish Airforce, the Embassy of the Republic of Turkey and the Turkish Consulate in Houston. Thank you all for joining us today. We also welcome and thank the individuals from Turkish industry that are here with us today including our distinguished colleagues from the following companies; Turkish Aerospace (TA), the Kale Group, Alp Aviation, AYESAŞ, TEI, Havelsan, Roketsan, TÜBİTAK- Sage, Kale & Pratt and Whitney aircraft industries JV.

Ladies and gentlemen, the skilled workers and these organizations were critical to the production of this aircraft. They and our entire Lockheed Martin team demonstrated every day that they believe in the purpose and the capabilities of the F-35. I want to thank you again for being here with us this morning to celebrate this aircraft. Enjoy the program."

Following Lockheed Martin Executive Vice President Aeronautics CARVALHO's speech, Lockheed Martin CEO Marillyn HEWSON took the floor.

"On behalf of the men and women of Lockheed Martin it's an honor to welcome you all to Fort Worth. I'd also like to extend our welcome to those watching live from locations around the world. Here in Fort Worth we have distinguished guests and officials from across government and industry, from the Republic of Turkey to the United States of America. Few nations have played such a pivotal role in human history as Turkey. Over the past decades Turkey has been an important and valuable ally for NATO, for the United States and for the cause of global security. Today at this roll-out we present one of the most powerful symbols ever of what three nations can achieve together. The F-35 Lightning II. The F-35 program is a result of relationships built over decades of cooperation, collaboration and shared commitment. This is a moment that was made possible by a bold vision put forth by the partner nations of the F-35 program which includes Australia, Canada, Denmark, Italy, Netherlands, Norway, United Kingdom and of course Turkey. That vision was to protect the lives of our citizens and to strengthen global security through an unparalleled 5th generation aircraft. As we look around the world, the need for strong and effective alliances is clear and urgent. We look out on a world filled with threats, some old, some new, and all evolving at an extraordinary pace in the 21st century. These threats touch every domain; on land, at sea, in the air, in space and in the cyber realm. Some of these threats are the result of what US Secretary of Defence James MATTIS has called 'A great power competition.' No aircraft and no technology will be a more decisive strategic tool in the decades ahead than the F-35. With its stealth, speed and survivability, its unrivaled flexibility, its interoperability and its increasing affordability, the F-35 is a game changing technology for countering modern threats. It strengthens security by acting as a force multiplier for a nation's entire armed



Lockheed Martin CEO Marillyn HEWSON

forces. It also strengthens allied planning, strategic awareness and capabilities for integrated defence. We know from the cooperation and industrial partnerships of the F-35 program it strengthens the economies of partner nations and facilitates job creation. The Republic of Turkey knows the value of the F-35 first hand. Building on more than 25 years of partnership on the F-16 Fighting Falcon, Turkey joined the F-35 team during the system development and demonstration phase. Turkish forces planned to build a fleet of 100 F-35As and Turkish companies are expected to benefit from significant industrial opportunities over the life of the program. These military and industrial partnerships are an important part of the foundation between Turkey, the United States and allied nations. Today's ceremony is yet another example of how the F-35 program serves as a bridge between nations.

In conclusion I thank our distinguished guests for joining

us today. At Lockheed Martin our hope is that the F-35 will continue to strengthen the mission and the value of NATO, our relationship with Turkey and the cause of peace in the region and around the world." HEWSON said.

Following HEWSON's speech, the introductory film of F-35 was shown on the screen. While the participants were watching the film on the screen, the first F-35 aircraft of the Turkish Armed Forces was unveiled the roll-out ceremony.

Upon this historic moment, Major General Reha Ufuk ER from the General Staff Plans and Policies Department took the floor and delivered his speech:

"It is my great pleasure to be here for this spectacular event and have the opportunity to address such a distinguished group. I am very excited to witness one of the state milestones of the Turkish Armed forces and I can assure you that all Turkish Armed forces share this excitement right now. As you are well aware Turkey is



Major General Reha Ufuk ER from the General Staff Plans and Policies Department

ALP HAVACILIK

DÜNYA HAVACILIK DEVLERİNİN

GÜVENİLİR ORTAĞI

Türk Genel Maksat Helikopteri Programında
(TUHP) Transmisyon Sistem ve
İniş Takımı Üreticisi

Sikorsky Black Hawk ve Seahawk® Helikopter
Modellerine Ait Arka Kuyruk Pervanesi
Sürücü Şaftları (TRDS) Asamblelerinin
Tek Global Kaynağı

F-135 motoru IBR (Integrally Bladed Rotors)
Ana Global Kaynak

F-35 İniş Takımı Komponent ve
Asambl Üreticisi

Türkiye ve Orta Asya Satış Sonrası
Hizmetleri İçin Sikorsky
Tek Yetkili Çözüm Ortağı

Sikorsky S-76, S-92,
S-61 & M28 Platformlarının
Türkiye, Azerbaycan, Kazakistan ve
Türkmenistan Satış Temsilcisi

AR-GE Merkezi

Yalın Üretim Sistemi



 Sales / Marketing

 MRO/CSC

 Warehouse

 Factory

 International Sikorsky Sales
Representation & Part Distribution

 Customers



Transmission System and Landing Gear
Manufacturer in the Turkish Utility Helicopter
Program (TUHP)

Single Global Source for Black Hawk and Seahawk®
Helicopter Flight Control &
TRDS Assemblies

Major Global Source for F-135 IBRs
(Integrally Bladed Rotors) and Rotating
Engine Components

Landing Gear Component/Subassy and
Aerostructures Manufacturer for F-35 Aircraft

Sikorsky Exclusive Aftermarket Parts & Services
Distributor for Turkey and Central Asia.

Sikorsky's Sales Consultant for
S-76, S-92, S-61 & M28 in Turkey, Azerbaijan,
Kazakhstan and Turkmenistan

R&D Center

Lean Manufacturing System

**TURKISH
TECHNIC**

**TURKISH
AEROSPACE**

aselsan

KAZAKHSTAN

TURKMENISTAN





AZERBAIJAN

TURKEY

UTC Aerospace Systems
PROPELLER SYSTEMS
Rattler-Figeez

AERnova

alp.com.tr | alptechnik.com

 | [alphavacilik](https://www.facebook.com/alphavacilik)  | [alp_havacilik](https://twitter.com/alp_havacilik)  | [alp_havacilik](https://www.instagram.com/alp_havacilik)  | [alp-havacilik](https://www.linkedin.com/company/alp-havacilik)

    | [alpjet](https://www.alpjet.com)

located at the geo-strategic and cultural cross-roads between the east and the West. On the other hand, it's geographic location and proximity to the conflict areas significantly increases the security challenges that it faces. All of these factors necessitate that Turkey has robust capabilities to secure its contribution to the regional and global security environment. In that sense, the F-35 aircraft is a great asset toward achieving that goal with its unprecedented and numerous superior technological features, robust joint operational capacity and unmatched potential to adapt to future threats.

The F-35 is said to become the major stock aircraft of the Turkish Airforce. As being the bulwark on the alliance's southern flank, Turkey's strengthening airpower will significantly augment the alliance's capabilities and contribute greatly to regional and global stability. Despite the superior features of the F-35 aircraft, in order to be successful in today's and the future's security environment, which is full of constantly changing multidimensional threats, we should work together to explore ways to better use the operational potential of this aircraft. The resulting synergy would greatly enhance the aircraft's already superior power and would ensure that it remains the same in the future. Turkey will provide more and better contributions to the interoperability of the NATO alliance in the future with the F-35. As you know, Turkish Airforce Maintenance personnel have already started their training at the England Airforce base and at the end of this month our pilots will begin their training flights with the F-35 aircraft. These personnel will open a new chapter in Turkish Airforce history and will Pioneer the training efforts at the Malatya integrated training center. At this center we are ready to take extra responsibility for training F-35 pilots and maintenance personnel of the European Alliance. Another aspect of the F-35 program that pleases me most is the prospective integration of Turkish indigenous weapons; stand-off-missile (SOM), SOM-J and the precision Guidance Kit (HGK) will be integrated to the aircraft in the near future. This will



Vice President of the Presidency of Defence Industries, Serdar DEMİREL

significantly boost the utility that we are anticipating from the F-35.

Before concluding my remarks, my warmest thanks go to Lockheed Martin and other related companies and personnel who contributed to the F-35 program and made it worthwhile. I also would like to recognize Ms. HEWSON for her outstanding job in orchestrating the efforts to that end. I strongly believe that this will further deepen our cooperation and collaboration efforts. Furthermore, it would be unfair if I do not express our gratitude to the program Executive Office for their invaluable efforts. Thank you very much for all of your hard work and strong cooperation. I hope our cooperation will improve during the life cycle period of

the F-35s and especially at the sustainment phase. Last but not least I should also thank Turkish Airforce personnel for their high dedication and hard work."

Vice President of the Presidency of Defence Industries, Serdar DEMİREL also delivered a speech and said: "Today, we are receiving our first F-35 jet and we are seeing with our indigenous weapons the SOM-J and the HGK. We are proud that we have reached this stage in the program, but our partnership with the US Defence Industry is not only limited to F-35, we've had a long history. I would like to name a few of them; we started with MLRS which is now a Lockheed Martin company, then armored combat vehicles, then United



Defence Company, Genesis system which Havelsan and Raytheon are comarketing together, Blackhawk helicopters co-produced by Sikorsky and Turkish Aerospace and being sold to other countries. Boeing – we have several programs together, the development of our TuRAF's Aircrafts and also Chinook helicopters. These are some examples that we are not just procuring or selling weapons to the United States but that we have been partners for long years. We are hoping that our partnership will continue from now on. Our biggest game changing cooperation event took place in the past, which was the co-production of F-16 program. With the F-16 program we have a very long history with Lockheed Martin Corporation. Finally, today, Turkey is taking the delivery of the first F-35 aircraft after joining the program 19 years ago. Turkey joined in 1999 in the concept demonstration phase, after doing our duties there, then in 2002 we became a member

of the system development and demonstration phase. Finally today, since 2007 we are still one of the 9 partner countries in the production, sustainment and follow-on development program.

F-35 is one of the largest acquisition programs around the world, and it is also a model for multi-national cooperation in the weapon development system. Today between the US and the Republic of Turkey there are 7 other nations cooperating with us to make this a reality; United Kingdom, Netherlands, Italy, Australia, Norway, Denmark and Canada. Today most of the representatives of these countries are with us and I would like to thank them for sharing our great day with us. With 9 partners we are both developing our common interests and ensuring that our national needs are met. We are ensuring that this aircraft will serve our special needs and it will be a great weapon system for protecting world peace. Industrial collaboration is one of the key

points. There are many industrial companies; Alp Aviation, Aselsan, AYESAŞ, Havelsan, Kale Group, Kale&Pratt, TA, Roketsan and TÜBİTAK. These are the biggest companies, we have many other Turkish companies participating in the program.

Starting from the AA1 – the first F-35 aircraft, there is a part that is produced by Turkish Industry that is used in every aircraft that is flying now. We are very proud that we a partner in this program and we own this weapon system. F-35 is changing the battlefields forever. Today we are the proud user of the F-16 which is one of the best aircrafts in the world, but the scene is changing. The F-35 will bring some new concepts to operation to our world. It is the weapon of the future. We will be very happy to have the delivery of the first 5th generation aircraft with this ceremony. We are hoping that this aircraft and our partner nation's aircraft will serve to strengthen the deterrence of NATO, will serve to

TechnoloSEA

Experts

www.navantia.es



© Lockheed Martin

Test Flight of TuRAF's First F-35

keep global peace and security and to serve everybody in the fight against terrorism. As I have mentioned, this aircraft is able to arm our indigenous weapons systems, SOM-J and HGK. When the F-35 has the full operational capability in Turkey we will be able to use our own weapons in the aircraft and they will be the standard weapons for that F-35 community.

I would like to thank everyone for making this dream a reality. I would like to start with Lockheed Martin as our prime contractor, thank all the engineers and employees, and also Pratt Whitney which is powering our aircraft. Also, our main subcontractors BAE systems and Northrop Grumman for working with us in the course of the program. Finally, I would like my staff in the Presidency of Defence Industries for spending all their and nights and their work on this program. Also thank you to the Turkish Airforce for working with us very closely to have very good program management. Finally I would like to thank the Joint Program Office for protecting the rights of the partners and making this program a very successful one. Thank you everyone for being with us on this important day."

The ceremony ended upon the completion of the speeches.

More than three thousand orders have been received so far and a total of three hundred aircrafts have been delivered to the related authorities in various configurations within the scope of the program developed by a total of nine countries including Turkey. Under the program where Turkey is a "Level 3" partner, thirty (2 + 4 + 8 + 8 + 8) aircraft in F-35A configuration have been ordered so far, while Turkey has committed a hundred F-35As within the scope of the whole program. Also, within the scope of the Turkish Naval Forces' requirements, 16 F-35B STVL aircraft are expected to be procured by Turkey in order to deploy them on the TCG Anatolia LHD ship, the construction activities of which are still ongoing. TCG Anadolu LHD ship for now to deploy is expected to supply STVL.

Following the delivery of the first aircraft with the tail number of 18-0001 on June 21, the second aircraft with flight number of 18-0002 was delivered to the related authorities on June 22. Following this delivery, both planes will fly to Luke Air Force Base in Arizona, United States, for the training of trainer pilots of Turkish Air Forces. The first two delivered aircraft are planned to remain here by 2020, and then to be deployed to the air training base of the 172nd Squadron in Malatya, which is currently under construction and will be fully operational in the last quarter of 2019 following accreditation

processes.

The third (AT-3) and fourth (AT-4) F-35A aircraft of the Turkish Air Forces, which are under production phase at Lockheed Martin facilities, are scheduled to be delivered to the Turkish authorities in March 2019. It is stated that the third and fourth planes will also remain at Luke Air base in Arizona by the year 2020. The fifth and sixth aircraft, which are planned to be delivered in November 2019, are expected to be deployed to the air training base of the 172th fleet in Malatya immediately after the delivery ceremony.

It is stated that the F-35 air training facility to be constructed in Malatya will be similar to Luke Air Base in Arizona, USA. The training of Turkish Air Forces pilots, as well as pilot training of F-35 user countries especially in Europe are planned to be conducted at this facility.

F-35 pilot training of the Turkish Air Forces will start at Luke Air Base in July 2018 and a total of 13 pilots will be trained as instructor pilots. Following the completion of their training, the instructor pilots are expected to stay here until the year 2020 in order to increase their flight experience. During the training, which is planned to eight weeks for each pilot, 50% will be simulation training and 50% physical flight training. It is also recorded that more than three hundred maintenance personnel will be trained in the US within the scope of the program ■



© Lockheed Martin

F-35 Lightning-II Cockpit Demonstrator

LAND DEFENCE SYSTEMS HOUSE OF TURKEY



KAYA



URAL



COBRA



ARMA 6x6



COBRA II



ARMA 8x8



TULPAR



Bright future for BAE Systems Partnerships in Turkey

In an interview with BAE Systems Turkey, Chief Executive Dr. Martin BENNETT discusses the company's plan to continue building on successful joint ventures. BAE prospects for partnerships in Turkey; Dr. BENNETT "I see a bright future for BAE Systems in Turkey."

Defence Turkey: Can you please start off by providing us an overview of BAE Systems from a corporate perspective? What are the recent achievements of the company? What is the main company strategy for the future in the international market?

Martin BENNETT: BAE Systems searches for new ways to provide our customers with a competitive edge across the air, maritime, land and cyber domains. We employ a skilled workforce of 83,200 people in over 40 countries and work closely with local partners to support economic development by transferring knowledge, skills and technology. This approach can be seen in Turkey where we are working in close partnership with Turkish industry to deliver defence solutions through the transfer and development of the latest technology.

Defence Turkey: How about the BAE Systems Turkey Branch? Can you please tell us about the presence of BAE Systems in Turkey?

Martin BENNETT: We have an increasing footprint in Turkey with BAE Systems employing over a thousand Turks through its joint venture holdings and local office. We are expanding our partnerships with the Turkish Defence Industry and providing increasingly sophisticated technology insertion into programs for SSM as well as for export. I would say that our footprint in Turkey has doubled in size over the past five years or so and continues to grow. We definitely see ourselves as Turkish BAE Systems, not simply an outpost of BAE Systems in Turkey.

Defence Turkey: BAE Systems has been an important supplier to the Turkish Military for a number of years. Products such as the AN/ALE-47 CMDs, Rapier short range air defence missile system, IFF systems, AN/ALQ-178(V3) and (V5) EW self-protection systems and Head Up Displays (HUDs) on the F-16C/D fleet are some of the systems currently in service of the Turkish Air Force (TurAF). How would you summarize BAE Systems' involvement in Turkey over the last decades? Could you give us commentary on past experience in Turkey over the last three decades?

Martin BENNETT: The last thirty years has seen significant change in the relationship between BAE Systems and Turkey. We have been fortunate

enough to have had the Turkish Armed Forces bring into service a number of our products including those you mention. In the air sector we have continued to build opportunities to partner locally on a number of product lines but importantly also to ensure that they can be suitably supported in Turkey. This, of course, not only provides Turkey with a sovereign based capability but also starts to open up international business prospects, using Turkey as a strategically placed hub.

Defence Turkey: What is the company approach to SSB priorities such as indigenization, local production and joint development? How does the company shape its Turkey strategy for current and future projects?

Martin BENNETT: Our strategy is reflected in the increasing number of partnership ventures performing at a technology rather than product level. The bringing together of technologies from BAE Systems and from Turkish industry to develop future solutions for the international market is at the heart of what we do. It is this "win/win" that drives value both for our partners and us commercially, and for our customers operationally.

Defence Turkey: BAE Systems has a growing presence in Turkey, most notably through the FNSS joint venture with Nurol in the land domain, and through the BNA (Nurol BAE Systems Air Systems Inc.) in the aerospace domain. Can you elaborate on the 2017 performance of FNSS and BNA from BAE Systems' point of view and elaborate on your targets for 2018?

Martin BENNETT: Together with our partners Nurol, we continue to be delighted with FNSS and BNA both in terms of sales and financial performance. They are at different stages of their corporate development, FNSS is now 30 years old while BNA has been operating for just two. The level of innovation and commitment shown by both organizations is testament to their management and workforce, and we are very proud of both companies which we see as important members of our broad corporate family.

BNA scored an early win in being awarded a contract from Germany to design and build a turbine engine digital electronic control unit. This competitive success was based on capability, quality and price. With

particular focus in high integrity aircraft systems, including flight controls, I am sure these key competitive discriminators will drive success in these technology areas also.

FNSS is experiencing sales success for both wheeled and tracked weapon platforms in Turkey and has recently experienced particular export sales success with wheeled vehicles both in the Middle East and Asia.

Overall the picture is rosy, and we look forward to continued growth led by excellent export performance, which is great for us and great for Turkey.

Defence Turkey: BAE Systems is working with Turkish Aerospace (TA) on the TF-X Program. Can you provide a top-level overview of the Contract and how this contract is affecting the future strategy in Turkey?

Martin BENNETT: Our role as partner to TA on TF-X has importance in terms of the program, where the development of a new aircraft is always an exciting prospect. Further, it has importance in terms of further strengthening our relationship with TA. Turkey is of great importance to BAE Systems' therefore, widening and deepening our future partnership with TA in the Air Sector is fundamental. We envisage this leading to further opportunities for both organizations, in Turkey yes, but as importantly in the international market.

Defence Turkey: Would you like to add anything as a final message for our readers?

Martin BENNETT: I have been fortunate enough to have been involved with our business in Turkey for a number of years now, and even better to have been living here in Ankara for close to two years. Building on the success of our joint ventures and the bright prospects for our partnerships, I see a bright future for BAE Systems in Turkey ■



BAE Systems Turkey, Chief Executive Dr. Martin BENNETT and Cem AKALIN, Managing Editor of Defence Turkey Magazine



T129 ATAK Helicopters and ADA Class Corvettes Sale to Pakistan

by İbrahim SÜNNETÇİ

According to an Election Manifesto of the ruling Justice and Development Party (AK Party), which was announced on May 24, 2018, Ankara and Islamabad have signed a deal for the sale of 30 T129 ATAK helicopters to Pakistan. The confirmation of the anticipated sale was revealed at the Defence, Aerospace and Space Section of the AK Party's election manifesto, which was released ahead of the June 24, Presidential and General Election. The election manifesto states that, "a very short while ago a contract for the sale of 30 T129 ATAK helicopters was signed with Pakistan".

After around two months on July 13, 2018 both the SSB (as of July 10th, 2018 the name of Undersecretariat for Defence Industries [SSM] was changed to the Presidency of Defence Industries [SSB]) and Turkish Aerospace (Turkish Aerospace Industries [TAI] was rebranded as Turkish Aerospace [TA] on July 11, 2018) have issued statements to confirm the T129 sale to Pakistan.

The SSB announced that Turkey and Pakistan have finalized a deal for Pakistan's purchase of 30 T129 Advanced Attack and Tactical Reconnaissance Helicopters (ATAK). "Contract negotiations on T129 ATAK helicopters between Turkish Aerospace (TA) and the Pakistani Ministry of Defence Production were

finalized," the Presidency said in a statement. "This is one of the biggest single defence export deals for Turkish Industry", the statement said without specifying the value of the contract. However, according to sources the value of the contract is around US\$1.5 Billion. The Turkish Government has been working to allocate US\$1.5 Billion in credit to Pakistan to finance this deal. According to TA's statement under the contract the Pakistan Army will receive 30 T129 ATAK Helicopters and a comprehensive package of support measures, to include logistics, munitions, spare parts, ground support equipment and training. Turkish Aerospace will start Pakistan Army's T129Bs deliveries in next three to four months and complete them by the end of 2022. Under the Pakistan Army T129 ATAK Helicopter Project, TA has also offered Pakistan Aeronautical Complex (PAC)

parts manufacturing work for the T129 helicopters.

Sources revealed to DEFENCE TURKEY that the Pakistan Army's T129 ATAK Helicopters will have similar configuration with Turkish Army's T129Bs and the first batch of 10 helicopters would be delivered in T129B Phase I configuration and the remaining 20 helicopters in T129B Phase II configuration. At the final phase of the program first batch 10 helicopters will be upgraded to Phase II configuration. The major differences between Phase I and Phase II are at the FLIR payload and at EW Self-Protection Suit. At Phase II T129Bs contrary to AselFLIR-300T EO/IR Targeting System new generation CATS (Common Aperture Targeting System) Reconnaissance, Surveillance and Targeting System will be deployed. Although it is lighter and smaller than the second generation



T129 P6 performed high altitude and high temperature flight/endurance tests in Pakistan during May 20-31, 2016

AselFLIR-300T used in T129A/B Helicopters and Heron and ANKA Unmanned Air Vehicles, it stands out with its superior features. The CATS, which weighs 60kgs is lighter than the AselFLIR-300T weighing 120kgs. While the T129As and T129B Phase I helicopters are equipped with only AN/ALQ-144 IRCM, Özlük CMDS and MWS-TU Missile Warning System (MWS) sensors the Phase II T129Bs will also feature Radar Warning Receiver (RWR), Radio Frequency Jammer (RFJ), Laser Warning Receiver (LWR) and 9681 V/ UHF Radio sets.

On July 5, Aselsan received a US\$254.725,195 Million contract from Turkish Aerospace (TA). Deliveries under the contract will take place during 2018-2022. This order probably has been given under the Pakistan Army T129 ATAK Helicopter Project.

Turkish Aerospace (TA) is the Prime Contractor of the T129 ATAK Program, covering the manufacture and delivery of 9 T129As, 50 T129Bs (29 in Phase I and 21 in Phase II configurations) to the Turkish Land

Forces and 27 T129Bs to the Turkish Ministry of Interior (18 T129Bs to the Turkish Gendarmerie General Command and 9 T129Bs to the Turkish Police) under license from the Italian-British AgustaWestland (rebranded as Leonardo Helicopters in 2016). TA manufactures and delivers two T129s per month. As of July 2018, TA has completed the delivery of 36 T129A/Bs (9A and 27Bs) to the Turkish Land Forces and 3 T129Bs to the Gendarmerie General Command.

The TA/Leonardo Helicopters T129 is a twin-engine, tandem seat, multi-role, all-weather attack helicopter based on the Agusta A129C Mangusta International platform. According to SSB figures each T129 ATAK Attack & Tactical Reconnaissance Helicopter costs around US\$40 Million.

The T129B ATAK Helicopters sale to Pakistan would mark a significant breakthrough for the Turkish Defence & Aerospace Industry and would be the largest ever defence system export in a single project achieved to date by a Turkish defence company. This record was held by Otokar with

a sale worth US\$661 Million for the RABDAN 8x8 Amphibious Armoured Combat Vehicle to the UAE.

As per the Pakistan Army Aviation Command's official request one of T129 prototypes [tail number P6] performed high altitude and high temperature flight/endurance tests during May 20-31, 2016 in Pakistan and confirmed that the helicopter fully meets Army requirements. As part of endurance tests the T129 P6 carried out three high temperature flight tests at Pano Aqil with an average temperature of 50C, and in Pano Agal climbed to 14,000ft altitude in Hindikush. T129 P6 also performed long-range flight during sand storm from Quetta to Multan, which is base to FOB 2 hours and 40 minutes without refuelling. According to Pakistani media no other current attack helicopter has managed these tests so the T129 is the best that the Pakistan Army has seen. On March 23, 2018 a formation of three T129 ATAK Helicopters from the Turkish Land Forces took part during a military parade held in Islamabad, Pakistan.

EUROSAM
YOUR PARTNER TO DELIVER
STATE OF THE ART EXTENDED
AIR DEFENSE SOLUTIONS

eurosam
Innovative air defense

www.eurosam.com

Pakistan Navy Will Receive 4 ADA Class Corvettes By 2024

On July 5, 2018 the then Turkish Minister of National Defence (MoND) Nurettin CANIKLİ (on July 10, 2018 Mr. CANIKLİ, Minister of National Defence, handed over the duty to General Hulusi AKAR who have appointed to this duty on July 9), disclosed that Turkey has won a tender to provide 4 ADA (MilGem) Class corvettes for the Pakistan Navy. "This will be largest single export [deal] in the history of the Turkish Defence Industry (due to the fact that until July 13th the sale of 30 T129Bs to the Pakistan Army has not been confirmed neither by the MoND or the SSB)," CANIKLİ said during an official visit to Montenegro without specifying the value of the contract. According to MoND CANIKLİ Ankara and Islamabad have agreed to build two of the warships at Turkey's Istanbul Naval Shipyard while the remaining two will be constructed in Pakistan's Karachi Shipyard & Engineering Works Limited (KSEW).

The Karachi-based newspaper the Express Tribune quoted the Pakistani Embassy in Ankara as saying in a statement that the contract includes a transfer of technology as well as a transfer of intellectual proprietary rights for the design of the Pakistani ships.

Shortly after MoND CANIKLİ's statement, Turkish and Pakistani authorities signed the deal on July 5, for the tender in a ceremony in Rawalpindi attended by the Deputy National Defence Minister and Military Factory and Shipyard Management Incorporated Company (ASFAT AŞ) Board Chairman Şuay ALPAY, Deputy Undersecretary of Ministry of National Defence and ASFAT Deputy Board Chairman Yunus Emre KARAOSMANOĞLU, Deputy Undersecretary of Ministry

of National Defence and ASFAT Board Member Ambassador Başat ÖZTÜRK, Istanbul Naval Shipyard Commander Rear Admiral Erdiç YETKİN and Islamabad Ambassador İhsan Mustafa YURDAKUL.

The deal, valued at around Euro1 Billion, was signed by KARAOSMANOĞLU on behalf of Turkey and Pakistani National Defense Ministry Ammunition Production General Manager Major Gen. Arshad MAHMOUD and Karachi Naval Shipyard Commander Rear Admiral Ather SELİM.

The Prime Contractor of the Pakistan Navy ADA Class Corvette Program is the ASFAT AŞ, which is tied to the Turkish MoND. It should be noted that as part of the restructure efforts that were launched following the bloody coup attempt, carried out on July 15, 2016, with an amendment made on the 1st Article of Law on Ministry of National Defence (MoND) military factories and shipyards have been removed from the structure of related Military Departments and General Staff organization and affiliated under the MoND with the State of Emergency Decree Law No. 669 issued on July 31, 2016. In this context Naval Shipyards of the Turkish Naval Forces Command such as Istanbul Naval Shipyard, Gölcük Naval Shipyard and İzmir Naval Shipyard, have been affiliated under the newly established MoND General Directorate of Shipyards (TGM) in 2017. Following the completion of organizational efforts in late 2017 the MoND General Directorate of Shipyards came into operation in January 2018 together with all of its sub-departments. In order to provide benefit from the capabilities of military factories and shipyards, with the State of Emergency Decree Law No. 696, issued on December 24, 2017,

the Military Factory and Shipyard Management Incorporated Company (ASFAT AŞ) was established to construct facilities provide development and modernization of military factories and shipyards as well as manufacture, design, research & development and product development activities regarding the requirements of real and legal persons.

Speaking about the Pakistan Navy's ADA Class Corvettes Project tender process, the then MoND CANIKLİ said:

"This tender will be realized, conducted and finalized by ASFAT company of which its fund is directly under the control of the state and also ASFAT is the head company of military factories and military shipyards established under the Ministry of National Defence. Turkey; the MilGem Class corvette project has taken a quickstep in the international market. Turkey is at the stage of making such great progress due to this shining project right now. We consider this as a Project to provide further contributions to the development and enhancement of subsequent projects."

According to presentation that was made before the signing ceremony on the Pakistan Navy's ADA Class corvettes and the tender process, negotiations had started in 2015 and the first purchase demand was made in 2017, whereas the final sale/contractual negotiations had lasted just 12 days. According to presentation the first corvette will be constructed in Turkey, the second one in Pakistan, the third one in Turkey and the fourth one in Pakistan. The first pair (one to be constructed in Turkey and one to be constructed in Pakistan) will join the inventory of the Pakistan Naval Forces in 2023 and the remaining two corvettes in 2024.



The first vessel will be constructed in 54 months and the remaining vessels will be constructed in 60, 66 and 72 months, respectively.

According to SSB figures each ADA Class Corvette costs around Euro250 Million to Turkey. However, the Pakistan Navy's ADA Class corvettes (to be customized to meet Pakistan Navy requirements) will have some differences in terms of propulsion system and weaponry and the Pakistan Navy will procure some systems and subsystems under the Government Furnished Equipment (GFE) approach. This has considerable impact in the decrease of unit price of the Pakistan Navy's ADA Class corvettes compared to the Turkish Navy's ADA Class configuration unit price. For example, while the Turkish Navy's ADA Class corvettes can reach up to 31 knots with their 32MW propulsion power, generated by one gas turbine (LM2500) and two diesel engines (CODAG system configuration), the ADA Class corvette can achieve a cruising speed of 15 knots with a single diesel (MTU 16V595TE90, driving two shafts), 27 knots with LM2500 gas turbine and 31 knots fully laden with two diesel engines and a gas turbine. The ADA Class corvette is able to execute operations in Sea State 5 (without limit) and in Sea State 6 (with some limits). The vessel is equipped with a GENESIS based indigenous Combat Management System, Thales Nederland's SMART-S Mk2 E/F-band 3D air and surface surveillance radar, STING EO Mk2 multi-sensor weapon director, Yakamos hull-mounted active/passive sonar system, Aselsan's AselFLIR-300D electro-optical director and Alper LPI radar, and is armed with an Oto Melara 76/62 Compact gun (with a locally produced stealth shield), a RAM System GmbH (RAMSYS) Mk49 Mod 3 Guided Missile Launching System for the RIM-116 Block 1A/HAS

missiles, Aselsan 12.7mm STAMP (2x) turrets, eight RGM-84L Harpoon Block II SSMs, four x 324mm (2-twin) torpedo tubes (for Mk46 Mod 5 and Mk54 LW torpedoes) and an Ultra Electronics Sea Sentor Surface Ship Torpedo Defence (SSTD) System, which is replaced with Aselsan's HIZIR Torpedo Defence System in 3rd and 4th vessels. The Turkish Navy currently operates two ADA Class corvettes, TCG Heybeliada (F-511) and TCG Buyukada (F-512). Construction of the third and fourth vessels TCG Burgazada (F-513) and TCG Kinaliada (F-514) are continuing at Istanbul Naval Shipyard. Provisional acceptances of TCG Burgazada and TCG Kinaliada Corvettes are scheduled to take place in 2018 (September 27, 2018) and in October 2019 respectively.

Saudi Arabia has also declared formal interest to purchase four ADA Class Corvettes (to be customized to meet Royal Saudi Arabian Navy requirements). STM has been carrying out negotiations with Saudi Arabian authorities for the sale of 4 ADA Class Corvettes since 2016 and preliminary contract for the sale was expected to be inked during IDEF '17 Fair but it did not take place. In April 2018 Saudi Arabia signed a Euro1.8 Billion (US\$2.2 Billion) framework agreement with Spain to purchase 5 Avante 2200 Corvettes from the Spanish state-owned shipbuilder Navantia, the contract also includes the construction of a naval base facilities. The construction of the vessels will be managed by Cadiz and Ferrol shipyards. Avante 2200 and ADA Class Corvettes are believed to be deployed at different fleets, one in the Eastern Fleet and the other in the Western Fleet ■



32MW propulsion power, generated by one gas turbine (LM2500) and two diesel engines (CODAG system configuration), the ADA Class corvette can achieve a cruising speed of 15 knots with a single diesel (MTU 16V595TE90, driving two shafts), 27 knots with LM2500 gas turbine and 31 knots fully laden with two diesel engines and a gas turbine. The ADA Class corvette is able to execute operations in Sea State 5 (without limit) and in Sea State 6 (with some limits). The vessel is equipped with a GENESIS based indigenous Combat Management System, Thales Nederland's SMART-S Mk2 E/F-band 3D air and surface surveillance radar, STING EO Mk2 multi-sensor weapon director, Yakamos hull-mounted active/passive sonar system, Aselsan's AselFLIR-300D electro-optical director and Alper LPI radar, and is armed with an Oto Melara 76/62 Compact gun (with a locally produced stealth shield), a RAM System GmbH (RAMSYS) Mk49 Mod 3 Guided Missile Launching System for the RIM-116 Block 1A/HAS



A Closer Look at the Turkish Defence Industry's Fixed Wing Air Platforms Sector

by İbrahim SÜNNETÇİ

Contrary to general opinion Turkey began quite early to be active in manned aircraft production. The history of Turkish Aviation can be traced back to the 1920's. Turkey's first ever aircraft manufacturing facilities Tayyare Otomobil ve Motor Türk Anonim Şirketi (Turkish Aircraft, Automobile and Engine Company/TOMTAŞ) was established in 1925, only two years after the proclamation of the Turkish Republic, in Kayseri and production started in 1928. However, Turkey missed the manned aircraft train due to internal political disputes and the foreign military aid that began upon Turkey's membership accession to NATO. Turkey could have probably have been placed in the top10 manned aircraft manufacturers in the world in the 1970s. Both stalled the development of local aviation industry, which was at its preliminary stage of formation at that time.

With the 'Build Your Own Aircraft' campaign, manned aircraft production in Turkey came to life again at the beginning of 1970s. For this purpose, on June 28, 1973 TUSAŞ (Turkish Aircraft Industries Incorporated Company) was established. However, after the Cyprus Peace Operation in 1974, the political and social problems prevented Turkey from building its own aircraft. In the early 1980s the Turkish Air Force (TurAF) started research to select its new combat aircraft and for this purpose a committee was founded in 1982. As a result of a comprehensive test and evaluation process the F-16 was chosen as the TurAF's new combat fighter. For this purpose, Turkish Aerospace Industries (TAI) Company, which is at that time was mainly responsible for the F-16 production/final assembly in Turkey, was founded on May 15, 1984 as a Joint Venture (JV). On June 25, 1985 TUSAŞ Engine Industries

(TEI), a Turkish-American joint stock company, was also established to manufacture engine components and assemble F110-GE-100 engines for the TurAF F-16C/Ds. TEI's factory was officially opened on June 10, 1987.

The contract for the purchase of 160 F-16C/D Block-30 (34 C's, 9 D's) and Block 40 (102 C's and 15 D's) aircraft under the Peace Onyx-I (PO-I) Project for the TurAF was signed on December 9, 1983. The first eight aircraft were manufactured in the U.S. and the remaining 152 were manufactured/assembled at TAI facilities in Ankara, Turkey. Under the PO-I Program aircraft deliveries performed between the years 1987-1995 and TAI manufactured 70% of the airframe of the F-16 aircraft including aft, center fuselages and wings. TEI, on the other hand, performed the final assembly and testing of 176 F110-GE-100 engines under General Electric (GE) license and completed engine deliveries under PO-I in 1994. In March of 1992, a follow-on order for two batches of 40 F-16C/D Block 50s (68 C's and 12 D's) was placed under the Peace Onyx-II FMS Program. With the PO-II Program, the manufacturing percentage of TAI, as far as airframe is concerned, reached 80% with the addition of

flaperons and the stuffing tasks for the forward fuselage to the airframe components were manufactured in the first Program. Meanwhile TEI completed PO-II engine deliveries in compliance with the program upon the delivery of the 95th F110-GE-129 engine in April 1998. Thus, the number of engines (F110-GE-100 and F110-GE-129 IPE) assembled and tested by TEI under PO-I and PO-II Programs reached 271 in total. TAI also awarded a contract to build 46 F-16C/D Block 40s (34 C's and 12 D's) for the Egyptian Air Force under the Peace Vector-IV Program and completed deliveries during 1993-1995. Among the 278 F-16 aircraft produced at TAI's facilities for the TurAF and Egyptian Air Force, three were "Perfect" and 29 were with "Zero Defect." On December 12, 2006, the Defence Industry Executive Committee (DIEC) decided on the procurement of 30 F-16 Advanced Block 50 (Block 50+) aircraft from the U.S. Government through Foreign Military Sales (FMS) under the Peace Onyx-IV (PO-IV) Program. In 2009 the United States and Turkey signed an FMS contract for 30 F-16 Block 50+ aircraft to be co-produced by TAI. According to the contract, the final assembly and delivery of the 30 F-16C/D Block 50+ (16 D's and



F110-GE-129 engine is seen here while being installed on a TurAF's F-16C Block 40 aircraft

14 C's) aircraft were realized at TAI facilities in Ankara with 7 "Perfect" and 19 "Zero Defect" quality, while the engines were manufactured by TEI in Eskisehir. Under PO-IV, TEI carried out assembly and testing of 42 F110-GE-129B engines and completed deliveries in December 2010. Under PO-IV the first aircraft was accepted in May 2011 and the deliveries were completed in December 2012. So, during 1987 – 2012 TAI manufactured a total of 308 F-16C/Ds, while TEI assembled and tested a total of 313 F110-GE-100, F110-GE-129 IPE and F110-GE-129B turbofan engines during 1987 – 2010.

In addition to manufacturing F-16C/Ds under license, during 1990-2018 TAI has also carried out a number of F-16 modernization programs including F-16C/Ds EW Upgrade performed during 1993-1999 on 148 aircraft, Falcon-UP Upgrade performed on 134 F-16s during the same period, Peace Onyx-III (covers 10 prototype aircraft) and F-16 Modernization Serial Assembly (MSM, covers 165 aircraft and performed during 2009-2015) of the TurAF F-16C/Ds. The company also carried out MLU Upgrade of Royal Jordanian Air Force (RJAF)'s 17 F-16A/Bs during 2006-2009 and MLU upgrade of the Pakistan Air Force (PAF)'s 41 F-16A/Bs during 2009-2014. In addition to F-16s TAI also manufactured/assembled 50 CN235-100M light transport aircraft for the TurAF (February 1991 – August 1998), 34 SF-260Ds primary trainers (contract awarded in March 1990) for the TurAF, 28 AS532 Cougar helicopters (during 1998-2003) helicopter, and nine CN235-100M aircraft during July 1999 and January 2003 for the Turkish Navy (six) and the Turkish Coast Guard (three) under the MELTEM-I Project. Company also performed and launched a number of co-development/production (such as T129 ATAK and T70 Turkish Utility Helicopter Programs) and indigenous development (HürKuş, HürJet, TF-X and T625) Programs in the field of fixed and rotary wing aircraft. Today, known as Turkish Aerospace (Turkish Aerospace Industries [TAI] have been rebranded as Turkish Aerospace on July 11, 2018) the company has become Turkey's center of



technology in design, development, modernization, manufacturing, integration and life cycle support of integrated aerospace systems, from fixed and rotary wing air platforms to UAVs and satellites.

Many authorities accept that the foundation of Turkish Aerospace (TA) in May 1984 was an important milestone in the development of Turkey's indigenous capability to design, build and integrate military aircraft and engines; with the early days of manufacturing and assembling the F-16C/D aircraft in Turkey and TEI in January 1985, to the manufacture and assembly of General Electric F110-GE-100/129 jet engines, TAI and TEI have developed their capabilities over the years and have now begun participating in international military and civilian/commercial aerospace projects as well as their respective engine programs (TEI manufactures over 800 different parts/modules under 40 different engine programs), including F-35 JSF, A400M, TP400, Boeing 747-8, Boeing 787 Dreamliner, GE9X, LEAP and Airbus A350 XWB. TEI now carries out parts production and the assembly of turbofan, turbo-shaft and turboprop engines for military aircraft operated by TAF and NATO, working in collaboration with the Air Maintenance Factory Directorates.

As one of the largest air forces in the world, the Turkish Air Force (TurAF) currently has around 270 combat aircraft (including 238 F-16C/D [138 Block 30M and Block 40M, 71 Block 50M and 29 Blok 50+] and 31 to 32 F-4E 2020), 180 trainers (including 68

T-38M jet trainers and 16 NF-5A/B 2000 [10 NF-5A 2000 and 6 NF-5B 2000 in the Turkish Stars Acroteam inventory], 40 KT-1T, around 30 SF-260D and around 25 T-41D), and around 100 Transport/Support aircraft (including 6 A400M [+4 to be delivered], 4E-7T AEW&C aircraft, 19 C-130B/E Hercules [6 B and 13 E, undergoing avionics upgrade under ERCİYES Project], 10 C-160D [5 in transport, 3 in GÖREN ISR configuration and 2 in MilKar-2U Electronic Warfare configuration], 49 CN235-100M [45 in Transport/Air Ambulance/Training role, 3 in SIGINT/ELINT configuration and 1 in Open Skies Agreement (ASA) configuration], 7 KC-135R Stratotanker) in its inventory. The TurAF currently operates 238 F-16C/D fighters (operating in 12 different Squadrons deployed at 7 different bases around Turkey), which form the TurAF's leading edge, most of which have been modernized to the latest Block 50+ standards under the PO-III and F-16 MSM Programs. There are also some 32 upgraded F-4E 2020 Phantom II all-weather fighter-bombers (in 111th Squadron service located in 1st MJB and to be replaced by F-35As). Turkey, as a Level-III Partner in the JSF Program, will procure as many as 116 F-35A aircraft, which will provide a 5th generation stealth and long-range strike capability to the TurAF. As a modern, cutting edge air force, configured and trained to the highest Western/NATO standards, the TurAF is able to execute the full spectrum of air missions.

Aerospace Sector

Realizing 26.77% of the revenue and 51.2% of the total Defence exports in 2017, the aerospace (military and civil aviation) sector is the largest contributor in the Turkish Defence sector, having realized a total value of US\$935 Million in military (US\$393 Million) and civil (US\$542 Million) aviation exports in 2017. This is a reflection of the expansion of overall trade with the European Union and NAFTA (Turkey mainly exports civil/commercial and military aircraft such as A400M and F-35 Lightning II JSF aircraft components and parts to EU countries and the U.S. under IP/O commitments). According to the Turkish Defence and Aerospace Industry 2017 Performance Report, prepared by the Defence Industrial Manufacturers Association (SaSaD) through the evaluation of figures obtained from 86-member companies and issued in May 2018, Turkey has realized exports valued at US\$313 Million in civil aviation exports to the U.S., US\$225 Million to Europe and US\$4 Million in exports to other countries. In the field of military aviation Turkey has realized US\$262 Million in exports to the U.S., US\$105 to Europe and US\$26 Million to other countries.

According to Turkish Defence and Aerospace Industry 2017 Performance Report, Turkish Aerospace Sector (military and civil aviation) has realized US\$1.792 Billion (military aviation US\$1.132 Billion and civil aviation US\$660 Million) of the turnover (represents 26.77% of the total turnover, US\$6.693 Billion), around US\$935 Million of the exports (represents 51.2% of the total exports, US\$1.824 Billion), and around 46.3% (military aviation US\$1.336 Billion and civil aviation US\$2.392 Billion) of the order total (US\$8.055 Billion) in 2017. With these figures the Turkish Aerospace Sector is likely the strongest sector of the Turkish Defence & Aerospace Industry. If we count only military aviation figures Turkish Land Platforms/Systems sector is likely the strongest sector of the Turkish Defence & Aerospace Industry. All estimates show that the Turkish Aerospace Sector will grow further in 2018.



Under ERCİYES Project first prototype (C-130EM with tail number 63-13188) performed its maiden flight on March 2, 2011

The backbone of the Turkish Aerospace Sector is formed by state-owned Turkish Armed Forces Foundation (TAFF) companies; Turkish Aerospace (TA) and TEI, which also contribute the lion's share in turnover and export figures. With a Decree published on December 24, 2017 the TAFF companies, Turkey's major Defence industry institutions, have been officially attached to the Turkish Presidency. According to figures disclosed by the companies, in 2017 TAI realized US\$1.430 Billion in revenues (which represents 13.5% increase compared to 2016) and US\$829 Million in export sales (represents 58% of the turnover), whereas TEI realized US\$320 Million in revenues (80% from the sales of civil/commercial aircraft engine parts and 20% from the sales of military aircraft engine parts) of which US\$268 Million was gained from exports and as of the end of 2017 its order total reached US\$4.6 Billion. However, opportunities are also emerging for private companies such as Alp Aviation (a joint venture between the Sikorsky Aircraft Corporation and the Alpata Group of Turkey), BNA (BAE Systems-Nurol Hava Sistemleri A.Ş./BAE Systems-Nurol Air Systems Inc.), Fokker Elmo, KaleKalıp/Kale Aero, Kale Pratt & Whitney Engine Industries, Baykar Makina and Vestel Defence Industry.

Military factories of the Turkish Air Force (TuAF), such as 1st Air Supply and Maintenance Center Command in Eskişehir, and 2nd Air Supply and Maintenance Center Command in Kayseri have mainly taken roles in modernization projects such as the F-16C/D PO-III, F-16C/D Block 30 DB-100 Recce Pod Integration, F-16C/D Block 30 Structural Improvement, F-4E 2020,

F-5 2000, F-4E/TM (ŞİMŞEK), RF-4E/TM (IŞIK), T-38M (ARI) and C-130B/E (ERCİYES) Programs, and are providing maintenance/overhaul services to the fighter/bomber and transport aircraft in the TuAF inventory. On the other hand, the 3rd Air Supply and Maintenance Command, located in Ankara, provides maintenance, repair and overhaul services for avionics and the land-based radar and missile systems which are in the service of the TuAF. It should be noted that as part of the restructure efforts that were launched following the bloody coup attempt, carried out by FETO on July 15, 2016, with an amendment made on the 1st Article of Law on Ministry of National Defence (MoND) military factories and shipyards have been removed from the structure of related Military Departments and General Staff organization and affiliated under the MoND. In this context Military Factories of the TuAF Command such as the 1st Air Supply Maintenance Center (ASMC) in Eskişehir, the 2nd ASMC in Kayseri and the 3rd ASMC in Ankara have been affiliated under the MoND General Directorate of Military Factories (AFGM) as of February 2017. In March 2017 the names of the ASMCs have been changed to the 1st Air Maintenance Factory Directorate (AMFD), the 2nd AMFD and the 3rd AMFD. With the State of Emergency Decree Law No. 696 issued on December 24, 2017 the Military Factory and Shipyard Management Incorporated Company (ASFAT AŞ) was established. In the Turkish Defence and Aerospace Industry 2017 Performance Report, the revenue of military factories and shipyards was estimated to be around US\$650 Million.



SIMUNITION

GENERAL DYNAMICS
Ordnance and Tactical Systems

WORLD LEADER IN SAFE & REALISTIC TRAINING

www.simunition.com

PATENTED REDUCED ENERGY TECHNOLOGY

Cleaner than Conventional Blanks
Non-Lethal Marking Cartridges
Safe and Tactically Accurate

Sole Agent for Turkey Ala International Ltd.

info@alainter.com +90 312 446 8895

CLEANER THAN CONVENTIONAL BLANKS
PATENTED REDUCED-ENERGY TECHNOLOGY

**Securi
Blank**

FX



NON-LETHAL MARKING CARTRIDGES
SAFE AND TACTICALLY ACCURATE
WORLD LEADER IN SAFE & REALISTIC TRAINING

Remarkable Programs and Products of the Turkish Aerospace Sector

A. F-35A Lightning II JSF Program

The Turkish Ministry of Defence (MoND) was an early advocate of the F-35 Joint Strike Fighter (JSF) Program, so Turkey has participated in the F-35 Joint Strike Fighter (JSF) Program starting from Concept Demonstration Phase (CDP). In 1999 Turkey invested US\$6.2 Million in the CDP of the JSF Program as a Level-IV Partner through Foreign Military Sales (FMS). The CDP was an intense four-year process during which both companies (Boeing and Lockheed Martin) built and flew several prototypes and competed in a final fly-off competition. As a CDP partner Turkey gained significant insight into the program concepts and requirements definition and participated in various capabilities modeling and simulation events. Included in these efforts was a life cycle cost control study, an important area of consideration for the TurAF that examined the changes to Air Force logistics that should be accomplished to support their JSF aircraft. The CDP was then followed by the System Development and Demonstration (SDD) Phase, which involves the development of the X-35 into the F-35 production aircraft.

As a Level-III Partner of the Program Turkey has committed US\$175 Million to the F-35 JSF System Development and Demonstration (SDD) Phase, spread over 11 fiscal years from 2002 to 2012 under the agreement awarded on July 11, 2002. Thanks to its US\$175 Million investment Turkey was able to share in the technological leaps that are a significant part of this phase. Meanwhile, Presidency of Defence Industries (as of July 10th, 2018 the name of Undersecretariat for Defence Industries [SSM] was changed into Presidency of Defence Industries [SSB]) has provided a total of US\$75 Million in credit to local companies



A view from LM's F-35 Final Assembly Line at Dallas, Fortworth

taking part in the F-35 SDD Phase to renew their production infrastructure for the JFS Program.

Turkey confirmed its commitment to the F-35 JSF Program on January 25, 2007, with a MoU that will bring Turkey into the Production, Sustainment and Follow-on Development Phase (PSFD) of the Program, and pledging around US\$700 Million to aircraft production, and a further US\$250 Million to support local industry taking part in the PSFD Phase. The Production, Sustainment and Follow-on Development Phase Memorandum of Understanding (PSFD MoU) was signed at the Pentagon, in Washington DC by the then MoND Vecdi GÖNÜL. According to agreement as a Level-III Partner Turkey's maximum financial contribution to the total shared costs of the PSFD Phase shall not exceed US\$690 Million. As the third phase of the JSF, the PSFD Phase covers the entire service life of the F-35 aircraft beginning from the very first production. The overall objective of the PSFD MOU is to establish a framework to allow the partner countries to cooperatively produce, sustain and do follow-on development (e.g. future technology improvements) of the F-35 JSF. The PSFD MoU details the partners' responsibilities and benefits in these areas. The PSFD MoU does not commit Turkey to buy the F-35, but it does establish the conditions for its on-going participation in the F-35 JSF Program.

The F-35A was selected as the New Generation Fighter Jet of the Turkish Air Forces Command upon

the Decree of the Defence Industry Executive Committee (DIEC) dated December 12, 2006 and the Letter of Intent (LoI) and the Industry Participation Plan was signed between the SSB and the Prime Contractor Lockheed Martin (LM) on February 6, 2007 in Ankara. The number of F-35As to be procured by Turkey was identified as 100 (+16 optional) in order to replace the aging F-4Es and F-4Es by the 2020s in the inventory of the TurAF that are reaching the end of their economic life and the F-16C/D in the following period within a ten-year program as part of the Project.

So, since 1999, Turkey has committed around US\$1.2 Billion (US\$6.2 Million + US\$175 Million + US\$75 Million + US\$690 Million + 250 Million) to developing what became known as the F-35 Lightning II. According to the SSB 2008 Activity Report the value of the F-35A contract, for initially planned 100 F-35A CTOL aircraft, is US\$10.7 Billion. At a televised interview with Anatolian Agency that was held on June 14, 2018, the then MoND Nurettin CANIKLI (on July 10, 2018 Mr. CANIKLI, Minister of National Defence, handed over the duty to General Hulusi AKAR who have appointed to this duty on July 9), disclosed that Turkey will pay around US\$11 Billion for 100 F-35As and so far, has paid more than US\$800 Million under the JSF Program. Meanwhile, in his letter to the U.S. Congress, which was sent on July 7, 2018, Defence Secretary Jim MATTIS underlined that Turkey has invested US\$1.25 Billion in the F-35 development phase. It is not

“An innovational move for a safer world”

Telescopic Lifting Systems

 **ARMY** 2018

21 to 26 August in 2018
Hall C, Stand 4C5 162



Radar Systems



Optical Systems



Communication



Marine Vehicles



Land Vehicles



Quiet
Operation



Private
Solutions



Global Technical
Support

MILMAST

Malköy Mahallesi, Başkent OSB Başkent Bulvarı
No: 80 06909 Sincan / Ankara / TURKEY

+90 (312) 504 54 00
+90 (312) 504 53 40

www.milmast.com.tr
info@milmast.com.tr

clear yet whether or not the figure announced by the U.S. Defence Secretary MATTIS includes the cost of the National Integrated Training Center (ITC) and European Regional F135 Engine Maintenance Repair Overhaul & Upgrade (MRO&U) facility.

In May 2013, while Turkey did not place any order for the F-35A Lightning II aircraft LM officials disclosed that the total value of the contracts awarded to Turkish companies under the Program has reached US\$300 Million. As of April 2016, the estimated value of revenue to be acquired through the work packages assumed by the Turkish Defence Industry throughout the F-35 JSF Program's total duration was calculated as US\$7.5 Billion by the SSB. The Prime Contractor of the JSF Program LM declared that F-35 Production Industrial Participation opportunities for Turkish companies (in total for LM and P&W) are expected to reach more than US\$12 Billion by the end of the Program, that is expected to run until 2051. Speaking at a televised interview held on June 13th, 2018 President of Defence Industries (SSB) İsmail DEMİR Ph.D. underlined that so far Turkish Defence and aerospace companies have realized US\$700 Million in exports under the F-35 JSF Program.

10 Turkish Defence and aerospace companies (Alp Aviation, Aselsan/MİKES, AYESAŞ, Fokker Elmo, Havelsan, Kale Aero, Kale Pratt & Whitney Engine Industries, Roketsan, TÜBİTAK-SAGE and Turkish Aerospace) have been supporting the development and production phases of the F-35 fighter jets as part of Turkey's partner role in the JSF Program. Turkish Industry has a significant Industrial Participation role supporting Lockheed Martin and Pratt & Whitney for F-35 aircraft sustainment and F135 turbofan engine production and sustainment. The issue of Turkey's self-sufficiency in sustaining its planned F-35A Lightning II fleet has been a matter of discussion at the government-to-government level and with the F-35 Joint Program Office (JPO) and Lockheed Martin for several years. As a result of intensive discussions between the Turkish and US Governments Turkey has been given the approval to build/assemble its own F135 engines and was also



TurAF's F-35As will be integrated with indigenous weapon systems including HGK-2 and SOM-J

selected to have the first European Regional F135 Engine depot overhaul capability. Both the engine production and overhaul will take place at the 1st Air Maintenance Factory Directorate (1st AMFD, former 1st ASMC) in Eskisehir. Additionally, Turkish Aerospace (TA) has also been assigned to represent the organic depots of the Turkish Armed Forces (TAF) within the Autonomic Logistic Global Sustainment (ALGS) system and Havelsan has been assigned as the Turkish Integrator for the National Integrated Training Center (ITC). Meanwhile, In January 2018, the SSB launched a project to enable the TurAF F-35A Lightning II fleet to connect with the Turkish Air Force Information System (HvBS). The HvBS-JSF Integration Project aims to ensure that HvBS and F-35 securely exchange information. The SSB received four proposals from Altay Yazılım, Aydın Yazılım, Havelsan and MilSoft Yazılım.

The TurAF F-35As will be integrated with indigenous weapon systems such as Precision Guidance Kit (HGK), SOM Air Launched Cruise Missile and SOM-J air launched anti-ship missile. HGK series smart ammunition and SOM-J missile integration efforts on F-35A will be launched in 2021 with Block 4.2 software. SOM-J flight tests onboard a TurAF F-16 will be performed in 2019. In fact, even if it can be useful to carry up to six SOM-J missiles (2 in the internal bays and 4 on the external pylons) an F-35A carrying the SOM-J on the underwing pylons would lose much of its stealthiness. Having a range of 150+nm and carrying a single 350lb blast-fragmentation/semi-armor-piercing warhead the

1,000lb class SOM-J is an air-to-surface missile designed for use against heavily defended, high value maritime targets and land targets. Roketsan has been cooperating with TÜBİTAK-SAGE and Lockheed Martin Aeronautics, the Prime Contractor of the JSF Program since 2014 for the integration of SOM-J on F-35. A business partnership agreement was signed with Lockheed Martin Missiles and Fire Control (LMMFC) for the design, development, production and marketing of the SOM-J Weapon System in 2014 and the contract was signed in 2016. The integration activities of the F-35 are being carried out by LMMFC with the assistance of Roketsan and TÜBİTAK-SAGE, and these activities are scheduled to be completed in 2023.

The F-35A remains crucial to the continued modernization of TAF and Turkey's ability to preserve Turkish and allied security and interests. Combining new developments such as composite materials, stealth technology, advanced radar, fully integrated avionics and sensors, low observability (including the use of internal weapons bays), vastly improved situational awareness through a network-centric combat environment and the design ability to act as an integrated data node, the 5th Generation F-35A Lightning II combat aircraft will be a key factor in deterring any attack on Turkey. The F-35A is a lot more than simply an F-4E 2020 and F-16C/D replacement. It will add a wide range of capabilities to the Turkish Armed Forces that Turkey has never had before. The F-35A Lightning II is not just a new generation fighter. It is a completely new weapons system of the TurAF!

MERSEN WORLDWIDE SPECIALIST IN MATERIALS SOLUTIONS

Expertise, Performance and Innovation



Iso and Extruded Graphite



C/C Composite



Insulation Board



Flexible Graphite



Sintered SiC

Material Enhancement

- Densification
- Impregnation
- Purification
- Coating

Solutions
for your needs

Engineering
and precise
machining



Rocket Nozzle



Ceramic Armour



Semiconductor



C/C Carrier



Hot Press Mold



SiC Mirror

GOSB İhsan Dede Caddesi 900 Sokak
41480 Gebze-Kocaeli/TURKEY

T+90 262 7510262 F+90 262 7510268

www.mersen.com

sales.istanbul@mersen.com

merseN
Expertise, our source of energy

TurAF's 5th Generation Combat Aircraft: F-35A Lightning II

Turkey has a plan to procure as many as 116 F-35As, conventional takeoff and landing (CTOL) variant, until 2031 for the TurAF to replace the ageing F-4Es (already phased out of service but when the project was launched they were in service), F-4E 2020s (according to open sources around 31 to 32 aircraft are in service), and F-16C/D Block 30 and Block 40s (according to open sources as of July 2018 there are 138 B30 and B40 aircraft in the TurAF's inventory).

Although Turkey's F-35A order was planned as 6 aircraft in training configuration in the beginning, this figure was later reduced to 2 jets and at the DIEC meeting on 5 January 2012, the SSB was authorized to put the firm order for the first two F-35A Lightning II aircraft to be used at the Instructor Pilot training. At that time, in accordance with the Low Rate Initial Production-6 (LRIP-6) agreement, the deliveries were projected to be initiated in 2014. But as a result of Turkey's request, the delivery date was revised to 2015. In this context, the order regarding the first two aircraft was placed under the LRIP- 7 package and with per-aircraft price of US\$120 Million. In respect to the first two aircraft, a payment of around US\$380 Million, including the costs of Turkey's initial logistics and all other items, was projected in the SSDF sources. The two aircraft that were supposed to be delivered in 2015 and to stay at the U.S. for the Instructor Pilot Training for a year were actually planned to be delivered to Turkey by the end of 2016 or in the beginning of 2017.

However, as the costs in the project exceeded the planned amounts and since no consensus was reached by the governments of the U.S. and Turkey (SSB and TurAF) on increasing the industrial participation (establishment of the Final Assembly and Test capabilities for the F135 engine and establishment of the National F-35 Integrated Training Center [ITC]), sharing of the source codes and integration of the indigenous



A view from Turkish Aerospace's F-35 Center Fuselage production line

weapon systems on F-35As, it was decided to postpone the delivery of the first two F-35A JSF aircraft for a period of one year, with the DIEC Decree dated January 3, 2014. In line with the DIEC decision made on May 6, 2014, Turkey placed an order for the first two F-35As to be delivered in LRIP-10 with Block-3F software in 2014. Then the DIEC, the highest decision-making body on Defence procurement in Turkey, approved the procurement of a further four F-35As under LRIP-11 during the January 7, 2015 meeting and an additional eight F-35As (at the end of meeting the value of the purchase was announced as US\$1.4 Billion by President of Defence Industries Mr. DEMİR) under LRIP-12 at the March 9, 2016 meeting.

Since LRIP-12 was made under Series Production Phase by F-35 Joint Program Office (JPO) and partner countries were asked to deliver their orders under Block Buy approach, Turkey decided to add the previously decided upon eight F-35As into the Block Buy package to gain a price advantage. So, during the October 28, 2016 meeting the DIEC approved the Block Buy of 24 F-35As (8+ 16, eight of them were previously planned to be procured under LRIP-12) over three contract years (8 each under LRIP-12, LRIP-13 and LRIP-14). According to the SSB as of June 22, 2018, Turkey has placed an order for a total of 30 F-35As. By the end of 2023 TurAF

is expected to receive a total of 30 F-35As, which have been ordered in two batches, and all will be deployed at the 7th Main Jet Base (MJB) located in Akçadağ, Malatya. The schedule of the TurAF's 30 F-35A Lightning II aircraft per LRIP contract is: LRIP-10 2 aircraft (2018), LRIP-11 4 aircraft (2019), LRIP-12 8 aircraft (2020-21), LRIP-13 8 aircraft (2022) and LRIP-14 8 aircraft (2023).

The 172nd and the 171st Squadrons of the 7th MJB Command will be the TurAF's first F-35A squadrons. The first batch includes 14 (2+4+8) F-35As and the second batch includes 16 (LRIP-13 and LRIP-14) F-35As. The F-35A AT-01 and F-35A AT-02 are the first two aircraft of the first batch of the F-35A order. These 14 F-35As will be deployed at the F-35A Operational Conversion Unit (OCU) Squadron (172nd Squadron), where the TurAF F-35A pilots receive training from Turkish Instructor Pilots who have completed their training in the US. The second batch of 16 F-35As is expected to equip the 171st Squadron.

According to the current schedule the F-35A AT-01 and AT-02 will stay in the U.S. at Luke Air Force Base, Arizona, where TurAF pilots and maintainers will perform training on the aircraft, until December 2020. The 3rd and 4th F-35As, currently at the production/final assembly line, will be delivered in March 2019 and they will also stay at Luke Air Force Base (AFB). These four F-35As



will be utilized in TurAF pilot and maintenance personnel training in the U.S. until December 2020. The TurAF's 5th and 6th F-35As are scheduled to be delivered to Turkey in November 2019 and will be flown by Turkish pilots to the 7th MJB in November of 2019, with several air-to-air refueling serials. By the end of 2019 the TurAF is expected to receive further two F-35As (7th and 8th aircraft) and all of these four F-35As will serve at the 172nd Squadron/F-35A OCU in the 7th MJB. The TurAF is expected to be able to declare Initial Operational Capability (IOC) for the 172nd Squadron/F-35A OCU during fourth quarter of 2020, even the Squadron will not have its full complement of F-35As. The Israeli Air Force (IAF) for example declared IOC for the 140th Squadron (Call Name: Golden Eagle) located at Nevatim Airbase during the first week of December 2017, while there were only 9 F-35I Adir Lightning II jets in the Squadron inventory. As the first main Operating Base of the TurAF F-35As, in addition to the 172nd and 171st Squadrons, the 7th MJB will also host the National F-35 Integrated Training Center (ITC), where TurAF pilots and maintainers will perform training.

To accommodate F-35As the entire infrastructure for air

operations at the 7th MJB is being restructured. The base is being modernized by Nuro İnşaat/Rönesans Holding under a contract valued at TL429.5 Million (around US\$121.6 Million according to Central Bank's August 14, 2017 US\$/TL rate) that was awarded on August 14, 2017. In this context a total of 88 building/facility will be demolished and reconstructed. New buildings/facilities are under construction at the 7th MJB to accommodate the F-35A aircraft includes; new Hardened Aircraft Shelters (HASs) and hangars, underground pens, Squadron and Headquarter buildings, mess halls, guest houses, maintenance facilities, depots, heating plant, sport facilities, taxi ways, concrete pavements and a National F-35 ITC building.

The construction of the National F-35 ITC building is currently ongoing and first phase of the facility is expected to be completed by the end of 2018 and construction of the whole facility is scheduled to be completed by the end of 2019. Following the completion of construction, outfitting phase will begin. The inside of the National ITC building will be outfitted with furniture, phones and computers and advanced equipment like classified areas and simulators.

According to the current schedule the first class of TurAF students is scheduled to begin training in the National ITC at the 7th MJB in 2020. The National F-35 ITC will have similar features with the F-35 ITC at Luke AFB in Arizona, U.S. Valued at roughly US\$47 Million, the F-35 ITC at Luke AFB is an architecturally and technologically advanced facility. Pilots are being trained in Full Mission Simulators (FMSs) that replicate all F-35 sensors and weapons employment and provide half of the initial qualification flights, according to Lockheed Martin. The National ITC facility will provide state-of-the-art training for fighter pilots and maintainers and will serve not only TurAF F-35 pilots and maintainers but also other F-35 user countries' fighter pilots and maintainers, who will pay for this.

The TurAF has selected the 1st MJB Command located in Eskisehir as the preferred location for the second F-35A Lightning II base. The 1st MJB is currently home to three squadrons: The 111th Squadron flying with F-4E 2020s, the 113th Squadron (Recce Squadron) flying with F-16C/D Block 30TMs and the 401st Test Squadron (under the organization of the 1st Air Maintenance Factory Directorate [1st AMFD]).

Instructor Pilot and Student Pilot Training for the F-35As at Luke AFB

As the introduction of the TurAF F-35A Lightning II is not just about the aircraft, but the entire air system, the build out of basing and training is a key part of the standing up of the F-35A aircraft. As part of transition efforts to the F-35A Lightning II, the TurAF has already started a project to renew entire infrastructure for air operations at the 7th MJB Command, which needed to accommodate F-35As and has sent pilots and maintenance personnel to Luke Air Force Base (AFB) in the U.S. to receive training for the JSF.

Following the rollout ceremony during the last week of June, both F-35A AT-01 and AT-02 were flown by Lockheed Martin to Luke Air Force Base (AFB) in Arizona. TurAF trainees at Luke AFB currently consists of 13 student pilots (who will receive Transition and Instructor Pilot training) and 325 maintenance personnel and lead by Colonel Ziya KABASAKAL. As of June 2018, two TurAF pilots (Major Halit OKTAY and Major M. Onur KARA) have received Instructor Pilot training in the U.S. at Lockheed Martin facility. Their training Program started in early 2018. The U.S. Air Force (USAF) activated the 63rd Fighter Squadron on August 1, 2016 at Luke AFB to train TurAF F-35A pilots. Turkish pilots will perform their first flight with the F-35A in July 2018 after they complete some initial classroom and simulator training.

The TurAF Instructor Pilots (IPs) will get the qualification to train Turkish and partner nations pilots on the F-35A lightning II Joint Strike Fighter through a 6-month syllabus made of two distinct classes respectively called "Transition" and "Instructor Pilot Upgrade" (IPUG). During Transition the pilots train in various forms of flight: air-to-air combat, air-to-ground missions including SEAD/DEAD tasks (Suppression/ Destruction of Enemy Air Defences). At the end of this stage, the student IPs have gained skills to fly these missions in all-weather conditions. During the subsequent IPUG class, the students are taught how to teach follow-on pilots to fly and fight in the F-35A. The IPUG course ends with a check ride required to achieve the IP qualification.



Travis Byrom, a LM instructor pilot, briefs students in the first F-35 Lightning II training class at Luke AFB, Ariz

While training as an F-35A student pilot, a TurAF F-16 pilot with more than 1,000 hours of flight experience will complete approximately 200 hours of academics, 14 simulators, a high-speed taxi, and six flights in the F-35A aircraft before being deemed qualified. That training will take four months. A student pilot, who does not have any combat aircraft flight experience and only has about 150 hours of flight time in T-38M Advanced Jet Trainers performed under Advanced Jet Training and Combat Readiness Transition Training at T-38M aircraft at Çiğli Air Base (2nd Main Jet Base Command) in Izmir, Turkey will undergo eight-month training to be certified for the F-35A Lightning II aircraft. During the 141-day training course (which lasts 8 months, 2 months for classroom academic instruction and 6 months for the flight line phase to learn the skills necessary to perform basic air-to-air, air-to-ground, and low-visibility combat flying), the F-35A student pilot will receive around 300 hours of academics; 46 sortie simulator flight (amounting to 80 hours) in a full mission simulator and 48 sortie (roughly 80 hours) flights in the F-35A. TurAF F-35A student pilots will perform 50% of their flight training with simulators.

F135-PW-100 Turbofan Engine MRO&U Capability

Turkey has been given the approval to build/assemble its own F135-PW-100 turbofan engines and on December 11, 2014 was also assigned by the U.S. Department of Defence to be the first European Regional F135 Engine Maintenance Repair Overhaul & Upgrade (MRO&U) capability starting from 2018 for a period of three years, with Norway and the Netherlands providing additional capability approximately 2-3 years after Turkey's initial capability. For this purpose, The Engine Final Assembly/Check-Out (FACO) Line and Depot-Level Maintenance (DLM) Center for the European Region will be established at 1st Air Maintenance Factory Directorate (1st AMFD, the former 1st Air Supply Maintenance Center [ASMC]). A signing ceremony between the SSB and TEI for JSF Project Engine Final Assembly Line Establishment, Activation and the 1st AMFD T-11 Test Cell Modification Phase Project' was held on March 23, 2017 at the SSB Headquarters in Ankara, Turkey. TEI will realize the 1st AMFD T-11 Test Cell Modification and Engine FACO



TurAF F-35A Instructor Pilots posing for a photograph with a maintenance officer in front of the TurAF's first F-35A

Supported by



ANKARA

Industrial Cooperation Days in

DEFENSE & AEROSPACE

4th Edition

October 23-25, 2018

Ankara, Turkey

Hacettepe University,
Beytepe Congress Center

2018 SPONSORS



**TURKISH
AEROSPACE**
Platinum Sponsor



aselsan
Gold Sponsor

Turkey
Discover
the potential

AIRBUS
Honour Sponsor



FNSS
Bronze Sponsor

OSTİM
ORGANİZE SANAYİ BÖLGESİ

**DASSAULT
SYSTEMES**
Bronze Sponsor

ato Ankara
Ticaret Odası
Bronze Sponsor

GTEI
Bronze Sponsor

roketan
Bronze Sponsor

2018 SUPPORTERS

**INVEST IN
TURKEY**



**TURKISH
AIRLINES**
Official Airlines



SaSaD
Savunma ve Havacılık Sanayii
İnovatörler Derneği

BMC

**KONYA
SANAYİ ODASI**

TURKISH TECHNIC

SSTEK

HAB

STM

SAGE

**Ostim
teknopark**

**DEFENCE
TURKEY**

Official Media

MSI

OSSA
OSTİM DEFENSE AND AVIATION
CLUSTER

www.icdda.com.tr

abe advanced
business
events
advbe.com

Line Assembly within a project schedule period of three years at the 1st AMFD in Eskisehir. The capabilities acquired as part of the project, to be carried out under the leadership of Aircraft Department of the SSB. The 1st AMFD will be the first center to be established for the purpose of providing heavy maintenance and repair services for JSF aircraft of all users across the European region. In this context, beginning from the third quarter of 2019, F135 engine Depot Level Maintenance, Repair, Overhaul and Upgrade (MRO&U) activities of all F-35A aircraft, to be procured by the European Countries under the F-35 Joint Strike Fighter Program, will be performed at 1st AMFD. According to the SSB with F135 Engine MRO&U capability Turkey will be able to provide DLM service to at least 100 F135 engines per year starting from 2024.

Meanwhile, in addition to the TurAF, the Turkish Navy is also planning to procure up to 32 F-35Bs, STOVL version of the Lightning II aircraft, to deploy at two LHDs (TCG Anadolu [under construction and expected to enter service in 2021] and the second LHD [planned to be constructed during the second half of 2020s]). The Turkish Navy already selected two pilots to be trained on the F-35B in the U.S. According to sources soon after a DİEC decision would be made regarding F-35B procurement for the Turkish Navy, these pilots will receive Advanced Jet Training at T-38M aircraft at Çiğli Air Base (2nd Main Jet Base Command) in Izmir, Turkey and then will fly to the U.S. to receive F-35B Transition and Instructor Pilot training. Turkey has officially expressed its interest in buying the F-35B STOVL variant to the US in October 2017.

F-35 Lightning II Aircraft and JSF Program

The Lockheed Martin F-35 Lightning II is a family of single-seat, single-engine, fifth-generation multirole fighter aircraft. The F-35 will be manufactured in three versions: a conventional takeoff and landing (CTOL) variant for the U.S. Air Force, an aircraft-carrier version (CV) for the US Navy, and a short takeoff/vertical



A view from P&W's F135 turbofan engine production line

landing (STOVL) version for the U.S. Marine Corps and the UK Royal Air Force and Royal Navy. Three variants of the F-35 will replace the A-10 and F-16 for the U.S. Air Force, the F/A-18 for the US Navy, the F/A-18 and AV-8B Harrier for the US Marine Corps, and a variety of fighters for at least ten other countries.

Nine nations have partnered in the F-35's SDD Phase: The United States (USAF 1.763 F-35As, DoN 693 F-35B/Cs), United Kingdom (RAF/RN 138 F-35Bs), Italy (60 F-35As and 30 F-35Bs), the Netherlands (37 F-35As), Turkey (100 F-35As), Canada (65 F-35As), Denmark (27 F-35As), Norway (52 F-35As), and Australia (100 F-35As). International partners of the Program have agreed to contribute US\$4.375 Billion towards development costs. There are three levels of international participation. The levels generally reflect financial stake in the program, the amount of technology transfer and subcontracts open for bid by national companies, and the order in which countries can obtain production aircraft. The UK is the sole 'Level-I' partner, contributing US\$2.5 Billion. Israel and Singapore have joined the Program as Security Cooperative Participants (SCP). Israel has ordered 50 F-35Is, Japan has ordered 42 F-35A and South Korea has ordered 40 F-35As. Israel declared IOC for the F-35I Adir in December 2017. Total development costs are estimated at more than US\$40 Billion. The purchase of an

estimated 2,400 aircraft is expected to cost an additional US\$200 Billion.

As of June 10, 2018, more than 620 F-35 pilots and 5,600 maintainers have qualified through the F-35 Training System, eight nations have pilots and/or maintainers in training and the F-35 fleet has surpassed more than 140,000 cumulative flight hours. Simulation plays a prominent role in the F-35 training process, more so than legacy platforms. Because of the advanced capabilities of the F-35, it is not possible to adequately challenge pilots in the live environment alone. With simulation, the F-35 team is redefining how pilots train to provide the range of experience required to maximize the jet's 5th Generation capabilities.

Under the F-35 Lightning II Program the first production model of the F-35 Lightning II (F-35A known as AF-6) conducted its first flight on February 25, 2011 and aircraft deliveries also started in 2011. On June 11, 2018 the F-35 Joint Program Office and Lockheed Martin delivered the 300th production F-35 aircraft, demonstrating the program's continued progress and momentum. The 300th aircraft is a U.S. Air Force F-35A, delivered to Hill Air Force Base, Utah. The first 300 F-35s include 197 F-35A CTOL variants, 75 F-35B STOVL variants, and 28 F-35C carrier variants (CV) and have been delivered to U.S. and international customers. The total aircraft quantities ordered under LRIP-1 to LRIP-10 is 358.





PROTECTING & ENHANCING
50 MILLION LIVES BY 2025

Emergent BioSolutions Inc. is a global life sciences company seeking to **protect and enhance life** by focusing on providing specialty products for civilian and military populations that address accidental, intentional, and naturally occurring public health threats. Through our work, we envision protecting and enhancing 50 million lives with our products by 2025. Additional information about the company may be found at emergentbiosolutions.com.

Emergent Countermeasures International Ltd
(a subsidiary of Emergent BioSolutions Inc.)
Parkshot House, 5 Kew Road
Richmond, Surrey TW9 2PR
United Kingdom
Tel: +44 [0] 782 558 0806
UKqueries@ebsi.com
Fax: +44 [0] 20 8334 8100



@life_at_emergent



@emergentbiosolu



www.linkedin.com/companies/emergent-biosolutions

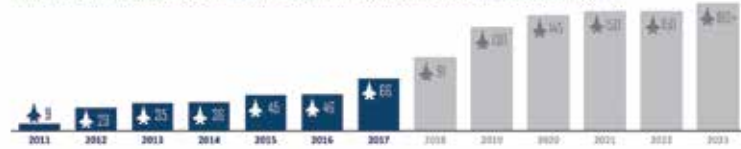
emergent
biosolutions®

As production volume increases and additional efficiencies are implemented, the price of F-35 aircraft continues to decline. LM is on track to reduce the cost of an F-35A to US\$80 Million by Lot-14/LRIP-14 in 2020, which is equal to or less than the legacy 4th generation aircraft. The price of the F-35A fell below US\$100 Million for the first time in LRIP-10. Announced in February 2017 under LRIP-10 contract a total of 94 F-35 Lightning II fighter aircraft in three versions will be delivered. In LRIP-10 the price of an F-35A was lowered to US\$94.3 Million (including airframe, engine and contractor fee and approximately 7.5% less than LRIP-9 aircraft), the F-35B's price was lowered to US\$122.8 Million and the F-35C carrier version sat at US\$121.8 Million, representing about 7.7% reduction in unit cost when compared with the LRIP-9 prices. Confirmed on July 15, 2018 Lockheed Martin made a "handshake agreement" with the F-35 Joint Program Office for the LRIP-11 which covers a total of 141 F-35 Lightning II jets for the U.S. and international customers. The company declined to state the unit cost for LRIP-11 until the deal was finalized but Reuters cited sources that said the cost per unit of the F-35A in Lot 11 would fall about 6% to about US\$89 Million (including airframe, engine and contractor fee). The flyaway cost is aimed to be reduced to no more than US\$85 Million for the F-35A in Lot 13. Lockheed Martin has delivered 66 F-35 in 2017 and plans to deliver 91 in 2018, 130 in 2019, 145 in 2020, 150 in 2021 and 2022 and 160+ in 2023. F-35 will remain in service until 2077.

The F-35 is the most advanced warplane ever produced. More than 300,000 individual parts (each aircraft contains over 35,000 major components of which around 6,000 of them are used at Center Fuselage) from more than 1,400 suppliers from domestic and international companies around the world, all come together to produce the F-35 Lightning II at Lockheed Martin's factory in Fort Worth, Texas. But final assembly is largely a matter of connecting three fuselage sections plus wings. The present build time for each F-35 is 36 months, following a contract award and 18 months of this period is spent at final assembly line. Currently Lockheed Martin manufactures 7 to 8 F-35 jets per month but in 2020

F-35 PRODUCTION

*Planned delivery quantities beyond 2018 are approximate based on the current F-35 production profile.



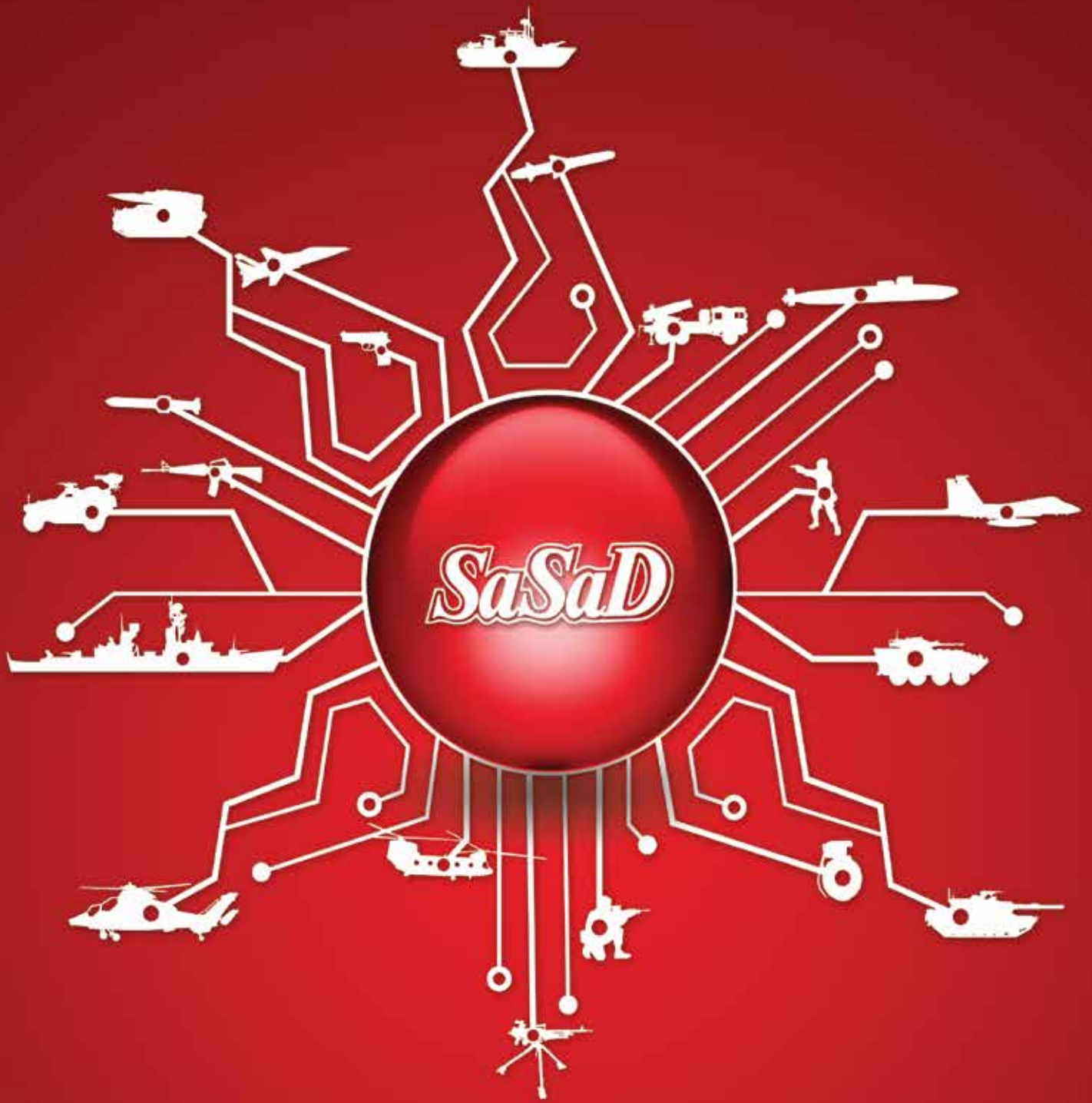
the production rate is aimed to be increased to 15 to 17 aircraft a month, which represents the maximum level in F-35 production history. For this purpose, the company opened an expanded manufacturing facility in May 2018 that will help increase production of the F-35 Lightning II jets.

The F-35A has a maximum speed of over Mach 1.6 with a maximum takeoff weight of 60,000lbs (27,000kg). As a multi-role stealth fighter, the F-35A can be configured to suit a variety of missions. The jet is designed to carry up to 18,000 pounds of munitions on 11 internal and external weapons stations (+ GAU-22/A four-barrel 25mm gun) depending on mission requirements. The F-35 is designed with two internal weapon bays (containing a total of four hardpoints), six external underwing hardpoints/pylons, which can be used when stealthiness is not required and a centerline pylon, cleared for 1,000lb. The two outer external pylons are cleared for 300lb and will be used for air-to-air missiles (AAM) missiles such as AIM-9X Sidewinder, AIM-132 ASRAAM and GÖKDOĞAN (Peregrine) short-range AAMs only. The other underwing pylons with a capacity of 2,500lb and 5,000lbs can carry the AIM-120 AMRAAM or BOZDOĞAN (Merlin) Beyond Visual Range (BVR) AAMs, AGM-158 JASSM, SOM,

SOM-J cruise missiles, and guided bombs such as GBU-12 and HGB. The two weapon bays include two pylons each (7, 8 and 4, 5), two on the doors (7 and 5, capable of 350lbs each) for AAMs, and 2 pylons (8 and 4, capable of 2,500lb each) for both AAMs and air-to-surface loads.

With its multi-spectral active, passive & IR sensors, and increased payload, the F-35 is more capable in air-to-ground role and optimized for Global Precision Attack. The F-35 is drastically more than just a fighter jet; it is a highly integrated air system. The F-35A's advanced sensor package gathers and distributes more information than any fighter in history, giving operators a decisive advantage over all adversaries. The Lightning II will provide paralleled situation awareness, allowing the pilot to virtually "look through the floor of the fighter or behind the aircraft". Networking will also allow the pilot to see information provided by other aircraft, ships or ground units. Its tremendous processing power, open architecture, sophisticated sensors, information fusion and flexible communication links make the F-35 an indispensable tool in future homeland Defence, joint and coalition irregular warfare, and major combat operations. According to sources the F-35 offers far broader capabilities so it is not

F-35 LIGHTNING II SPECS	F-35A	F-35B	F-35C
Length	51.4 ft / 15.7 m	51.2 ft / 15.6 m	51.5 ft / 15.7 m
Height	14.4 ft / 4.38 m	14.3 ft / 4.36 m	14.7 ft / 4.48 m
Wingspan	35 ft / 10.7 m	35 ft / 10.7 m	43 ft / 13.1 m
Wing area	460 ft ² / 42.7 m ²	460 ft ² / 42.7 m ²	668 ft ² / 62.1 m ²
Horizontal tail span	22.5 ft / 6.86 m	21.8 ft / 6.65 m	26.3 ft / 8.02 m
Weight empty	29,300 lb	32,300 lb	34,800 lb
Internal fuel capacity	18,250 lb / 8,278 kg	13,500 lb / 6,125 kg	19,750 lb / 8,960 kg
Weapons payload	18,000 lb / 8,160 kg	15,000 lb / 6,800 kg	18,000 lb / 8,160 kg
Standard internal weapons load	<ul style="list-style-type: none"> • 25 mm GAU-22/A cannon • Two AIM-120C/D air-to-air missiles • Two 2,000-pound GBU-31 JDAM guided bombs 	<ul style="list-style-type: none"> • Two AIM-120C/D air-to-air missiles • Two 1,000-pound GBU-32 JDAM guided bombs 	<ul style="list-style-type: none"> • Two AIM-120C/D air-to-air missiles • Two 2,000-pound GBU-31 JDAM guided bombs
Maximum weight	70,000 lb class	60,000 lb class	70,000 lb class
Propulsion* (uninstalled thrust ratings)	F135-PW-100 40,000 lb Max. 25,000 lb Mil. Vertical N/A	F135-PW-600 40,000 lb Max. 25,000 lb Mil. 40,500 lb Vertical	F135-PW-100 40,000 lb Max. 25,000 lb Mil. Vertical N/A
Speed (full internal weapons load)	Mach 1.6 (~1,200 mph)	Mach 1.6 (~1,200 mph)	Mach 1.6 (~1,200 mph)
Combat radius (internal fuel)	>590 nm / 1,093 km (JSSA profile)	>450 nm / 833 km (JSSA profile)	>600 nm / 1,100 km (JSSA profile)
Range (internal fuel)	>1,200 nm / 2,200 km (JSSA profile)	>900 nm / 1,667 km (JSSA profile)	>1,200 nm / 2,200 km (JSSA profile)
Max g-rating	9.0	7.0	7.5



DEFENSE AND AEROSPACE INDUSTRY MANUFACTURERS ASSOCIATION

www.sasad.org.tr
Turan Güneş Bulvarı 100/18 Akçam Plaza
06550 Çankaya / ANKARA / TÜRKİYE
+90 312 426 22 55 P
+90 312 426 22 56 F
sasad@sasad.org.tr E

Land Platforms, Naval Platforms, Aerospace
Informatics, Electronics, Electrical Equipment
Weapons, Ammunition, Rockets and Missiles
Research, Development and Engineering
Materials, Mouldings and Parts
Uniforms – Footwear

fair to label it just a “fighter”. Land-based tests in 2016 showed the Aegis Combat System could kill a target using a Standard-Missile 6 (SM-6) with data provided solely by an F-35, with at-sea tests to follow.

Fifth-generation fighter capabilities are largely defined by their software capabilities. The F-35 has more software than any other air combat aircraft, with 8.6 million lines of code in the aircraft, and a further 7 million lines of software in the supporting ground systems.

The F-35 is less maneuverable than some fourth-generation aircraft, particularly the Russian Sukhoi fighters, but this deficiency is negated through its all-aspect stealth feature. The F-35 has stealth designed in as part of the aircraft from the beginning. The F-35's advanced stealth allows pilots to penetrate areas without being detected by radars that legacy fighters cannot evade. The F-22 Raptor is probably the only operational aircraft stealthier than the JSF, but the radar cross section of the JSF is at its lowest when directly facing a radar. It then increases as the aircraft turns away from the radar presenting more of its side rather than front. The F-35's exact Radar Cross Section (RCS) is classified; however, Aviation Week magazine reports that the F-35 RCS is -30 dBsm or .001 square meters. In June 2016 the F-35 JSF scored an 8:0 kill ratio against the F-15E during mock air combat. It was disclosed in September 2017 that during their flight which lasted 45 minutes within the Greek FIR, while heading to Nevatim Airbase in Israel, the two new F-35I Adir fighters of the Israeli Air Force were not detected by any Greek air surveillance radar in the area. F-35 Lightning II jets are equipped with Luneberg Radar Reflectors, which increase the F-35's radar signature several hundred times over so that helping friendly nations spot the stealth jet, or allowing F-35, a plane that would normally be nearly impossible for civilian air traffic controllers to spot, to give off a big, safe blip. During ferry flights when the aircraft use also the transponder in a cooperative way with the ATC (Air Traffic Control) agencies. At peace time, since the aircraft don't need to evade the radars, F-35s operate with Luneberg Radar Reflectors, also known as RCS enhancers, hence not in “stealth mode”. These devices are installed on the aircraft on the ground

and can also be used when the aircraft operate close to the enemy whose ground or flying radars, intelligence gathering sensors with an aim to prevent enemy to collect real RCS data of the aircraft. According to TurAF officials, since the radar reflector devices have on-off control capability and they can be switch on or switch off by the pilot during flight.

B. TF-X: National Combat Aircraft

In order to meet Turkish Air Force (TurAF) requirements beyond 2030s, the TF-X National Combat Aircraft (Milli Muharip Uçak/MMU) Development Program was launched in accordance with Decision No 545 adopted at DIEC dated 15 December 2010. The MMU/TF-X was planned to replace the F-16C/D Combat Aircraft starting from 2030 and Turkish Aerospace (TA) was selected as the Prime Contractor. The contract for the Conceptual Design Development Project was signed between the SSB and Turkish Aerospace on August 23, 2001.

Under the ‘Concept Development and Preliminary Design Phase’, which is the first phase of the Program, Turkish Aerospace (TA) designated SAAB Aircraft Company as the Technical Support and Assistance Provider (TSAP) for themselves. Under the contract involving a 24-month schedule that came into force on 29 September 2011, between September 2011 - September 2013, Prime Contractor TA prepared three separate conceptual designs with technical support provided by SAAB Aircraft. These three configurations are named as follows; FX-1 (configuration

with double engine, back wing and conventional tail design such as F/A-18, EuroFighter, Rafale and Mig-29), FX-5 (configuration with single engine, back wing and conventional tail design) and FX-6 (configuration with single engine, broad delta wing and front wings). It is anticipated that single engine fighter aircraft (FX-5 and FX-6) would feature between 50,000-60,000lbs of maximum takeoff weight (MTOW) and the double engine concept (FX-1) will have 60,000-70,000lbs of MTOW. Performance analyses have been carried out on all three designs/concepts and it was seen that they all meet the TurAF's requirements almost at the rate of 100%. Under the ‘Concept Development and Preliminary Design Phase’, on September 29, 2013, TAI submitted the report for the designs and the results of the efforts carried out during the past two years to the SSB.

The entire document package, including aircraft specifications, development program plan and budget estimates, which was completed and delivered at the end of the Conceptual Design Development Project, was accepted by the SSB in early 2014. Although during the DIEC meeting held on May 6, 2014 the decision for the initiation of the Engineering Development & Preliminary Design Phase was expected to be made for the subsequent phase of the Project, the project was only placed on the agenda at the DIEC meeting held on January 7, 2015. At the meeting, the decision was made to initiate the Engineering Development & Preliminary Design Phase within the scope of the TF-X National Combat Aircraft Development Program.



Trusted partners

We're working with our partners
around the world to help them
realise their visions for the security
and prosperity of their nations.

With you where it counts.



A Request for Information (RFI) was issued by the SSB on March 13, 2015 to the international aviation companies capable to design, develop and/or produce the 5th Generation Combat Aircraft for the Engineering Development & Preliminary Design Phase initiated by the DIEC Decision dated January 7, 2015. The related RFI, originally addressed to nine international companies, however, was only by BAE Systems, SAAB Aircraft and Airbus Defence & Space (ADS) who submitted their responses to the SSB in April 2015. Turkish Aerospace (TA) was designated as the Prime Contractor for the MMU/TF-X Development Program's Engineering Development & Preliminary Design Phase in line with the DIEC Decision made in April 2015.

Under the Engineering Development & Preliminary Design Phase, which will end up with completion of the Preliminary Design Phase, beyond the design and development of the TF-X aircraft, engineering capabilities, technology development activities (for key sensors like radar, electronic warfare.. etc.), test infrastructures establishment and certification processes will be performed and extensive capabilities for a new generation jet fighter design, development and production will be gained by the Turkish Defence & Aerospace Industry.

In June 2015, an RFP was issued by the SSB to BAE Systems, SAAB Aircraft and ADS companies that responded to RfI. As per the evaluation of proposals, BAE Systems Company came to the forefront as a candidate for the Foreign Cooperation Company (FCC/YIF) to provide technical support for certain fields to the Prime Contractor TA, within the scope of MMU/TF-X Development Program Engineering Development & Preliminary Design Phase, which covers the design, development, production, test and certification studies of MMU/TFX prototypes (total of seven aircraft). As a result of the proposal evaluations conducted during the FCC selection process, it was decided to start negotiations for the contract with the British company BAE Systems on November 12, 2015 and as from December 2015, the Pre-Contract Studies with BAE Systems commenced.



The MMU/TF-X Program will be carried out under three periods as the Design and Prototype Qualification (Period I), Acquisition of Initial Operation Capability and Full Operation Capability (Period II) and Mass Production (Period III). A preliminary agreement was signed on July 14, 2016 during the Farnborough International Airshow 2016 (FIA '16) in London between the Prime Contractor TA and the SSB for the Engineering Development & Preliminary Design Phase (Period I, Phase I), which is expected to last four years. Signatures for the official agreement were given in Ankara on August 5, 2016. In early 2016, the decision was made to continue the project with twin-engine aircraft configurations (FX-1 and FX-2). The FX-2 concept was prepared and submitted during the second half of 2015 by the MMU/TF-X Program Management Office (PMO) established with the participation of the SSB, the TurAF and TA representatives, resembled YF-23 from all appearances. In contrast to the FX-1, which is a twin-engine with a conventional wing tail assembly, in the FX-2 the horizontal stabilizers have been removed, the angles of vertical stabilizers have been slightly increased, the air intakes have been placed not on the sides but in the bottom, a little further back and the joints of the wings with the fuselage have been designed in a more 'blended' manner. Thus, it is intended to reduce weight and drag, and meet performance requirements even if the Radar Cross Section (RCS) value slightly increases. However, during the fourth quarter of 2016, the twin-engine FX-1 concept was selected over FX-2.

Pre-Contract Studies with FCC

candidate BAE Systems were conducted in 2016 and negotiations with alternative FCC candidate Airbus Defence & Space (ADS) were initiated in November 2016 in order to serve as the basis for the final selection decision. ADS Company presented the report on the technical evaluations as of the end of 2016.

On January 28, 2017 in the presence of the Prime Ministers of Turkey and the United Kingdom, BAE Systems and TA signed a Heads of Agreement (HoA) valued at US\$156 Million to collaborate under the Engineering Development & Preliminary Design Phase of the TF-X Program. In addition, the Letter of Agreement (LoA) was signed during the IDEF '17 Fair in Istanbul. The UK Department for International Trade brought an Open General Export License (OGEL) into effect on July 28, 2017. The OGEL will allow companies involved in the development of the TF-X Program to apply for licenses to export goods, software and technology from a range of control list classifications, including air launched munitions, fire-control equipment, aircraft components, propulsion systems, ground support equipment, electronic equipment, training and simulation equipment, imaging and countermeasure equipment, and specialized forgings, fittings and coatings. The TA-BAE Systems Collaboration Agreement was signed and entered in to effect on August 25, 2017.

As of June 2018, the Engineering Development & Preliminary Design Phase is continuing and is planned to be completed in 2021. The 4-year scheduled Engineering Development & Preliminary Design Phase is expected to cost around US\$1.3 Billion (according to TA



Under the Management and
Responsibility of
Turkish Armed Forces Foundation

Eurasian Meeting



IDEF'19

14th International Defence Industry Fair

April 30 - May 3, 2019

www.idef.com.tr

TÜYAP
www.tuyap.com.tr



THIS FAIR IS ORGANIZED WITH THE AUDIT OF TOBB (THE UNION OF CHAMBERS AND COMMODITY EXCHANGES OF TURKEY)
IN ACCORDANCE WITH THE LAW NO.5174.

President & CEO Temel KOTİL around US\$300-400 Million of this figure will be allocated for infrastructural investment and around US\$1 Billion for the engineers) and to be followed by an 8-year scheduled Critical Design Review (CDR) and Prototype Production and Qualification Phase, which is estimated to cost around US\$7.3 Billion. At the end of 12-years and US\$8.6 Billion (US\$8.2 Billion is expected to be spent until the first prototype's maiden flight) in expenses, seven flying TF-X prototypes will be manufactured for the test, evaluation and qualification purposes. TA President & CEO KOTİL, estimated that the TF-X Program would cost about US\$20 Billion. Meanwhile in April 2018, it was announced that the TF-X Program would be realized within a Project-based incentive system. In this context for the Engineering Development & Preliminary Design Phase TA has received a TL4.817 Billion (US\$1.178 Billion) incentive certificate under the incentive program. According to the current estimation the Engineering and Manufacturing Development (EMD) Phase of the TF-X Program will employ 3,200 people, with an indirect employment contribution estimated to be around 11,200 people.

On June 22, 2018 Turkish Aerospace (TA) signed a cooperation agreement with Dassault Systèmes for the implementation and maintenance of the 3DEXPERIENCE platform within TF-X Program. The 3DEXPERIENCE platform delivers seamless integration between data management and industry-leading design and process capabilities. As TA states through a written statement, collaboration with Dassault Systèmes will include data security and quick design processes of the company's original projects, while the software will be used primarily in the TF-X fighter, one of the authentic products of the Turkish industrial giant. In April 2018 TA President & CEO KOTİL disclosed that TA has procured a 10,000-core computer and it was being setting up at TAI facilities to be utilized under Preliminary Design Phase of the TF-X Program.

On July, 2018 TA signed a contract with Aircraft Research Association (ARA) Company, an independent research and development organization providing a range of specialist services to the



TA signed a contract with ARA regarding the risk reduction phase of the wind tunnel tests for the TF-X aircraft

worldwide aerospace industry, of the UK regarding the risk reduction phase of the wind tunnel tests for the TF-X aircraft. The highest level of quality wind tunnel data is required to verify an aerodynamic design. The ARA's Experimental Aerodynamics Department uses the latest wind tunnel test techniques efficiently to provide accurate aerodynamic databases for the world's largest civil aircraft, military aircraft and Defence system development programs. ARA currently operates a Transonic Wind Tunnel (TWT), a closed circuit, continuous flow tunnel with 2.4m wide, 2.33m high and operates continuously from Mach 0.2 to Mach 1.4. Since Turkey presently lacks a sufficient infrastructure in high-speed wind tunnel testing was planning to utilize BAE Systems capabilities in this field during TF-X's wind tunnel test phase especially at supersonic speeds. The BAE Systems Wind Tunnel facility is home to two tunnels, known respectively as the low speed and high-speed tunnels. In the latter tests can be carried out at speed up to Mach 3.8, which makes it perfect for transonic work.

As Turkey's most ambitious Defence program, the TF-X Development Program is being carried out under the coordination of TF-X Program Management Office (PMO), comprising of representatives from the TurAF National Combatant Branch Office, the SSB, TA and BAE Systems personnel. As part of its reorganization effort the TA has established the MMU/TF-X Department.

To carry out the TF-X Program TA is constructing a new facility at the Ankara Aerospace Industrial Zone, a total of 2,700 engineers will be employed at this facility. According to TA President & CEO Temel KOTİL,

TF-X will feature Acoustic Heating Technology and during next 10-years period a total of 10,000 Turkish and foreign (including those from BAE Systems) engineers from different disciplines and with supersonic fighter design and manufacture experience (know-how) will work under the program. Under the contract BAE System will provide 400 man/year engineering support for a period of 4 years to TA under the Engineering Development & Preliminary Design Phase of the TF-X Program.

In order to meet the TurAF's operational requirements properly, the 60,000lb class the TF-X will be equipped with twin turbofan engines, with Low Observability and Super Cruise capabilities. According to TA President & CEO KOTİL when entered in the service of the TurAF the TF-X will have indigenous turbofans each generating with a 27,000lb thrust. The first TF-X prototype was expected to achieve its maiden flight in 2023, when Turkey will celebrate 100th anniversary of the founding of the Republic, but this schedule was renewed in March 2018 when TA President & CEO KOTİL disclosed that first flight will be achieved in 2026 with engines to be procured from abroad (such as EuroJet EJ200, F414-GE-400 of GE or Saturn AL-31 of Russian United Engine Corporation [UEC]). In June 2018, the TF-X first flight date was renewed once again according to the current plan and the TF-X prototype will perform its maiden flight in 2027. The first of an envisioned 150 production of TF-X aircraft are expected to leave TA facilities in 2029 and to enter service in 2031. Deliveries will continue until 2039 and the TF-X aircraft will be phased out from the Turkish Air Force inventory after the 2070s.



EXHIBITION | PARIS LE BOURGET

23 > 26
OCTOBER 2018

22 OCT. | CONFERENCE | PARIS



50 YEARS

euromaval.fr

//// Your Sales Contact //

Tel : +33 (0)1 56 59 15 15 • sales@euromaval.fr

TF-X Aircraft and Turbofan Engine

National Combat Aircraft TF-X will be a single-seat, twin-engine next generation fighter (based on FX-1 concept) with stealth features and new generation avionics. Replacing the F-16C/Ds currently in service of the TurAF during the first quarter of the 2030s, the TF-X will be a fifth-generation indigenous air superiority fighter with secondary ground attack capability, which will escort and provide air protection to the TurAF's F-35A Lighting II fleet. The TurAF currently operates 238 F-16C/D aircraft and Turkey is likely to procure some 150 TF-X in the long term to replace F-16s.

In December 2017 Turkish Aerospace (TA) released the technical specifications of TF-X. According to TA, the TF-X will measure 19 meters (60ft) long, have a 12-meter wingspan, around 60m² (670ft²) wing area and a maximum takeoff weight (MTOW) of 60,000lbs+ (27.215kg+). Powered with a pair of over 20,000lb class turbofan engines, the TF-X is intended to have a maximum speed of Mach 2, a service ceiling of over 55,000 feet, and a combat radius of over 600 nautical miles.

Aselsan is working on a on a domestic gallium-nitride Active Electronically Scanned Array (AESA) radar, Electronic Warfare System, Digital Cockpit with a large central display screen, Integrated Modular Avionics Mission Computer and an Infrared Search and Tract (IRST) System for the TF-X. According to Aselsan, the AESA radar and EW System will be in integrated configuration. The final configuration of the indigenous AESA radar will be completed when the design of the TF-X become mature. It is not known at the moment whether the TF-X will have a single multi-mode main front AESA antenna on the nose or will also feature side-looking arrays and L-band arrays mounted in the wing leading edges as it is seen at Su-57/T-50 aircraft. During the EURASIA 2018 Airshow, in April 2018, TA signed a preliminary contract with Aselsan for the development of the



A computer generated image of TAEC's turbofan engine proposed for the TF-X indigenous AESA radar, EW and electro-optical (IRST) systems for the TF-X fighter.

Within the scope of efforts initiated regarding the procurement of 7-sets of turbofan engines to be used on TF-X prototypes, an RFP was issued by the SSB on January 17, 2014 through TA to EuroJet Turbo GmbH, General Electric (GE), Pratt & Whitney (P&W), RosoboronExport and Snecma. While GE (F414-GE-400 and F110-GE-129), EuroJet (EJ200) and Snecma (M88-4E) companies submitted their proposals to TA in late June 2014, P&W and RosoboronExport did not deliver any proposals.

As a result of the Feasibility Studies conducted under coordination of the SSB for the development of the new engine in compliance with the requirements of TF-X, the decision was made to launch a new tender process for the development of a totally new national engine, the IP rights of which would belong to Turkey (SSB), with a foreign engine supplier/Technical Support Provider, by cancelling the tender process that was initiated in 2014. Within this frame, the official letter stating the cancellation of the first tender was sent by the SSB in mid-2017 to the engine manufacturers, who had submitted their proposals. Then the SSB issued a new tender and received proposals from TEI (without GE) and TAEC (Kale Group and Rolls-Royce JV company) in December 2017, while EuroJet decided not to participate in

the tender. TEI committed to make everything from scratch within the scope of the Project, to develop an indigenous turbofan engine, the IP rights of which will belong to Turkey, to certify and deliver it to the SSB within 14.5 years by completing the qualification process.

Meanwhile according to sources SSB/TA recently carried out negotiations with Rostec/Russian United Engine Corporation (UEC) not only for TF-X prototypes but also for HürJet aircraft. Signs of Russian interest in aiding Turkey in its TF-X program have surfaced in April 2018, when Russian aerospace corporation Rostec's International Cooperation & Regional Policy Director Viktor KLADOV told press at the Eurasia Airshow in Antalya, Turkey, that his company would prepare a proposal for cooperation with Turkey on aircraft engines. "We could supply an engine," he said. During those days, Turkish procurement officials have confirmed Russian interest in a plan for the development of an engine that would power the TF-X. "There is a Russian interest in this regard, but it is too premature to say if the idea would gain further ground," an official said.

On May 8, 2017 Kale Group announced that they would set up a joint venture company (TAEC, 51% Kale Group and 49% Rolls-Royce) with UK-based Rolls-Royce to develop civilian and fighter aircraft engines including for Turkey's planned TF-X fighter jet. According to Kale Group if



© Defence Turkey

they are selected they will develop the first production engine until 2023 and start to mass production of the engine by 2030 following the completion of all certification processes. According to Chris CHOLERTON, President of Rolls-Royce Defence Aerospace, they plan to develop an engine from scratch for the planned TF-X fighter jet and Turkey will hold the intellectual property (IP) rights of this new engine. Rolls-Royce previously developed the XG-40 core engine that forms a basis also for EJ200 engine's core.

The winner of the tender will cooperate with TR Motor Company (TA [35%] + BMC [55%] + SSB [10%]) for the development and manufacture of 27,000lb turbofan engine. Speaking on the TF-X Program at a televised interview held on June 13th, 2018 President of Defence Industries (SSB) Mr. DEMİR underlined that currently 50 engineers have been working/studying on TF-X engine and 10 experienced and valuable engineers have been brought to Turkey from abroad via reverse brain drain. SSB DEMİR also stressed that knowledge on aircraft engines in Turkey would be gathered under the umbrella of the TR Motor Company.

During Turkish President Recep Tayyip ERDOĞAN's official visit to the UK, that took place during May 13-15, 2018, Turkish SSB DEMİR and British Minister for Defence Procurement Guto BEBB signed a Letter of Intent (LoI) Agreement. The LoI stipulates that the result of the Rolls-Royce bid should be finalized by July 31, 2018.

C. HürJet New Generation AJT & Light Attack Aircraft Development Project

On July, 2018 Turkey's Defence procurement agency SSB announced with a tweet that under the HürJet Project a Protocol had been signed between TA, SSB and TurAF Command. According to Protocol, which was signed on July 2, 2018 the HürJet Project, developed considering the needs of both Turkish and global markets, will receive strong support from both SSB and the TurAF Command.

The initial studies for the "Advanced Jet Trainer & Light Attack Aircraft (HürJet) Project" was started in July 2017 and the Project was officially launched on August 14, 2017, as a company funded project (which funded from TA's own resources) after receiving a green light to go ahead from TA's Board. Conceptual Design Phase (CDP) of the HürJet Project was completed in April 2018, currently engineering and analysis studies as part of its Preliminary Design Review (PDR) Phase activities are underway.

The PDR Phase is expected to be completed in August 2019, and to be followed by Critical Design Review (CDR) Phase, which is scheduled to be launched some time in 2019.

The HürJet Project is aimed at the development of an indigenous new generation Advanced Jet Trainer (AJT), capable of supersonic flight to replace T-38M jet trainer fleet in the service of the TurAF, and a Light Attack Aircraft (LCA) able to perform a Close Air Support (CAS) role to assist and release the loads on the TurAF's F-16C/Ds shoulders. The indigenous jet trainer HürJet will be utilized to train and prepare pilots for the next generation F-35A and TF-X fighters in 2030s, replacing ageing T-38M jet trainers in service with the TurAF. Currently, The TurAF operates 68 T-38M Advanced Jet Trainers in Advanced Jet Training and Combat Readiness Transition Training Çiğli Air Base (2nd Main Jet Base Command) in Izmir. As in the case of the T-38M, HürJet will be also utilized in both Advanced Jet Training and Combat Readiness Transition Training. The TurAF can also employ the HürJet as an aggressor aircraft during exercises.



© Defence Turkey

According to Protocol the HürJet prototypes (a total of five) will be manufactured in two different configurations; the Advanced Jet Trainer (AJT) and the Light Combat Aircraft (LCA). The AJT will be the first produced configuration while the second will be, an armed variant. In the LCA variant, a fire control radar, external payloads (on six external hardpoints) up to 3 tons (2.721kg according to infographic prepared and distributed by the SSB on July, 2018), a fire control system and various mission systems will be integrated. The HürJet AJT prototype is expected to perform its maiden flight in 2022 and to enter TurAF service in 2025.

According to current research the market size of jet trainers has reached an annual average of US\$1.6 billion in 20 years. And many of the Armed Forces around the world, including the USAF and the TurAF, are planning to replace their existing jet trainers with advanced versions over the next 10 years. It is considered that the U.S. will have difficulty supporting the foreign market since their T-X jet trainer aircraft Program, launched by the USAF in December 2016, will occupy producers until the end of the 2020s. Due to this gap to be created by the U.S., it is predicted that some 2,500 jet training aircraft will be sold from 2017 to 2025 and Turkey/Turkish Aerospace would be able to meet approximately 20% (500 aircraft) of this need over HürJet.

In order to attract the attention of potential international customers, Turkish Aerospace showcased a full-scale mock-up (indeed a ground prototype of the aircraft) of the HürJet Advanced Jet Trainer & Light Attack Aircraft, with single turbofan engine (F404-GE-102, offers 17,000lb thrust with afterburner) and having underwing stores of indigenous air-to-air (GÖKDOĞAN/Peregrine short-range IIR guided AAMs) and air-to-ground (UMTAS and TEBER-82) weapon systems as well as BNA's external fuel tank. There was an eagle figure, a long-time symbol of the Turkish nation and Turkish Air Force, on the tail of HürJet mock-up, which was painted with digital camouflage. According to sources TA engineers completed the HürJet's composite mock-up in 11 weeks.

The HürJet is a single-engine, twin-seat advanced jet trainer and light attack aircraft, currently under



development by TA (and probably with technical support from Sierra Nevada Corporation [SNC] of the United States which was, at one point, a player in the USAF T-X advanced jet trainer competition) to replace the ageing T-38M AJTs currently in service with the TurAF. The aircraft is being developed in two versions; AJT and LCA. The HürJet prototypes will be powered by a GE's 17,000lb thrust class F404-GE-102 turbofan engine. A number of series productions of HürJet are also expected to be powered by F404 turbofans (to be manufactured under license in Turkey). But there is a plan to start deploying indigenous turbofan engine on HürJet production models some time at series production phase during the 2030s. Designed with the goal of 5th generation training aircraft, the HürJet features; modern glass cockpit (including Aselsan's Integrated Mission Display [IMD-820], a large area colored multifunction display and VPX compatible mission computer), Helmet Mounted Display System (HMDS, offered provisionally helmet system projects essential symbology and aiming parameters onto the visor, enhancing the pilot's situational awareness and providing head-out control of aircraft targeting systems and sensors), advanced mission and

flight computers, embedded training system, live virtual constructive training system, BAE Systems LiteHUD HUD System (selected in July 2017 and already deployed at the mock-up/ground prototype), intra & inter data link and air-to-air refueling capabilities (dry for AJT and wet for LCA versions), is designed to execute pilot training as well as light attack missions in all weather conditions. The aircraft is designed to incorporate a full authority digital fly-by-wire (FBW) flight control system (to be developed indigenously), elevator, rudder and aileron control system.

As a clean-sheet design the HürJet will be Turkey's first indigenous supersonic aircraft and one of the world's few supersonic trainers. The aircraft is approximately 13m in length, 4.2m in height, has 9.8m wingspan and 24m² wing area. The figures related the predicted dry weight and maximum takeoff weight of the aircraft have not been publicized yet. The maximum speed of the HürJet will be Mach 1.2; the maximum altitude will be 45,000ft. The HürJet will have climb rate of 25,000ft/minute, will be able to perform +8G/-3G maneuver and capable of sustaining 6.5G at an altitude of 15,000ft. The range of the aircraft is 2,592km.



The GE's F404-GE-102 engine includes single engine safety features and a FADEC derived from F414

D. HürKuş-A/B/C Basic Trainer & Light Attack Aircraft Programs

The Turkish Primary and Basic Trainer Aircraft (HürKuş) Development Program Contract for the prototype manufacturing (2 ea. prototype aircraft and 2 ea. structural test aircraft) of the HürKuş-A aircraft was signed between the SSB and Prime Contractor TA on March 15, 2006. Named after Turkey's most famous fighter pilot and aircraft pioneer, Vecihi HÜRKUŞ, the HürKuş turboprop Primary and Basic Trainer Aircraft Program comprises the design, development, testing, verification, manufacturing and civil certification of an indigenous training aircraft. In addition to a number of military and civil standards, the HürKuş aircraft has been designed for certification in accordance with the EASA CS-23 standard. The HürKuş-A will have night and day mission capability, tandem seating and a single turboprop engine, allowing familiarization training in instrument flight, navigation and formation flight.

Equipped with an analogue cockpit the HürKuş-A aircraft performed its first flight on August 29, 2013. The certification (Type Certification according to CS-23 requirements) of HürKuş-A by EASA and the Directorate General of Civil Aviation (SHGM) was completed in July 2016 following the completion of over 500 flight tests with prototypes (with TC-VCH and TC-VCI tail numbers).



HürKuş-B - New Generation Basic Trainer Aircraft

Under the Series Production contract awarded in December 2013 and valued at around US\$250 Million, TA is manufacturing 15 HürKuş-B Basic Trainers (+40 options), to meet demand of Turkish Air Forces Command for New Generation Basic Training Aircraft. As an advanced version of HürKuş-A and in contrast to HürKuş-A, the HürKuş-B will have digital cockpit layout along with modern integrated avionics including Aselsan's GMFD-68 colored MFDs, Central Control Computer, DSH-300 Internal Communication System, ANS-511 Inertial Navigation System, MXF-484 V/UHF Airborne Radio Sets, national IFF transponder, OFP software and Digital Map). Aselsan has already completed deliveries of 10 sets of HürKuş-B cockpit avionics to Turkish Aerospace. Fotoniks, on the other hand, is providing LiteHUD Head Up Display (HUD) System, Control Panel, Rudder-A system, stall

system, radar altimeter and digital video data recording system for the HürKuş-B. In January 2015 LiteHUD was selected for HürKuş-B and during IDEF '15, BAE Systems signed a contract with Fotoniks to collaborate on the development and in-region delivery of aircraft display systems. Under the terms of the agreement, Fotoniks would develop BAE Systems' LiteHUD HUD System at their facility in Ankara to meet Turkish requirements so that it can be fitted to the HürKuş-B New Generation Basic Training Aircraft of the TurAF and to deliver 16 new LiteHUD HUD Systems to the TurAF with the assistance of BAE Systems. The first batch of LiteHUD HUD Systems were delivered to Turkish Aerospace for the HürKuş-Bs in December 2016. Meanwhile, it is intended that Alp Aviation will manufacture the landing gears of HürKuş-B aircraft in Turkey within the scope of the works for the nationalization of the sub-systems of HürKuş-B aircraft.



The HürKuş-C New Generation Light Attack & Armed Reconnaissance Aircraft prototype takes-off for a live firing test

With the HürKuş-B contract, the number of local contractors taking part in the HürKuş Program has risen to 33 (from 26). The contract also covers the start of Conceptual Design studies for HürKuş-C Next Generation Light Attack & Armed Reconnaissance Aircraft, armed version of HürKuş-B, developed in response to meet the armed close air support (CAS) and reconnaissance and surveillance aircraft requirement of the Turkish Land Forces Command.

Under the contract the first HürKuş-B aircraft with tail number 17-101 performed its maiden flight on January 19, 2018. TA President & CEO KOTİL Ph.D. while talking about successful first test flight of HürKuş-B, emphasized that right after HürKuş-A, which was built for civilian use, HürKuş-B was designed specifically for the Turkish Armed Forces. KOTİL said: "HürKuş-B is 100kg lighter, faster, more modern and stronger than HürKuş-A. This version has a more stable and comprehensive design". Deliveries of HürKuş-B Basic Trainers were planned to start in June 2018, but this date was then postponed to Autumn 2018 (September/October). Due to some further modifications on the aircraft to meet the TurAF's last minute requirements. According to MoND 2017 Activity Report, the HürKuş-B deliveries to the TurAF will be completed in June 2019.

The HürKuş-A was designed through the work of 140 engineers and 70 technicians. There are a total of 270 pieces of equipment in the aircraft. Nearly all the systems in the HürKuş-A will also be used in HürKuş-B. Some minor changes have been made on the power plant system and the Pilot Recovery System. The most significant difference between HürKuş-A and HürKuş-B configuration is in the avionic equipment.

Turkish Aerospace (TA) displayed the HürKuş-C New Generation Light Attack & Armed Reconnaissance Aircraft prototype (based on HürKuş-A's first prototype with tail number TC-VCH) in January 2017, first flight test performed in March and first live firing test with Laser UMTAS ATGM was performed on April 7, 2017. The HürKuş-C prototype was delivered to Gendarmerie General

Command during the second half of 2017 under a leasing agreement. Gendarmerie General Command launched a project to procure up to 12 (6+6) HürKuş-C aircraft. During IDEF '17 Fair on May 11, 2017 HürKuş-C New Generation Light Attack & Armed Reconnaissance Aircraft Development and Serial Production Project contract was signed between the SSB and TA, covering the delivery of 12 (+12 optional) HürKuş-Cs to Turkish Land Forces Command. Deliveries are scheduled to start in 2018.

The HürKuş-C will be integrated with EO/IR Targeting/Imaging System (on a centerline under-fuselage pylon, prototype aircraft is integrated with a Star SAFIRE® 380-HLD FLIR turret) and can carry up to 1.5 tons of payload (including Laser-UMTAS Long Range Anti Tank Guided Missiles, 12.7mm and/or 20mm gun pods, CİRİT laser-guided missiles, GBU-12, KGK-82, HGK-3 and TEBER-82/82 precision guided bombs, Mk81 and Mk82 general purpose bombs, Mk106 and BDU33 training bombs) at six hardpoints under the wings. The HürKuş-C will also be equipped with night vision compatible fully digital cockpit, a tactical data-link system, secure communication system, self-protection system, and an armor-reinforced airframe.

As for the technical characteristics, with a wingspan of 10m, the plane has a wing height of 2.16m, the vertical tail height of 3.7m. It is powered by a 1.600shp P&W Canada PT-6A-68T turboprop engine, cabin pressure is available and it has two tandem cockpits. As for the performance parameters, it has been detected that the maximum travel speed of the aircraft is 310 knots (574km/h), the stall speed is 77 knots (143km/h), the service ceiling is 34,700ft (10.577m), its endurance time is up to 4 hours and 15 minutes, its flight range is 800 nautical miles (1,478km), the takeoff distance is 1,605ft (489m), its landing distance is 1,945ft (593m) and G limits are +7/-3.5G. The HürKuş-A, B and C aircraft are equipped with Martin-Baker's MK T-16N ejection seats. The contract for the HürKuş-B Aircraft was signed in July 2014 during the Farnborough Air Show.

E. F-16C/D Block 30 Structural Upgrade and ÖZGÜR Projects

The F-16 Block 30 Structural Upgrade Project was launched in order to increase service life of the 35 F-16C/D Block 30 Aircraft in the inventory of the TurAF from its original 8,000 flight hours to 12,000 flight hours. The F-16 Block 30 Aircraft in the TurAF service already have flown over 7,000 flight hours as of 2016, these aircraft are quite work-worn in respect to their fuselage endurance.

The contract for the Project was signed between the SSB and Prime Contractor TA on 10 August 2015. Lockheed Martin (LM) Company takes part as the Main Subcontractor in the Project while the 1st Air Maintenance Factory Directorate (1st AMFD) was assigned for the modernization of 10 aircraft out of 35.

The structural upgrade kits developed by LM were planned to be installed initially on the single-seat and twin-seat F-16 Block 30 aircraft and the structural upgrade activities on the prototype aircraft were planned to be completed by October or November 2017. Then the flights for verification would be conducted with these two prototypes in 2017 and the structural upgrade activities on the remaining 33 aircraft would be launched had these flights been completed successfully. TA has also carried out negotiations for maintaining the cooperation established for the TurAF Block 30 aircraft with the LM Company on other Block 30 aircraft in the world. According to the information dated June 2017 on the official website of SSB, the modernization of the first batch F-16C/D Block 30 aircraft were planned to be completed by the end of 2018 and the modernization activities for the last aircraft were planned to be finished in August 2023.

The ÖZGÜR Program was launched upon DIEC's Decree dated December 15, 2010 in line with the requirements and demands of the TurAF, and covers the modernization and certification of an F-16C Block 30 Aircraft, which did not receive avionic upgrades under PO-III and F-16 MSM Projects, with a national

avionic suite solution that contains an indigenous Mission Computer with a national Operational Flight Program (OFP) and a AESA Radar (optional). The contract signed between the SSB and Prime Contractor TA on March 6, 2012 became effective on 24 May 2012. Aselsan is the Main Subcontractor of the ÖZGÜR Program.

Launching its activities under the contract valued at US\$46 Million, TA has aimed to conduct first test flight with the indigenous avionic suite solution in 3 years upon the contract's effectivity and to deliver the first aircraft (under a 52-months schedule) to the TurAF in the 4th year. If the prototype activities were completed successfully, all of the 35 F-16C/D Block 30 aircraft in TurAF service were expected to be modernized with the avionic suite solution until the year 2020, but the activities failed to keep up with the Project Schedule. Meanwhile, within the scope of the Project a contract, valued at US\$17 Million and with a 46-month schedule, was signed between TA and Aselsan on March 6, 2012 for the Development of a Mission Computer and the procurement of the related Avionic Equipment. The System Requirements Review Meeting regarding the Project was held on December 4, 2012 with the participation of the representatives from the SSB and the TurAF and the Preliminary Design Review (PDR) Phase was completed in 2013.

The prototype F-16C Block 30 aircraft modernized under the ÖZGÜR Program and equipped with three colored Multi-Functional Displays (MFDs) and an indigenous Mission Computer on which a national Operational Flight Program (OFP) running designed and developed by Aselsan, executed nine test flights as of December 27, 2016. The software running on the Mission Computer is installed to the system in blocks towards different task capabilities (air-to-air, air-to-ground, air-to-surface, etc.). Therefore, while certain functions of the Mission Computer are presently active, some of them are not active yet. The Flight Control Computer onboard the F-16C Block 30 is not changed so the existing computer is being used as part of the Project as is.



The Cockpit Demonstrator of the F-16 Block 30 aircraft developed and produced by Aselsan under ÖZGÜR Program

Even though the Project Schedule lasts for 52 months, in December 2016 the 54th month was passed, and the Project Schedule was extended to 80 months due to the delays. According to sources it is required to obtain a flight approval from the Certification Authority for every software block. In this direction, each software block is initially tested at the System Integration Laboratory (SIL), then it is installed to the prototype aircraft and the flight test is executed following the flight approval.

According to the information we acquired, in order to accelerate this process TA has offered Aselsan to use certain programs developed as part of the ERCİYES Project in the ÖZGÜR Project. It is a fact that certain capabilities gained with the ÖZGÜR Project are not exist even at the F-16C/D Block 50+ aircraft procured under the PO-IV Project. The TurAF will make a decision on how to pursue the process after the completion of the prototype process. The capabilities gained through the ÖZGÜR Project may be implemented to the Block 40, Block 50 and Block 50+ aircraft that have separate Mission and Flight Computers, in the inventory. Therefore, merely by replacing the existing Mission Computer with the indigenous Mission Computer with national OFP software, integration of the national air-to-air, air-to-ground and air-to-surface missiles and ammunition systems would be possible. PO-III/F-16 MSM

and PO-IV F-16C/Ds feature the same Mission Computer (MMC 7000) and OFP. Despite Turkey's long-lasting negotiations held with the U.S. Government on sharing the source codes running at the MMC 7000 Mission Computer, a concrete agreement has not been signed yet. In the past years, an F-16 Mission Computer was procured from the LM Company and a national program to run on this computer was developed through the ÖZGÜR R&D Project. However, when LM integrated the more developed Modular Mission Computer (MMC 5000 and MMC 7000) with a lighter/ smaller and more different architecture as part of the CCIP Project of the U.S. Air Force (USAF), the possibility of the utilization of the indigenous solution computer as part of the PO-III/F-16 MSM was eliminated.

After a very long very period of silence, since December 27, 2016, F-16C Block 30, prototype aircraft of the ÖZGÜR Program, performed a flight test on July, 2018 over Ankara skies with special permission from Turkish Presidency. During the test flight aircraft passed the speed of sound at 30,000ft altitude and its sonic boom was heard across much of the Western Ankara. According to sources, during last two years important steps have been taken under the ÖZGÜR Program and currently necessary steps are being taken to initiate the Serial Modernization Phase of the Program.

F. A400M Atlas Strategic Transport Aircraft

Within the scope of the A400M Program, Turkey declared that 10 aircraft would be procured for the TurAF and signed a contract valued at €1.496 Billion in 2003 to this end. Project amount was mentioned as €1.496 Billion in the Activity Reports of 2009 and 2010 published by the SSB and stated as €1.332 Billion in the Activity Reports regarding the years 2011 and 2013. Every A400M Atlas Strategic Transport Aircraft's cost to Turkey was announced as €125 Million.

The A400M joining the 221st Air Transport Fleet Command under the 12th Air Transport Main Base Command at Erkillet, Kayseri under the name 'Atlas' as part of the A400M Program, defined as the ESEN Project by the TurAF, is a new generation military transport aircraft capable of conducting long-range tactical and strategic transport missions. With the tasks it executed so far, the A400M Atlas proven that it has increased the limits of the TurAF. There are currently six A400M Atlas Strategic Transport Aircraft in the service of the 221st Air Transport Fleet Command.

Following the completion of the unit level controls, the first A400M Atlas Strategic Transport Aircraft with MSN009 (Manufacturer Serial Number 009) serial number and 13-0009 tail number entered into service with a ceremony held at the 12th Air Transport Main Base Command on May 12, 2014. The 14-0013 tail and MSN0013 serial numbered second A400M Atlas Strategic Transport Aircraft was received as of December 22, 2014 and having left the Airbus Defence & Space (ADS) facilities at Seville where the acceptance activities were accomplished, the aircraft descended at the 12th Air Transport Main Base Command on December 23, 2014. The MSN009 and MSN013 went through a retrofit activity with emphasis on software and hardware (including the engine) for elevating them to the highest capability standard ready for utilization at ADS Military Aircraft's Getafe facilities located 20km south of Spain's capital Madrid during 2015-2016. Meanwhile, the third A400M Atlas

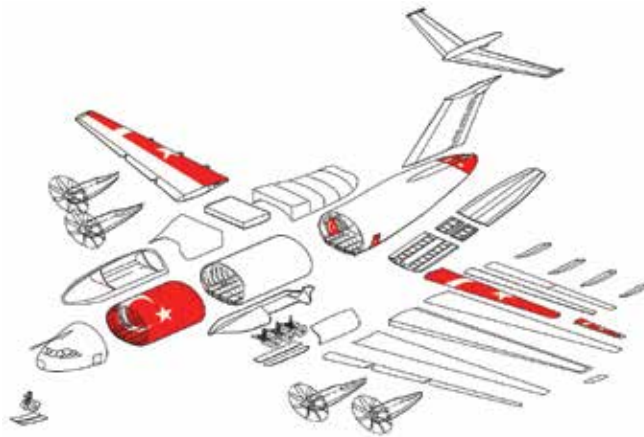


TuRAF's 'MSN009' A400M

Aircraft with MSN023 serial number manufactured for the TurAF crashed during the first test flight (Factory Acceptance Test) conducted at Seville/Spain on May 9, 2015, so in order to replace MSN023 sliding an aircraft from the production line of the other joint countries came to the agenda. The third A400M with the MSN028 serial number and 14-0028 tail number (the fourth aircraft manufactured for the TurAF yet it is the third delivered aircraft) reached the 12th Air Transport Main Base Command on November 25, 2016, while the fourth A400M tail numbered 15-0051 was received on April 7, 2017. The initial flight test of the fifth A400M Atlas Aircraft with 16-0055 tail number and MSN055 serial number was executed at San Pablo facilities of the ADS in Seville, Spain on April 18, 2017 and the acceptance of the aircraft was accomplished on July 13, 2017. The A400M Aircraft with MSN078 serial number and 18-0078 tail number

conducted its maiden flight on May 16, 2018 and reached the 12th Air Transport Main Base Command on June 22, 2018.

With the A400M Atlas aircraft's entry into inventory, heavier weights or equipment with higher volume are able to be transported at once and the weapon systems and vehicles that could not be transported via airline would be transported to one place from another. With the A400M Atlas Strategic Transport Aircraft, the speed, range and weight carriage capacity of the TurAF has doubled. With many new capabilities it features, the A400M enables the Turkish Armed Forces (TAF) to conduct operations anywhere in the world. The TurAF increased its operating radius to 3.000nm without air refueling with the A400M and to 5.000nm with air refueling. A400M aircraft is capable of flying uninterruptedly up to 3.000km distance with 37 tons of load, and to 9,000km with 10



© TAI

This graphic shows the Turkish Aerospace's contribution to the A400M Program



ISTANBUL AIRSHOW

12th

International Civil Aviation & Airports Exhibition
& Aviation Industry Supply Chain Platform



27-30
SEPTEMBER
2018
ATATURK AIRPORT
ISTANBUL

SUPPORTED BY



Republic of Turkey
Ministry of Transport, Maritime Affairs
and Communications



SPONSORS



EXHIBITION ORGANIZERS

Follow us on:



/istanbulairshow

THIS FAIR IS ORGANIZED WITH
THE AUDIT OF TOBB (THE UNION
OF CHAMBERS AND COMMODITY
EXCHANGES OF TURKEY) IN
ACCORDANCE WITH THE LAW
NO.5174

ton load, that is equal a flight from Turkey to the American continent. The A400M Aircraft increased the TurAF's power projection capability and reaction speed to a critical extent with the 37-ton carriage capacity and 422 knots cruise speed it features.

A400M Atlas flight crew is composed of two pilots (Aircraft Commander and the Second Pilot) and two Load Masters. Procurement of an A400M Full Flight Simulator (FFS) with Level-D certificate is planned for the training of the pilots to be assigned at the Atlas Strategic Transport Aircrafts and activities to this end were launched. Considering the fact that the ageing C-160D Transall Aircrafts to be utilized for transportation tasks until 2019 would be put out of service as from 2020, the TurAF is expected to order additional A400Ms or other transports aircraft in similar classes (i.e. AN-188) in order to fulfill the transport aircraft requirement that would emerge for the year 2020 and afterwards.

Within the scope of the A400M Program, which is the most critical step taken towards the integration of the Turkish Industry to the European Aerospace Industry, Turkish Aerospace (TA) and TEI (cooperates with the Spanish ITP Aero Company) from Turkey are taking part directly. Selex ES Türkiye (former Selex Communications), on the other hand, works on the A400M Lighting System as the subcontractor of TA. TA has been attending the design and feasibility activities of the A400M Program on behalf of our country since the beginning. In response to the 10 A400Ms to be procured by Turkey, the Structural Work Package of 7.2% is under the responsibility of TA which is the partner of Airbus (the percentage of its shares is 5.56%) is composed of the following: Front Waist, Rear End Top Part, Paratrooper Doors, Emergency Exit Door, Rear Top Escape Capsule, Tail Cone, Aileron and Spoilers. The 1.26% of the System Work Package consists of the design and production of the Lighting Systems (all the interior and exterior lighting systems of the aircraft, excluding the cockpit) and the Waste/Clean Water Systems. TA design and production parts are being used



The TP400-D6 is a 3-shaft counter rotating turboprop engine delivering more than 11,600 shp

over the A400Ms since the A400M MSN001 aircraft. The financial value of the work packages assumed by TA as part of the A400M Program is 6% of the project amount (cost to Turkey) and this work share exceeds €1 Billion within the whole program. According to this, over every A400M aircraft, a TA made part with an average worth €4-4.5 Million will exist. The TA, switched to Production from Design Technology from the Production from Picture Technology with the A400M Program, has shipped its 100th component set to the Integrated Fuselage Assembly (IFA) at Airbus Bremen facilities on February 16, 2018.

TEI in charge of the 2.45% of the TP400-D6 turboprop engine which powers the aircraft and is the most powerful engine developed so far in the USA and West Europe. Within the scope of the Program, TEI executes the Engine's Front Bearing Structure Module, Propeller Gearbox Supporting Bars, Primary Exhaust Nozzle, Exhaust Cone and Project Specific Test Equipment's design, development, prototype production, assembly, test and research and development activities. Currently 50 TEI engineers perform R&D activities particularly for the development of TP400-D6 turboprop engine. As part of the development of the modules under their responsibilities, the Company has been conducting nearly 2,500 man/month R&D activity since the beginning of the engine development process. Moreover, in the first stages of the

engine development period, TEI's R&D team of 30 engineers was assigned at ITP Aero Company's premises in Madrid and Bilbao for a period of two years. TEI projects to acquire an export turnover of nearly €120 Million in the upcoming period within the scope of the Project.

In accordance with the In-Service Support - ISS, the Turkish Air Forces staff will be in responsible for the aircraft's complete Line Maintenance (1st Level), besides maintenance workshops for the certain sub components/systems such as the engine, wheels and aircraft tires will be established under the auspices of the 12th Air Transport Main Base Command in Kayseri. On the other hand, in addition to the A400M to be owned by the TurAF, in order to provide In-Service Support to the other potential future users of the A400M, a company titled Airbus Military Türkiye (AMTR) was established with the cooperation of Turkish Aerospace and Airbus Defence and Space (ADS). AMTR launched with 100% participation of the ADS started its activities in 2013. AMTR will provide all the logistical support for the A400M including aircraft level maintenance by using the capabilities of the Air Maintenance Factory Directorates (former Air Supply Maintenance Centers), Turkish Technic and other domestic industry as well. In this way, the aircraft would not need to go to Seville for Depot Level Maintenance (DLM).

During the IDEF '15 Fair in May 2015 ADS signed an agreement



The A400M's unique cargo design allows it to carry up to two Arlan armoured vehicles, with a combat weight of 16 tons each and a height of 3.4metres

© ADS

with Turkish Airlines' MRO subsidiary; Turkish Technic to provide maintenance support for the A400M Atlas Strategic Transport Aircraft in the service of the TurAF. Under the terms of the A400M Maintenance Support Agreement, Airbus will support Turkish Technic in further developing its capability to provide long-term maintenance services (covering both second and third level maintenance support initially for the A400M fleet of the TurAF.

Located at the 12th Air Transportation Main Base Command premises the 2nd Air Maintenance Factory Directorate (2nd AMFD, former 2nd Air Supply Maintenance Centre [ASMC], the name of facilities have been changed as 2nd Air Maintenance Factory Directorate in March 2017) has been certified by ADS to provide C-Level Overhaul service to TurAF A400Ms, following a detailed certification process conducted by ADS/AMTR personnel over a one year period. The A400M C-Level Overhaul service is being carried out at Aircraft Depot Level Maintenance & Repair (DLM&R) facilities of the 2nd AMFD. In this context, the A400M C-Level Overhaul Capacity Achievement Ceremony was held on February 22, 2018 at 12th Air

Transport Main Base Command in Kayseri with the participation of the then MoND Nurettin CANIKLI as well as TuAF and AMTR representatives. Speaking at the ceremony the then Turkish MoND CANIKLI stated that "Our institution (referring to 2nd AMFD), having 88-years of aviation experience, has performed the repair and overhaul of A400M for the first time, which is a new generation transport aircraft, with national capacities and capabilities," and said "By this means, we have taken another significant step in the field of aviation. Therefore, it was ensured that an average of 900,000 Euro, flowing abroad previously for each aircraft (for C-Level Overhaul), has remained in the national budget. In addition to this, the operational efficiency of our A400Ms were increased upon completion of the overhaul and repair processes in a period shorter than 2 months, which is far less than the average 6 month period abroad."

Before Certifying the 2nd AMFD for providing C-Level Overhaul Service to A400M the ADS also authorized the 2nd AMFD as a regional support and maintenance center for Airbus CN235 aircraft on July 1, 2015 following a detailed certification process conducted

over the previous year. Turkey is the world's largest customer of CN235s with 61 aircraft order (as of July 2018 there are 49 in the TurAF, 6 in the Turkish Navy and 3 in the Turkish Coast Guard inventory, the TurAF lost 3 CN235-100Ms so far two in January and May 2001 and one in January 2018) and has accumulated a wealth of expertise in the maintenance, repair, overhaul and updating of the aircraft throughout 23 years of operations.

Meanwhile, Airbus and the Presidency of Defence Industries (SSB) inked a deal on January 25, 2018 in Istanbul to further improve and expand industrial cooperation in Turkey. With the agreement, which was signed by Turkish President for Defence Industries Prof. DEMIR and Airbus Board Member and Chief Human Resources Officer Thierry BARIL the two sides agreed to expand industrial partnership in Turkey and to increase cooperation. Under the terms of agreement Airbus will continue to develop its purchases from Turkey and will purchase components worth over US\$2 Billion by 2020 from Turkish suppliers. According to the agreement, Airbus will carry out purchases worth US\$5 Billion between 2020 and 2030 from Turkish suppliers.

G. ERCİYES C-130B/E Avionics Modernization Program

In accordance with the contract signed between the SSB and TA in December 2006, the avionics system of 13 C-130E and 6 C-130B aircraft of the TurAF are being modernized. First prototype (C-130E with tail number 63-13188) was delivered to the TurAF with a ceremony held on August 8, 2014 at TA's premises. The acceptance process of the second prototype aircraft (C-130B with tail number 61-2634) took longer than planned and eventually, after acquiring the flight approval, the official acceptance was made with the acceptance flight executed in the second half of December 2016 in Kayseri.

Within the scope of the ERCİYES Avionics Modernization Program, TA performs design, integration test and check-out of the system for 2 prototypes, install 4 serial aircraft and deliver the kits for the modification of remaining 13 aircraft. Installation of these modification kits on 13 aircraft is being performed by 2nd AMFD in Kayseri. The after-delivery support of the whole system will be made by TA.

With the realization of the ERCİYES Program, TA will take a significant advantage to meet the modernization requirements of all countries that use C-130 Hercules transport aircraft. The modernized aircraft, planned to remain in the TurAF inventory until 2040, are named as C-130BM and C-130EM. The modernization activities on the remaining C-130B and C-130E Hercules transport aircraft, within the scope of the ERCİYES Program, expected to be completed by the end of 2019.

On account of the revision made in the Program Schedule, the delivery of every C-130B/E Hercules aircraft to receive ERCİYES modernization, starting from the 2nd Series Production Aircraft (C-160BM with tail number 61-960, the fourth aircraft modernized as part of the Program) will be delivered to the TurAF following the completion of its Depot Level Maintenance & Repair (DLM&R, focusing on structure and engines) procedures performed at the 2nd AFMD in Kayseri. The integration and installation activities on avionic modernization kits over each C-130 aircraft take approximately 6 months, while the DLM&R activities take an average of 6-7 months. Since the C-130BM/EMs go through both DLM&R and avionic modernization, both TA (Turkish Aerospace) and 2nd AMFD staff work over the aircraft



© Turkish Aerospace

simultaneously.

The C-130BM/EM Hercules Transport Aircraft are equipped with a Glass Cockpit (4 colored Multi-Functional Displays [MFDs] with Moving Map capability, 2 Central Display Units [CDUs] and 2 Multi-Functional Central Control Computers [CCCs]), Multi-Functional Mission Computer (MFTC) with high operational efficiency, National Flight Management System (FMS), Ground Task Planning Unit capable of operating with the HvBS and compatible with the international navigation regulations. The new avionics system is fully NVIS capable. The Operational Flight Program (OFP, consists approximately 3.2 million lines codes) running on the national Mission Computers (Central Control Computers) to execute the control and management of the new avionic suit at the aircraft was developed in line with the DO-178B Level - A Standard by TA engineers. Especially with the help of the glass cockpit aligned with the Night Vision Goggle (NVG), the secure navigation capability in night and day and under all types of weather conditions was acquired. In addition to this, the C-130BM and C-130EM aircraft reached the capacity to drop paratroopers and loads from low altitude under night conditions.

The C-130BMs and C-130EMs

within the scope of the Program are being equipped with the Link-16 Tactical Data Link System (via Multi-Functional Information Distribution System (MIDS) terminal). In this way, the C-130BM/EM aircraft gain the capability of executing integrated operations with the E-7T Airborne Early Warning and Control (AEWC) aircraft, modernized F-16s and ground and sea-based command control units. With the help of the Link-16, C-130BM/EM aircraft are capable of transmitting brief, core and confidential information in cosmic level to both ground (air - to - ground) and air (air - to - air) units.

In standard configuration C-130B and E Hercules operates a crew of five people composed of two Pilots, a Navigation Officer (Navigators), a Flight Engineer and a Load Master. Thanks to Flight Management System (FMS) software developed by TA engineers as part of the ERCİYES Program, that replaced the Navigation Officer, the number of crew fell to four at the modernized C-130BM/EM Hercules.

On the other hand, with an amendment made in the ERCİYES Program Contract in 2013, two C-130BM/EMs were planned to be converted into GunShip (armed aircraft) configuration, but there has been no concrete progress in this field during recent years.





ATR72/600 Turkish Maritime Utility Aircraft

H. MELTEM-III Project and ATR-72/600 TMPA

With the MELTEM-III Project which is the last one of the MELTEM Programs with the approximate value of US\$218.7 Million [€180 Million, the cost of the AMASCOS-300 Mission System procured under the MELTEM-II Project is not included in this figure, merely the aircraft procurement, structural modification, test and certification costs are covered] two ATR-72/600 utility aircraft in TMUA (Turkish Maritime Utility Aircraft) configuration entered the inventory (inducted into Turkish Navy service in July and August 2013) in 2013.

Within the scope of the Project, further six ATR-72/600 Maritime Patrol (M/P) Aircraft with Anti-Submarine Warfare (ASW) and Anti Surface Warfare (ASuW) capabilities will be also procured. According to the official website of the Turkish Naval Forces Command (TNFC), the delivery of six ATR-72/600 Turkish Maritime Patrol Aircraft (TMPA) will take place during 2019 – 2020. The structural modification activities on the ATR-72/600 Utility Aircraft with tail numbers TCB701 and TCB702 were performed by the Prime Contractor Alenia Aermacchi/Leonardo at Napoli-Capodichino and Torino-Caselle facilities and to this end the aircraft were equipped with new radio sets and an IFF system.

The contract of the Meltem-III Project, covering the procurement of a total of 6 ATR-72/600 aircraft and their modification into ASW

and ASuW configuration for the Turkish Navy was signed between Alenia Aermacchi S.p.A and Turkish Aerospace (TA) on July 2012. The agreement is an amendment to a previous deal signed on July 20, 2005 and became effective in April 2006 between Alenia and the Turkish Government for the delivery of 10 ATR-72/500 ASW aircraft to the Turkish Navy. Within the framework of the Project, as Main Sub-Contractor of Alenia/Leonardo, all related modification activities to convert the 'green' ATR-72/600 in ATR-72/600 TMPA will be carried out at TA's facilities. TA's work share includes Kit-A and tools manufacturing, procurement of material and support equipment, structural and electrical modification, assembly, test, Ground Flight Support and Integrated Logistics Support (ILS) activities.

According to original schedule, upon the completion of the certification and acceptance tests the first of the six ATR-72/600 TMPAs was planned to be delivered to the Turkish Navy in February 2017. The remaining five TMPAs were intended to be delivered by the end of 2018's first quarter. However, the first ATR-72/600 green aircraft to receive Structural Modification could only arrived at TA's facilities on April 19, 2013 and modification efforts have been launched in the same year. Following the completion of the Structural Modification (covering the integration of Airborne Maritime Situation Control System-300 [AMASCOS-300] mission equipment and converting the green aircraft into an MPA with ASW capabilities) activities, first aircraft accomplished its maiden flight on



ATR-72/600 Turkish Maritime Patrol Aircraft

July 14, 2016 and was sent to Torino/ Italy for the execution of the certification tests by the Italian Certification Authority (DAAA) and Finmeccanica, on the same day. The second aircraft was sent to Torino, Italy in April 2017 upon the completion of the Structural Modification. The flight tests are being executed at the Flight Test Center of the Alenia Aermacchi/ Leonardo Company in Torino.

The delivery date of the first ATR-72/600 TMPA was later postponed to May 2017, but due to the difficulties arising during the certification tests, the aforesaid delivery could not be actualized. At a press meeting held on May 10, 2017 during IDEF '17 Fair in response to our question on whether the first ATR-72/600 Turkish Maritime Patrol Aircraft would be delivered to the Turkish Naval Forces in May, the Vice President of Leonardo in charge of Strategy, Markets and Business Development Giovanni SOCCODATO told that due to the delays occurred in the certification process, the delivery would be accomplished in the second half of 2017.

Meanwhile, procured within the scope of the MELTEM-III Project, eight of the ten AMASCOS-300 Mission System sets to be utilized at the ATR-72/600 TMPA platforms powered with two PW127M turboprop engines produced by P&W Canada were received as of April 2014, and the remaining 2 AMASCOS-300 Mission System sets were delivered in September/ October 2014. Six of the aforesaid Mission Systems will be utilized in the 6 ATR-72/600 aircraft to be delivered in Turkish Maritime Patrol Aircraft (TMPA) configuration, while the remaining four would be stored in order to be used as backups for securing the lifetime maintenance and operation of the AMASCOS-300 Mission System deployed at both at the P-235 (CN235-100M) and ATR-72/600 TMPA Maritime Patrol Aircraft of the Turkish Navy.

While the P-235 MPAs, equipped with Link-11 Tactical Data Link System, are able to



carry Mk46 Lightweight Torpedo and Depth Bombs at the external hardpoints/pylons under the wings, the ATR-72/600 ASW/ ASuW aircraft can carry the weapon load on two pylons at the fuselage sides (lack the underwing pylons for external payload due to their wing designs) will additionally feature the Link-16 Tactical Data Link and Mk54 Lightweight Torpedo capabilities. Via the Link-11 Tactical Data Link System operating at the HF band, data communication could be conducted up to the range of 200km+ at the Line of Sight (LoS). The engineering support required for the integration of the Mk46 Mode 5 and Mk54 Lightweight Torpedoes to ATR-72/600 TMPAs is provided by the Raytheon Company. To this end, a contract worth US\$5.7 Million was signed between the Main Contractor Alenia Aermacchi and Raytheon in July 2014.

The AMASCOS-300 Airborne Maritime Situation Control System deployed both at CN235-100M (P-235) and ATR-72/600 ASW/ASuW aircraft, featuring a total of four operator consoles (Radar Operator, Tactical Coordination Officer [TacCo], Acoustics Operator and Electronic Warfare (EW) and Communication Operator) and includes: Ocean Master 400 Search Radar with a range of 190nm, in 400W power and with

SAR/ISAR/SPOT-SAR/STRIP-SAR/ MMTI capabilities, the AselFLIR 200T FLIR System enabling the identification of surface contacts up to 35nm range, Sonobuoy Launcher, TMS-200 Active/Passive Sonobuoy Processing System (for the sonobuoys, capable of listening to 16 sonobuoys simultaneously), TCAS II Air Traffic Collision Avoidance System, DR-3000 Electronic Support Measures (ESM) [functions also as an RWR], AN/ASQ-508(V) Magnetic Anomaly Detector (MAD) with an antenna length of 4.5m and an antenna weighing nearly 50kg, Link-11/Link-16 Tactical Data Link Systems, LN-100G INS/ GPS, ARS-700 Airborne Rescue System, APX-113 IFF System and Aselsan's ASES-235 EW Integrated Self-Protection System containing the AN/AAR-60 MILDS MWS and four AN/ALE-47 CMDS Launchers. Three million lines software was developed for the real-time AMASCOS-300 Mission System within the scope of the Program. The Ocean Master 400 Radar with a mechanically rotated antenna array is capable of detecting a submarine periscope from a 30nm range and an altitude of 1,000ft under favorable weather conditions, and a patrol boat from a 90nm range and 6,000ft altitude within an area of 100 square meters.

I. Liaison and General-Purpose Aircraft (GPA) Project

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

To this end, SSB has launched a tender in 2016 to procure a total of 9 Liaison and General-Purpose Aircraft (GMU/GPA), 6 for the Turkish land Forces and 3 for the Turkish Police. The Request for Proposal (RFP) document prepared as part of the Project was published by the SSB on June 21, 2016. The bidders were asked to submit their proposals to the Department of Aircraft at the SSB until August 19, 2016. However, the proposal submission deadline was extended five times by the SSB during August 19, 2016 and December 29, 2017. Leonardo is offering C-27J Spartan and ADS is offering C295 to meet both Turkish Army and Turkish Police requirements. In order to provide first hand information on C-27J Spartan to Turkish Media, Leonardo has organized a press tour to the Italian Air Force (IAF)'s Pisa Air Base, from where IAF operates their C-27Js in October 2017. During the event Turkish media representatives had find a chance to see C-27J with their eyes and to have information about its operational capabilities from their pilots.

According to the information we acquired, the Liaison and GPA to be procured for the Turkish Army are required to have the capability to carry the blades of the CH-47F Chinook Heavy Lift Helicopters, the deliveries of which were launched to the Turkish Army in July 2016. As the length of each of the six blades at the CH-47F Helicopter is 914.4 cm (360 inches), the aircraft to be procured in this case need to have a cabin length of minimum 9.5m and a rear ramp that would assist the easy embarkation and disembarkation of both the passengers and the cargo load.

The C-27J Spartan is a new generation tactical airlifter with great market success, with 82 aircraft already sold to 14 operators across five continents. The Spartan is a



C-27J Spartan

twin-turboprop tactical airlifter with state-of-the-art technologies in avionics, propulsion system and other on-board systems. Thanks to its very versatile design, the C-27J is ideal for roles including troop and materials transport, medical evacuation, paratroop and materials airdrops, search and rescue (SAR), logistic supply, humanitarian support, firefighting and civil emergency operations support. Purpose-designed kits also allow VIP transport and other missions. The C-27J has a large cargo box, capable of supporting almost 5 tons per square meter. The aircraft can carry pallets or platforms weighing up to 6,000 kilos, or 60 equipped soldiers, 46 fully equipped paratroops, 36 stretchers or other combinations up to 32,500 kilos maximum takeoff weight. The aircraft can operate from airstrips under 500 meters.

The Airbus C295 is a new generation tactical airlifter in the light and medium segment. It is robust and reliable but also highly versatile in terms of the number of different missions it can perform. In total the ADS received 206 orders as of July 2018 and completed deliveries of 167 C295s. The aircraft is noted for its short takeoff and landing capability on semi-prepared runways and for the large payload capacity of 9,250kgs. The landing and takeoff run of just 320m and 670m allow the aircraft access to runways close to operational or crisis areas or where supplies and troops are needed.

J. Stand-Off Jammer and SIGINT Aircraft Programs

The Stand-Off Electronic Support/Electronic Attack (ES/EA) Capability at Air Platform (Air SOJ) Project, which previously assigned to Aselsan as a single source (in 2009) upon the Decree of the DIEC, covers the procurement of a modern airborne stand-off ES/EA system capable of jamming the early warning and air Defence radars and enemy communication systems of the enemy thus preventing or postponing the detection, identification and interception of the TurAF's attacking fighter/bombers by the enemy especially in cross-border operations. Under the Air SOJ Project, Aselsan would deliver a total of four Stand-Off Jammer Aircraft, one prototype and three serial production models.

The negotiations had been held for many long years between Aselsan (Submitted its proposal on May 15, 2013 to the SSB) and the SSB focused on the costs and shortening the project schedule instead of the technical issues. Aselsan has been continuing its activities to launch the Air SOJ Project with optimum duration and costs. Since the demand is quite immediate, the duration is quite critical. The contract regarding the Project was expected to be signed in the first quarter of 2016 but the activities failed to keep up with this schedule.

In the meantime, while Aselsan has engaged in talks with foreign business jet manufacturers (Turkey had previously considered adapting the A400M Atlas for this role) to build a stand-off jammer (SOJ) system, in early 2015 SSB has launched a parallel program dubbed as GÖLGE (Shadow) to procure similar systems, but covers only two Stand-Off Jammer Aircraft, from a foreign supplier to meet urgent requirements. The Presidency of Defence Industries (SSB) announced that the new program would involve "production, delivery and acceptance of the systems; installation and integration of mission equipment into the systems; construction of barracks and buildings; test and assessment of the systems; maintenance, repairs, technical support, spare

parts; supply of ground support equipment and their spare parts and overall training." Under the GÖLGE/Shadow Project a Request for Proposal (RFP) was issued by the SSB to the potential local and foreign bidders who were asked to reply no later than February 23, 2015.

The SSB shortlisted four companies (U.S. based Tempus Applied Solutions, Savronik Elektronik Sanayi, Aselsan, and Duygu Havacilik ve Savunma Sanayi) under the GÖLGE Project and following the proposal evaluation process Tempus Applied Solutions was announced as the winner of the tender. However, due to the financial difficulties that Tempus Applied Solutions Company experienced at that time, it was understood that the Company would not be able to accomplish the Project and contract negotiations were launched in 2015 with the second company at the short list, Savronik Elektronik Sanayi (cooperating with Ultra Electronics). Savronik was supposed to integrate the Air SOJ System on two Bombardier Global Express business jets with the Ultra Electronics it cooperated with as part of the Project and to deliver them to the TurAF. The GÖLGE Air SOJ System was expected to cost approximately US\$250 Million. However, since negotiations with Savronik has not been concluded with a contract award, with a DIEC resolution adopted at November 2, 2017 meeting the GÖLGE Project, which was launched in order to fulfill the urgent requirement but could not be elevated to the signing stage was cancelled and fulfilling all the requirements over Aselsan was decided upon.

Aselsan and the SSB have been carrying out contractual negotiations under the Air SOJ Project since then. The Air SOJ contract was scheduled to be signed in the first quarter of 2018 and the deliveries were expected to take place during 2023 - 2025. Aselsan's Airborne Stand-Off Jammer System will feature long range detecting and jamming capability with Active Electronically Scanned Array (AESA) technology, wide band frequency coverage, high power jamming output, precise



A computer generated image of Aselsan's Stand-Off Jammer aircraft based on G-550

direction finding and geo-location for radar and communication signals and to be integrated on a business jet (probably either on the GulfStream G-550 [the Stand-Off Jammer Aircraft mock-up displayed by the Company is based on G-550] or on the Bombardier Global 6000). The Stand-Off Jammer Aircraft to be procured under Air SOJ project will replace existing MilKar-2U RF Jammer Aircraft (based on C-160D Transall transport aircraft and could also perform COMINT and IMINT roles) in the service of the TurAF.

In order to meet next generation SIGINT (with ELINT and COMINT capability) Aircraft requirement of the Signal Intelligence Directorate (former Electronic Systems [GES] Command of the Turkish General Staff) of the Presidency of National Intelligence Organization (MIT, which reports directly to the Presidency since August 2017), SSB launched SIGINT Aircraft (SU) Project in 2016. Aselsan assigned as the Prime Contractor for the SU Project and in December 2016 a contract was signed between Aselsan and Field Aviation of Canada for the joint development

of a new Special Mission Aircraft based on the Bombardier Challenger 605 business jet. Aselsan engineers participated the structural modification on Challenger 605 (CL-605) aircraft in Canada. Aselsan also purchased a second CL-605 aircraft in poor condition and almost not airworthy to utilize at ground test at its test facilities in Gölbeek, Ankara and installed the aircraft fuselage on test tower after dismantling its engines and avionics equipment in 2017. The first CL-605 based SIGINT aircraft is expected to be ready for delivery by late 2018 or early 2019.

Currently there are three CN235-100M SIGINT aircraft equipped with a pair of Aselsan's MILSIS-23U ELINT/SIGINT Pods (on underwing pylons) along with other mission equipment in MIT service. In January 2012, when the GES Command of the TGS was transferred to the MIT along with other assets three CN235-100M SIGINT aircraft were also transferred to MIT property. However even though they belong to MIT, the CN235-100M SIGINT aircraft are still operated by the TurAF pilots ■



A computer generated image of Aselsan's SIGINT aircraft based on CL-605



SAHA EXPO2018

13-15
SEPTEMBER
2018

ISTANBUL EXPO CENTER

Grand Meeting Of Domestic And National Defense Industry



www.sahaexpo.com

[f](#) [@](#) [t](#) [in](#) /sahaexpo



ISTANBUL
WORLD TRADE
CENTER



ISTANBUL
CHAMBER OF
COMMERCE



ISTANBUL
ANADOLU SGE
YORGANCI INDUSTRIAL



AKINCI Attack UAV System

Speaking at a televised interview held on June 12th, 2018 the then Turkish Minister of National Defence (MoND) Nurettin CANIKLI disclosed that a contract was signed with a company for the development and manufacture of new 4.5-ton armed UAV dubbed AKINCI and first delivery will take place in 2020. He, however, did not mention the name of the company to produce AKINCI Attack UAV.

On July 10, 2018 Mr. CANIKLI, Minister of National Defence, handed over the duty to General Hulusi AKAR who was appointed to this duty on July 9.

On the same day images of the AKINCI (Raider) Attack UAV, previously announced by MoND CANIKLI, were released for the first time by Selçuk BAYRAKTAR, Baykar Makina Chief Technology Officer (CTO). CTO BAYRAKTAR announced that the company's AKINCI Attack UAV hit the production line.

With a service ceiling of 40,000 feet, the AKINCI UAV will have maximum take-off weight of 4,5 tons, have a payload capacity of 1.350kg (900kg external and 450kg internal), have 24 hours of endurance and be powered by two turboprop engines each generating 550hp.

AKINCI UAV will have a 20m wingspan, is 12,5m long and 4,1m high and to be equipped with indigenously developed SatCom, CATS FLIR, Wide Area Surveillance System, ELINT/SIGINT System, ESM Pod, Collision Avoidance System, Multi-role AESA Air Radar and a SAR/GMTI Radar. AKINCI can be armed with wide range of air-to-ground munitions including MAM-L, MAM-C, CIRIT, Mk81 and Mk82 general-purpose bombs, smart munitions (such as HGK, KGK and LGK) with various guidance kits and SOM ALCM. According to Baykar Makina General Manager Haluk BAYRAKTAR, AKINCI UAV may be equipped with air-to-air missile systems domestically



© Baykar Makina

developed in Turkey and may be deployed in air-to-air missions. "The AKINCI UAV system will have the most developed state-of-the-art technology in its own class within three years", he said.

Under the AKINCI Attack UAV Program, the SSB issued a Request for Information (RFI) during the first half of 2016 and received responses from TA and Baykar Makina on June 17, 2016. During its January 31, 2018 DIEC, the highest decision-making body on defence procurement in Turkey, selected Baykar

Makina over TA and authorized the SSB to start contractual negotiations with Baykar Makina. In an interview with Yeni Şafak daily on February 24, 2018, MoND CANIKLI disclosed that a contract with Baykar Makina would be signed soon and that AKINCI UAV deliveries will begin in 2021. CANIKLI also underlined that the AKINCI UAV would enable Turkey to develop Unmanned Combat Aircraft (UCAV) starting in 2027 based on the technology acquired.



© Baykar Makina

www.adex.az



ADEX
AZERBAIJAN DEFENCE EXHIBITION **2018**

3rd Azerbaijan International

DEFENCE EXHIBITION

25-27 SEPTEMBER

**BAKU EXPO CENTER
BAKU, AZERBAIJAN**

ORGANISERS



MINISTRY OF DEFENCE INDUSTRY
OF THE REPUBLIC OF AZERBAIJAN



SUPPORT



MINISTRY OF DEFENCE OF
THE REPUBLIC OF AZERBAIJAN

KTJ-3200 Turbojet Engine Tests Ongoing

On June 20, 2018 President of Defence Industries Ismail DEMİR Ph.D announced with a tweet that the KTJ-3200 (Kale Turbojet-3200) turbojet engine's tests are being carried out successfully and when it becomes operational the engine will power all of the indigenously developed air-to-surface (SOM ALCM Family) and surface-to-surface missile (ATMACA Block I and Block II) programs.

Being developed indigenously by Kale R&D company under a US\$25 Million R&D contract signed between Kale Aero and the SSB on February 22, 2012 the KTJ-3200 turbojet engine was previously named the Kale 3500, due to its targeted maximum thrust power capability of 3,500N (3.5kN). It is believed that it has even been targeted to produce as much as 3,500N thrust, however since during the run tests performed at the test bench it has been confirmed that the engine could deliver only 3,200N, and thus it was renamed the KTJ-3200.

The engine will run on either JP8 or JP10 fuel and since the engine will be designed for a one-time use missile, its running time will be only 20 to 25 minutes. KTJ-3200 is aimed to replace Safran Power Units' (former Microturbo) TR40 turbojet engine (in the 2.5 kN to 3.4 kN [560 lbf to 750 lbf]) thrust class being used on SOM ALCM Family and ATMACA Block I surface-to-surface anti-ship missiles.

Kale 3500 Turbojet Engine Specifications:

Type: Single Spool Turbojet

Major Applications: SOM ALCM Family and ATMACA Block I/II Missiles

Fully Functional Prototypes

Delivery: Two prototypes in 2019 (originally planned for April 2016)

Length: ~ 70 cm



© Defence Turkey

Diameter: 30 cm
Dry Weight: 48 kg
Specific Fuel Consumption (SFC): < or = 1.2 kg/daN/hr

Compressor: Various configurations have been studied during design phase including 4-stage axial, 5-stage axial and 1 axial and 1 radial compressor combination

Turbine: Single Stage

Fuel Type: JP8, JP10

Lubrication System: The bearing system is lubricated by fuel (on board the missile) rather

than a separate oil system

Generator: Permanent magnet based 6kVA generator mounted on the engine shaft

Maximum Thrust: 3.2 kN (787 lbf)

Speed: Kale 3500 is designed to provide Mach 0.95 flight speed on SOM ALCM at a 5,000 ft altitude

Service Life: 17 hours

Running Time on SOM

Missile: 20 to 25 minutes

First Test on a Test Bench at Laboratory: September 19, 2013



© Defence Turkey

Aselsan Signs a New Export Contract for AselPOD

Through its statement sent to the Public Disclosure Platform (PDP) on June 29, 2018, Aselsan announced the award of a contract worth US\$30 million with a foreign customer for the integration of the AselPOD Electro - Optical [EO/IR] Targeting System to the air platforms. This has been the third export order of AselPOD received by Aselsan.

Aselsan initially signed an AselPOD export contract worth approximately US\$25 million with Pakistan on June 10, 2016 for the delivery of 16 pods [this figure is stated as 8 according to Pakistani sources]. The AselPODs procured within the scope of the contract were started to be delivered in early 2017 and were integrated to the JF-17 aircrafts at the inventory of Pakistani Air Forces (PAF), in Pakistan. To this end, in addition to the integration activities, the production of the pylon (the external load station under the body) to which the pod is mounted was also accomplished by Pakistan. As part of the integration activities (power, communication and image transfer as well as interoperability of the navigation systems at the pod and the aircraft), the interface related with the aircraft provided by the Pakistani Air Forces was prepared and delivered by Aselsan for the AselPOD. Certain required software based updates were also accomplished with the support of Aselsan. The integration activities were launched as of June 15, 2016 and an empty AselPOD was sent to Pakistan to this end.

In the international tender launched, Aselsan competed with the Lockheed Martin's (LM) SNIPER XR and Thales Group's DAMOCLES Targeting Pods and the Pakistani Air Forces selected AselPOD as it was pleased with the performance of the AselPOD and appreciated its features.

In May 2017, Aselsan signed a second AselPOD export contract worth US\$24.9 million with Pakistan, containing 16 more pods. In the meantime the firing tests executed in Pakistan with the AselPOD EO/IR Targeting System integrated to the JF-17 aircrafts were successfully completed in June 2017.



© Aselsan



© Cem Doğut



© Cem Doğut

Turkey Increases Defence Exports in the First Half of 2018

Emerging as a new arms exporter that can provide more efficient, low cost, combat-proven and less problematic products for arms buyers, the Turkish Defence & Aerospace Industry increased exports by 13.91% during the first half of 2018 compared to the same period last year.

According to export figures revealed by the Turkish Exporters' Assembly (TIM), on July 2, 2018 during January 1st – June 30 of 2017, the Turkish Defence & Aerospace Sector exported a total of US\$795.705 Million, while the said figure reached US\$906.408 Million in the same period of this year. The Turkish Defence & Aerospace Industry's total arms exports amounted to US\$122.095 Million in June 2018, which represents a 22.01.3% decrease compared to June 2017 and represents around a 36% decrease compared to May 2018.

The Turkish Defence & Aerospace Industry reached US\$106.506 Million in January, US\$149.675 Million in February, US\$148.010 Million in March,

US\$189.961 Million in April and US\$190.376 Million in May 2018.

According to TIM's figures during January 1 – June 30, 2018 the Turkish Defence & Aerospace Industry exported US\$351.075 Million in defence and aerospace equipment to the North America/USA, US\$279.139 Million to the EU Member Countries, US\$15,701 Million to other European countries, US\$114.057 Million to Middle East countries, US\$37.417 Million to the Commonwealth of Independent States (CIS), US\$51,072 Million to other Asian countries, around US\$27,628 Million to African countries and US\$19,186 Million to Far East countries.

According to TIM figures the list of the top 15 countries that imported defence and aerospace products from Turkey during January 1 – June 30, 2018 is composed of; the USA, Germany, Oman, the Netherlands, France, India, the UK, Azerbaijan, Senegal, Belgium, Italy, Switzerland, Poland, Qatar and Philippines.

With a total of US\$342,942 Million in purchases the United States was the largest recipient/

importer (mainly military and civil helicopter and aircraft parts, and component sales realized under offset commitments), followed by Germany with US\$116,903, Million, Oman with US\$81,535 Million, the Netherlands with US\$39,650 Million, France with US\$35,968 Million, India with around US\$34,676 Million, the UK with US\$28,465 Million, Azerbaijan with around US\$20,676 Million, Senegal with US\$12,300 Million, Belgium with US\$11,321 Million and Italy with US\$11,251 Million. Ranked 13th Poland has imported only US\$9,380 Million worth of defence and aerospace items from Turkey, which was US\$38,129 Million during the same period in 2017 thus represents a 75.40% decrease, the sharpest one in the first half of 2018 export figures. Ranked 16th, China imported US\$8,384 Million in defence and aerospace items from Turkey during first half of 2018, which was merely around US\$227,30 thousand during the same period in 2017 thus represents a 3588.87% increase the largest one in terms of rate of increase.

Sefine Shipyard Wins DIMDEG Contract

On July 10, 2018 Sefine Shipyard secured a contract from the Presidency of Defence Industries (SSB) to construct a Fleet Replenishment Ship (DIMDEG) for the Turkish Navy.

The DIMDEG Project was launched in order to meet the Turkish Naval Forces Command's new generation Fleet Replenishment Ship requirement, to satisfy the fuel, water transport and supply needs of surface units in the open seas around the world.

The project comprises two phases: Preliminary Design and Detailed Design & Construction. The ship's preliminary design has been carried out by the Turkish Naval Forces Command's Design

Project Office (DPO) located in Istanbul Naval Shipyard, while some activities/tests required for the design phase have been performed by the STM under a contract awarded by the SSB on October 1, 2012. For the Detailed Design & Construction Phase a tender was launched and in May 2016 and the SSB received proposals from Sedef Shipyard and Sefine Shipyard.

During DIEC's January 31, 2018 meeting Sefine Shipyard was selected under the DIMDEG Project and the SSB was given a green light to start contractual negotiations with the company.

The DIMDEG will have an overall length of 190 meters, height of 7.2

meters, displacement of 22,000 tons and a beam of 25 meters. It is to be powered by two gas turbines and two diesel engines and the DIMDEG Fleet Replenishment Ship will have a maximum speed of 24 knots.

According to the SSB statement, issued on July 13th, many Turkish companies including Aselsan, Havelsan and Turkish Lloyd will take part in the DIMDEG Project and the ship will be integrated with the GENESIS ADVENT Combat management System. "The Industrial Participation and Offset (IP/O) commitment in the DIMDEG Project will be realized over 77%" the Presidency said in a statement.

Aselsan Receives Additional Orders for SERHAT HTR

According to the company's statement dated June 29, 2018 for the procurement of the Counter Mortar Radar required by the Turkish Armed Forces (TAF), a contract with the volume of US\$ 40,320,000 was signed between Aselsan and the Ministry of National Defence (MoND). Within the scope of the contract worth TL 30.48 million [nearly US\$ 16 million] previously signed with the MoND, Aselsan delivered 15 SERHAT Counter Mortar Radars (CMR) with three-doored Cobra 4x4 Tactical Wheeled Armored Vehicle (TTWAV) produced by Otokar to the Land Forces Command (KKK). Upon the demand emerging in the past period, the modification of the SERHAT CMR for its C-RAM (Katyusha Missile capability included) task came up on the agenda and actual firing tests were executed to this end. Moreover, SERHAT CMR was integrated to the KORKUT and AIC for generating data in terms of early warning, with a study carried out by Aselsan.

In accordance with the Almanac 2017 published recently by Aselsan, deliveries as part of the contract signed between Aselsan and the STM Company in June 2017, towards the procurement of SERHAT CMR for fulfilling the demands of the Air Forces Command (HvKK), were accomplished in December 2017. It is assessed that the SERHAT CMRs launched into the service of the HvKK would be utilized in the protection of air surveillance early warning radar facilities at border zones and I-HAWK battalions against potential mortar fires.

Successfully performing its tasks in the operation field, primarily in the South Eastern border, SERHAT CMR was deployed at El Bab towards the end of 2016, as part of the operations executed in Syria. Around 30-40 SERHAT CMRs are expected to be launched into the service of the TAF as part of the new contract.

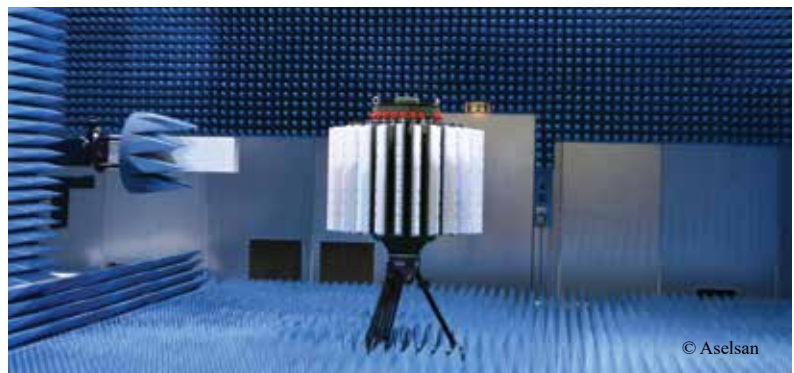
SERHAT Counter Mortar Radar, the first national weapon locating radar system with patented advanced radar techniques, can detect and accurately calculate point of impact and origin of enemy mortars fired behind hills or mountains in all extreme environmental conditions.



The L-Band SERHAT CMR with a phase arrayed cylindrical fixed antenna capable of executing 360° target acquisition was placed over a mast over a Cobra Vehicle. First SERHAT CMR delivered to the KKK in October 2014 is capable of operating 7/24 with the help of the generator transported at the exterior parts of the vehicle. Through the system where the calibration requirements are abolished with the help of the interior INS/ GPS System, the coordinates of the points where over five mortar shells simultaneously fired and fell within a range of 6 km could be identified precisely under all types of weather conditions and moreover the points where they will be dropped could be calculated with high accuracy. Later, Katyusha missile detection and tracking capability was gained to the SERHAT CMR. In addition to the SERHAT CMR, Aselsan signed a contract with the MoND in the previous years on the new generation Weapon Locating

Radar (WLR). As part of the contract worth US\$ 176,850 million signed between the MoND and Aselsan on 16 December 2016, the delivery of 9 WLRs with AESA antenna technology and 100 km target acquisition range will be accomplished by Aselsan to the KKK. Aselsan WLR systems will replace the COBRA WLR in the inventory with a range of 40 km.

Aselsan WLR detects enemy mortars, artilleries, and rocket launchers from long distances; accurately calculates point of impact and origin using state of the art technology. AESA [Active Electronic Scanning Antenna] and DBF [Digital Beam Forming] architecture of Aselsan WLR supports electronic scan and terrain following features. WLR can generate early warning messages for the friendly troops located in the vicinity of the calculated impact point by detecting long range enemy artilleries and rocket launchers in advance; hence reduces the number of casualties.



Azerbaijan Displayed Mock-Up of SOM-B1 Missile at Parade

by İbrahim SÜNNETÇİ

On June 26, the Azerbaijani Air and Air Defense Force displayed a mock-up of its SOM-B1 long-range, high-precision, Air Launched Cruise Missile (ALCM) which is being produced by the Turkish firm Roketsan. The SOM missile mock-up has been demonstrated (it has been crossed the front of a tribune on a tactical wheeled vehicle) in the 100th anniversary parade of the Azerbaijani Armed Forces for the first time, which makes it clear that Azerbaijan has procured an undisclosed amount of SOM-B1 ALCMS, making it the first foreign user of the SOM (Stand-Off Missile) missile.

The SOM-B1 is designed for use against high-value, heavily defended ground and sea targets with a range of up to 280 kilometers and will allow fighter jets of the Azerbaijani Air and Air Defense Force (AAF) to destroy targets that are located behind the frontline with high precision and without becoming caught up in anti-aircraft warfare.

The most likely launch platforms for Azerbaijan's SOM-B1 ALCMs are the AAF's MiG-29 multirole fighters. During one of the TurAz Falcon Exercises (probably at TurAz Falcon 2016) held in Turkey, SOM ALCM was integrated on an AAF MiG-29 fighter and a live firing test was performed at a test range in Konya.

According to a high-ranking Roketsan official the company has been working on SOM ALCM with Azerbaijan since 2014. In April 2018 Roketsan General Manager Selçuk YAŞAR disclosed that each SOM Missile has a price tag listed over US\$1 Million and integration and final assembly of the SOM Missiles are being performed in a 300 square meter facility.

Speaking at a televised interview held on July, 2018 the then Turkish Minister of National Defence (MoND) Nurettin CANIKLI



© Roketsan

announced that Turkey has started SOM Missile exports without disclosing any specific country name.

Designed, developed and manufactured by TÜBİTAK-SAGE, the Defence Research and Development Institute of Turkey, under a US\$80 Million valued contract awarded by the Turkish MoND on March 31, 2006, the SOM is a family of new generation, air launched non-nuclear, long range, fire-and-forget type precision strike missiles capable of defeating both fixed non-hardened and hardened land targets as well as moving sea targets. The 1,300 lbs (610 kgs, B2 version weighs 1,400 lbs [660 kgs]) SOM ALCM's airframe is designed with stealth

capability provided by the shape of the airframe and the materials used in its construction, to give the missile a low detection probability and allow it to penetrate enemy air defence systems.

Under the project prototype missiles were manufactured in 2008 and following extensive wind tunnel and systems tests, captive-carry and release trials were performed from a F-4E 2020 aircraft in 2010. On August 9, 2011 first live firing test of SOM-A (INS/GPS + TRNS guided version) from a F-4E 2020 aircraft was performed in Black Sea. During the test performed SOM-A missile, not carrying warhead, flew more than 100 nm (185km) before hitting its determined target with



© Defence Turkey

SOM-J and SOM Missiles being displayed at Roketsan stand during IDEF '17

high accuracy. During third firing test performed on September 27, 2011 once again from a F-4E 2020 aircraft in Black Sea, the SOM-A missile flew around 26 minutes and hit its determined surface target (a floating platform) located at around 250km distance with high precision. SOM-A aircraft release tests were also performed on a F-16D Block 40 in 2011. SOM was first displayed aboard a TuAF F-16C Block 50 aircraft during the 100th year celebrations of the Turkish Air Force held at the 2nd MJB Command in Çiğli, Izmir during June 4-5 2011. SOM's first international debut was took place during DSEI Exhibition in London UK, where the full-scale mock-up of the missile was displayed at TÜBİTAK-SAGE stand in September 2011. Following the completion of the Development and Qualification Phase (covering design, development, prototype manufacturing, live firing test and qualification activities) by TÜBİTAK-SAGE in 2012, the Turkish MoND selected Roketsan for the Series Manufacturing Phase and awarded an undisclosed amount of contract in early 2013. Under the contract following the production line qualification activities Roketsan started Low Rate Initial Production (LRIP) of SOM ALCMs in July 2013 and delivered the first batch of the series production SOM-A missiles to the TurAF during the second half of 2015. On January 4, 2018 Turkey's Defence procurement agency, the SSB, announced with a tweet that under a big pack order Roketsan has completed delivery of first 7 SOM-B1 missiles to the TurAF.

Powered by a Safran Power Units (former Microturbo TR40 turbojet engine (in the 2.5 kN to 3.4 kN [560 lbf to 750 lbf]) thrust class, the SOM is an indigenously developed high-subsonic cruise missile designed to meet Turkish Air Force requirements. Though it is smaller it shares several features with LFK KEPD-350 Taurus and MBDA Scalp/Storm Shadow missiles. SOM ALCM has four versions; SOM-A, SOM-B1, SOM-B2 and SOM-J. SOM-A is equipped with INS/GPS guidance



system plus a Terrain Referenced Navigation System (TRNS/TERCOM) coupled with radar altimeter and has 230 kgs HE-type unitary warhead. SOM-B1 version also has HE type unitary warhead, whereas SOM-B2 is armed with dual-stage tandem penetrator and in addition to GPS/INS they both also employ Imaging Infrared Seeker (IIR, has cooled type 640x512 pixels detector) for enhanced terminal guidance plus TRNS/TERCOM, radar altimeter and an Automatic Target Recognition/Acquisition system. It carries a single 350 lb (around 140 kgs) blast-fragmentation/semi-armor-piercing warhead the SOM-J, air launched anti-ship missile, is also equipped with an IIR seeker with Automatic Target Recognition/Acquisition capability. Having a range of 150+nm the 1,000lbs (around 500 kg) class SOM-J is an air-to-surface missile designed for use against heavily defended, high value maritime targets and land targets. Roketsan has been cooperating with TÜBİTAK-SAGE and Lockheed Martin Aeronautics, the Prime Contractor of the JSF Program since 2014 for the integration

of SOM-J on F-35. SOM-A and SOM-B1 have been certified for the F-4E 2020 and F-16 platforms and already entered the service of the Turkish Air Force (TurAF). Qualification and certification flight tests for the SOM-B2 are currently ongoing.

Currently, SOM ALCM supplies the selection among pre-planned missions and controllable impact points and parameters. Meteksan Defence is working on a two-way encrypted RF data-link capability under KEMENT Project, which will allow in-flight re-tasking against moving targets, for SOM B1/B2 missiles and planned to complete its studies until the missile enters the serial production phase. Meteksan Defence successfully completed the Prototype Demonstration phase in May 2018. Following the completion of the currently ongoing Design Verification Phase, Factory Acceptance Tests (FAT) and Site Acceptance Test (SAT) phases will be initiated. The company is expected to be ready for prototype deliveries by the end of 2018. SOM-J, on the other hand, is equipped with the Link-16 tactical data link system.

SOM-A/B1/B2 ALCM Specifications

Weight: 610 kg (1.300 lb, SOM-B2 1.400 lb [660 kg])

Length: 3.85 m

Warhead: 230 kg (500 lb) HE unitary or Dual Stage Tandem Penetrator

Engine: TR40 turbojet engine (to be replaced with Kale Aero's KJT-3200 turbojet engine)

Wingspan: 2.7 m (during flight)

Operational : 150 nm (279 km)

Cruise Speed: Mach 0.85

Guidance System: INS/GPS, TRNS/TERCOM, ATR, IIR, radar altimeter + two-way RF data link

Launch Platform: F-4E 2020, F-16C/D, Mig-29 and F-35A (planned)

BMC Received Contract for Series Production of ALTAY MBT and Its Power Pack

During its March 29th meeting, DIEC, the highest decision-making body on defence procurement in Turkey, selected BMC as the Prime Contractor for the Series Production Phase of ALTAY MBT and National Power Pack Development Program for the ALTAY MBT and gave green light to the SSB to start contractual negotiations with BMC. On April 24, 2018 the President of SSB Prof. Ismail Demir, announced with a tweet that under the ALTAY MBT Series Production Phase, covering 250 MBTs, and National Power Pack Development Program, the SSB would start contractual negotiations with BMC in compliance with DIEC's decree. On April 24, 2018 BMC announced that they have been invited by the SSB for the contractual negotiations for the ALTAY MBT Series Production Phase and National Power Pack Development Program.

On May 17, 2018, speaking at the TOBB Turkish Defence Industry Assembly Meeting the President of Defence Industry Prof. Demir announced that the ALTAY MBT Series Production Phase contract would be inked soon with BMC. "We are about the sign contract", he said. Series Production of ALTAY MBTs at BMC Karasu facilities is expected to start during late 2019 or in early 2020. The SSB held the ALTAY MBT Series Production Project Kick-Off Meeting on May 24, 2018 before the contract award to discuss their goals and expectations under the Project.

ALTAY pre-prototypes (MTR and FTR) and prototypes (PV-1 and PV-2) are powered by EuroPowerpacks mounted in a 'U Configuration'. Otocar



received five power packs from MTU under a €12 Million contract signed in October 2010. The EuroPowerpack incorporates V-12 type MTU MT883 Ka-501CR diesel engine (27,35 litres, dry weight is 1,800kg) coupled to RENK's HSWL 295TM automatic transmission (with 5 forward and 3 reverse gears, dry weight is 2,450kg) and a cooling and air filtration system.

Some of the ALTAY MBTs to be produced in the course of Series Production Phase (either in first batch of 250 or in the second batch of 250) are planned to be equipped with an indigenous power pack. Under the ALTAY MBT National Power Pack Development (BATU) Project, on June 14, 2018 the SSB awarded a contract to BMC Power for the development of indigenous power pack with 1,500hp diesel engine to be coupled with a hydro-mechanical transmission for the ALTAY MBT. According to contract the SSB should have been an owner of full intellectual property rights and export rights to the power pack. According

to image distributed after the contract award ALTAY MBT National Power Pack would be in a 'U Configuration' and will feature a cross-drive automatic transmission. According to the SSB, tests and qualification of the ALTAY MBT National Power Pack would be performed at a new Test Center to be established under the Project.

Located at Teknopark Istanbul, BMC Power was also selected under the New Generation Armoured Combat Vehicle (NGACV) Power Pack Development Program by the DIEC on October 28, 2016 and a contract was signed between the company and the SSB on October 13, 2017. Under the program BMC Power will design, develop, test, qualify and deliver a power pack which will consist of a 675kW (905hp), V8 type 18-litter diesel engine coupled with an automatic transmission under a 68-month schedule. The contract become effective on January 4, 2018 and 'To' started. According to BMC officials, 200 engineers including 70 foreign ones are working on the power pack.

Turkish Defence and Aerospace Sector Participates at Eurosatory 2018

Eurosatory 2018, the International Land and Airland Defence and Security exhibition, was held at the Paris Nord Villepinte Exhibition Center in Paris during June 11th to the 15th, 2018.

According to the organizing company COGES the exhibition hosted 39 national pavilions including the Turkish Pavilion, gathered 1,802 exhibitors from 63 countries, 65.8% of which are international companies, 57,056 international visitors from 153 countries including 227 Official Delegations and 177 VIP Experts from 94 countries and 4 international organizations. During Eurosatory 2018 a total of 71 conferences were held and 696 journalists followed the event from all continents. The next edition of Eurosatory will be held from 8 to 12 June 2020.

Eurosatory, is the world-leading event dedicated to Land & Airland Defence and Security. The event provides a unique time-effective opportunity to meet, in a single place, all the Land & Airland Defence and Security manufacturers, to discover the latest technological innovations in domains and to help exhibitors and visitors to expand their professional network, to prospect new markets and to generate business opportunities.

As a result of the Presidency of Defence Industries' (SSB) heavy investment to develop Turkish defence industrial capabilities by designing and developing high-technology defence equipment in Turkey through technology transfers and co-production contracts, the Turkish Defence and Aerospace Industry has achieved remarkable progress in many areas over the last decade and has transitioned from a license producer to a technology owner. The Turkish Defence and



Aerospace Industry today can compete in the international arena and has the ability to meet the needs of the majority (around 70 per cent in 2017) of both the Turkish Armed Forces (TAF) and its customers.

The SSB attaches a great deal of importance to defence exports and provides comprehensive support to the presentation of Turkish defence industrial capabilities under a National Participation concept. Believing that international fairs are the best platforms to share Turkish defence capabilities with other representatives from various countries and also to take advantage of their valuable experiences, the SSB has identified certain areas as targets of opportunity for Turkish defence industrial capabilities to establish themselves and have decided to participate in international fairs held in these areas such as IDEX in Abu Dhabi, DIMDEX in Qatar, DSA in Malaysia, IDEAS in Pakistan, SOFEX in Jordan, DSEi in the UK, FIDAE in Chile and Eurosatory in France with a National Pavillion.

The Turkish Defence and Aerospace Sector's participation in Eurosatory 2018, which is one of the major meeting points of

the world defence industry, was performed under the coordination of the SSB and Turkey's Defense Industry Exporters' Union (SSI). A total of 59 Turkish Defence and Aerospace companies (61 with the SSB and SSI) including Aselsan, AYESAŞ, BMC, FNSS, Havelsan, Katmerciler, MKEK, Otokar, Nurol Makina, Nurol Technologies Roketsan, SDT, STM, Vestel Defence and Yakupoğlu took part at the Turkish Pavillion. With 61 exhibitors the Turkish Defence and Aerospace Sector was the 6th largest international participant at Eurosatory 2018.

The Eurosatory 2018 stand was 700-square-meters. Participants included BMC, as one of the biggest commercial and military vehicle producers founded in Izmir Turkey with a background of more than 50 years, which showcased 6 military vehicles including 4 World Premieres; Multi-Purpose Armored Vehicle "VURAN (4x4)" with 120 mm ALKAR Mortar System, Multi-Purpose Armored Vehicle "AMAZON (4x4)" with Remote Control System, Mine Resistant Ambush Protected Vehicle "KIRPI II (4x4)"s Ambulance version and Armored Tactical Wheeled Vehicle "BMC 285."

Thanks to its monocoque type armored cabin and windows, shock absorbing seats, V-shaped underbelly, gun ports and emergency exit hatch, VURAN (4x4) is part of a family including multi-purpose armored vehicles. It provides mine and ballistic protection for its passengers. VURAN features front rear view camera, automatic fire extinguishing system, remote controlled weapon station, run-flat tire inserts and A/C with heating and cooling functions.

KİRPİ II (4x4), a prominent member of BMC's Mine Resistant Ambush Protected Vehicle Family, was also presented at the Eurosatory 2018 by BMC with its two distinct facelift models. "KİRPİ II (4x4) Ambulance" and "KİRPİ II (4x4) with Remote Controlled Weapon Station" which have the same cabin features as VURAN. The monocoque type armored cabin and windows, shock absorbing seats; V-shaped underbelly, gun ports and emergency exit hatch are leading common features of BMC's Mine Resistant Ambush Protected Vehicle Family.

AMAZON (4x4), another vehicle that was showcased at the BMC stand, guarantees security of its passengers against mine, ballistic and hand-made explosive threats. The distinguishing features of the vehicle are as follows: Automatic fire extinguishing system, central tire inflation system, run flat tire inserts, rear view camera, blackout and camouflage lighting. The new 4x4 Tactical Wheeled Armored Vehicle BMC 285 can carry nine tons of lightweight and has 10 tons of payload. It can travel at a speed of 90 kilometers per hour and has 285 horsepower.

FNSS Savunma Sistemleri unveiled the first prototype of the PARS 4x4 Anti-Tank Vehicle (ATV) which it is developing to meet the requirements of the Turkish Land Forces Command (TLFC) and exhibited KAPLAN-20 the New Generation Armored Fighting Vehicle (NG-AFV) and PARS III 8x8 Wheeled Armored Vehicle.



BMC VURAN (4x4)

Nurol Makina (at Hall 5, Stand B841), one of the most competitive 4x4 Tactical Wheeled Armored Vehicle producers, welcomed its visitors at Eurosatory 2018, with its best-in-class products; EJDER YALÇIN 4x4 and NMS 4x4. The two vehicles, which have become favorites among Armed Forces and Security Forces, were displayed at Eurosatory for the first time.

The EJDER YALÇIN, which passed numerous tests with flying colors in regions around the world as diverse as the Sahara Desert and the steppes of Central Asia. The NMS 4x4, on the other hand, adds modularity to the equation, taking adaptability to different requirements to a maximum level. The EJDER YALÇIN was presented in half desert, half khaki camouflage to highlight the adaptability of the vehicle to different environments, and to underline its selection by different countries around the world with very different climates.

The EJDER YALÇIN has already proven its combat-worthiness after having served in different conflicts and engagements in countries that have the vehicle in their inventory. The excitement it has generated in international markets has turned into concrete deals and orders over the course of 2017, and EJDER YALÇIN has been the choice of five different countries to date. Over 400 vehicles have already been delivered, while confirmed orders are in place for 500 more. Depending on user preference, the vehicles can be delivered in different configurations and with different mission payloads. Nurol Makina is currently projecting 1,400 orders for EJDER YALÇIN.

With the NMS 4x4, Nurol Makina responds to different protection levels and payload requirements with a single platform. The vehicle features scalable armor, offering a protection levels ranging from 1-4, and the level of ballistic protection



EJDER YALÇIN (4x4)

the platform offers can be further adjusted according to specific needs through the addition or removal of armor plates from its hull. These adjustments do not have to be the same all around the vehicle. For instance, based on user preferences, the vehicle's engine and personnel cabin can be granted higher protection, while the payload section at the rear can feature lower protection levels, effectively multiplying the number of alternative mission configurations available to the user. Another advantage offered by the NMS 4x4 in this respect is that its armor plates that have been developed by Nurol Technologies – which also operates under Nurol Holding – and the synergy between the two companies has paved the way for the production of vehicle-specific metal plates. Nurol Makina received the first purchase order for the NMS 4x4 from Qatar, even before the said qualification process had been completed. At DIMDEX 2018, Nurol Makina signed a letter of intent with Barzan Holding concerning the sale of 214 NMS 4x4 vehicles.

Otokar, a Koç Group company and the leading supplier to the Turkish Land Forces, debuted five armored vehicles at Eurosatory 2018, Europe's largest defense industry exhibition. The Company unveiled its TULPAR 105mm Light Tank for the first time at Eurosatory 2018. Designed as a multi-purpose tracked armored vehicle to address a diverse range of missions, TULPAR offers an effective solution for operators requiring high destructive capabilities. Other vehicles showcased by Otokar at the stand were; COBRA II, ARMA 6x6, COBRA and KAYA II. During Eurosatory 2018, Otokar's subsidiary Al Jason exhibited its RABDAN 8x8 WAV, for which it won a significant contract with the UAE last year.

Based on the COBRA platform, COBRA II 4x4 WAV offers high levels of protection against ballistic, IED threats and mines, a considerable payload capacity and a large internal volume. In



PARS-III 8X8

addition to superior mobility, the COBRA II accommodates 9 personnel including driver and commander, and delivers high performance in the toughest terrain and climate conditions. An amphibious option is available, and the vehicle offers a wide range of weapons integration and mission equipment options. The COBRA II is being successfully used in border protection as well as internal security and peacekeeping missions. Its modular structure means it can be used as a personnel carrier, a weapons platform, a ground surveillance radar platform, or as a CBRN reconnaissance, C2 or ambulance vehicle.

The KAYA II leverages Otokar's experience and knowhow in mine protected vehicles. Designed as a mine-resistant personnel carrier, KAYA II provides superior protection against both mines and kinetic-energy ammunition, with a chassis that adapts to the terrain

with a torsion bar suspension system. Offering excellent mobility in all kinds of terrain and climate conditions, the KAYA II 4x4 features a monocoque body and can accommodate 10 people, including commander and driver.

In addition, at the stand Roketsan showcased the mock-ups of CIRIT (named after a traditional Turkish cavalry game) 2.75" semi-active laser (SAL) guided rocket, the Smart Micro Munition (MAM-L), SOM Next Generation Air Launched Cruise Missile Family, Anti-Tank Guided Missile Family comprising UMTAS long-range and OMTAS medium-range anti-tank guided missiles with SAL and IIR guidance, 122mm and 107mm unguided Artillery Rockets, T-122/300 Multi Caliber and Multi Barrel Rocket Launching (MBRL) System, TRG-300 TIGER Missile System, TEBER Laser Guidance Kit, ASW Rocket and Ballistic Protection Solutions.



FNSS Launched PARS 4x4 Anti-Tank Vehicle Developed for ATV Project at Eurosatory 2018

Developed by FNSS to meet the requirements of the Turkish Land Forces Command, the PARS 4x4 Anti-Tank Vehicle (ATV) makes its first world appearance at Eurosatory 2018, where one of the two prototypes of the vehicle produced for qualification tests is being displayed at the FNSS stand, giving visitors to the event the opportunity to inspect up close a fully mission-equipped vehicle. The two prototypes, produced as part of the ATV project, will spend the coming months undergoing qualification tests once the manufacturer's verification tests have been completed.

The PARS 4x4 ATV has been devised as a vehicle that offers both speed and high manoeuvrability under all terrain conditions, with sufficient firepower to destroy enemy tanks and other armoured units from a distance, and with the ability to engage second targets following a rapid change of position. Drawing upon its vast experience and innovative approach, FNSS has come up with a very special amphibious vehicle that is capable of meeting these challenging requirements simultaneously.

Most noteworthy among the PARS 4x4 ATV's features is the positioning of its power pack at the rear of the vehicle. With the placement of cooling grate and exhaust on the upper body, this positioning allows the vehicle to go amphibious without prior preparation, thus granting it the best amphibious capabilities in its class and further allows the PARS 4x4 to manoeuvre at higher speeds. All these features, which can only be expected from a vehicle with a rear-positioned power pack, grants the PARS 4x4 with critical capabilities in moving away rapidly after launching an attack.

The outstanding capabilities of the PARS 4x4 ATV can be listed as follows:



PARS 4X4 ATV

- › **Mobility:** The PARS 4x4 features an axle and steering system that is designed to give the vehicle a small turning radius, while the long suspension movement range enhances the vehicle's performance over rough terrain. Although the PARS 4x4 is an amphibious vehicle, no concessions have been made in the vehicle's ballistic or mine protection levels.
- › **Situational Awareness:** The rear positioning of the power pack gives the driver a wide field of vision, while the integrated camera system provides the driver with full forward and rear situational awareness.
- › **Survivability:** The PARS 4x4 has been designed with superior ballistic and mine protection, and uses special armour material that ensure weight optimisation. The rear positioning of the power pack also helps reduce the vehicle's thermal signature.
- › **Weapon System:** The PARS 4x4 is armed with an unmanned, remote-controlled anti-tank turret, also of FNSS design. In addition to ballistic protection, the turret also has two anti-tank missiles and a 7.62 mm machine gun. The turret recently performed its first firing test with the anti-tank missile, during which it successfully hit its target at maximum range.

K. Nail KURT, General Manager and CEO of FNSS, said that the PARS 4x4 marks the beginning of a new era in anti-tank vehicles: "FNSS closely follows both developments and user requirements around the world, and as a result of these efforts, we came up with the PARS



ARCT Anti-Tank Guided Missile Turret

PARS 4x4 Anti-Tank Vehicle Specifications	
General	Mobility
Engine: Diesel	Maximum Road Speed: 110 km/h
Transmission: Fully Automatic	Swimming Speed: 6.5 km/h
Crew Capacity: 4	Maximum Road Range: 700+ km
Length: 5 m	Gradient: 70%
Width: 2.6 m	Side Slope: 40%
Height (Hull): 2.1 m	Vertical Obstacle: 40 cm
Suspension System: Double Wishbone, Independent, Coil Springs	Trench Crossing: 80 cm
Braking System: Hydraulic and ABS with in All Wheels	Turning Radius: 7.5 m
Protection Systems	Air Transportation: C-130, A400M, C-17, C-5
<ul style="list-style-type: none"> › CBRN Protection System › Air Conditioning System › Automatic Fire Suppression System › Blast and Leakage Protected Fuel Tanks › Modular Armour › Mine Blast-Resistant Seats › Smoke Grenade Launchers 	Firepower
	Turret: Remote Controlled Anti-Tank Turret (RCAT)
	Main Armament: 2 Guided Anti-Tank Guided Missiles
	Secondary Armament: 7.62 mm Machine Gun
	Ready Rounds: 500
	Weapon/Turret Drive System: Electric
	Drive with Two-Axis Stabilisation
	Traverse Axis: 360° Continuous
	Elevation Axis: -250 to +250
	Deck Clearance: Automatic and Programmable
	Sight System:
	<ul style="list-style-type: none"> › Mid Wave or Long Wave Thermal Camera › Day Camera › Laser Range Finder with 10,000 m Range
	Fire Control System:
	<ul style="list-style-type: none"> › Fire Control Computer › Automatic Super-Elevation and Lead Angle Computation

4x4 concept that we presented for the first time at IDEF 2017. Following the signing of our contract with the user, we readied this concept, along with its turret, for qualification tests, completely from scratch. This has allowed us to roll out a vehicle that is peerless in the world. The PARS 4x4 stands as yet further evidence of FNSS' engineering strength and tailored capabilities. With the introduction of the PARS 4x4 into the inventory, we are certain that it will become a force multiplier that changes all the equations, first for Turkish Land Forces Command, and later, for friendly and allied nations."

Anti-Tank Vehicles Project

Launched by the Presidency of Defence Industries (SSB) and conducted with FNSS as the prime contractor, the Anti-Tank Vehicles (ATV) project covers the development, qualification and delivery of a total of 260 vehicles that include the tracked KAPLAN-ATV and wheeled PARS 4x4 ATV platforms.

The project contract was signed on June 27, 2016 and entered into effect on October 14, 2016.

As envisaged in the project plan,

the detailed design of the vehicles was examined and approved by the SSB and Land Forces Command on the 15th month of the project schedule. In the classical project methodology, this milestone also corresponds to the start of production activities. In addition to the detailed design, FNSS also manufactured the first KAPLAN-ATV prototype, and presented the Remote-Controlled Anti-Tank Turret (RCAT), which is at the heart of the vehicle's primary striking power, to users in order to obtain feedback prior to commencing factory tests. The 15-month development period for the prototype is impressive in terms of its shortness when compared to recent

similar projects and could in fact be considered unprecedented.

The first prototype of the PARS ATV, which is the wheeled anti-tank system in the ATV project, began verification tests in May, and will soon commence qualification tests in line with the project schedule.

Serial production of both the tracked and wheeled vehicles in the ATV project is planned to be completed in 2021, with 260 vehicles expected to be delivered in total to the Turkish Land Forces Command.

FNSS Unveils Newly Developed ARCT Anti-Tank Guided Missile Turret

FNSS also unveiled its Anti-Tank Remote Controlled Turret (ARCT) first day of Eurosatory. The ARCT was developed utilizing state-of-the-art technology, the most current design approaches and combat experiences by the user. Armed with guided anti-tank missiles, the FNSS developed ARCT within the Turkish Land Forces Anti-Tank Vehicles (ATV) Program that was signed between the Turkish Presidency of Defence Industries (SSB) and FNSS on June 27, 2016 and went into effect on October 14, 2016. The contract contains the delivery of a total of 260 tracked and wheeled armored vehicles, to be designed and produced through indigenous capabilities.

Working at an intense pace from the beginning of the ATV Program, FNSS managed to complete the design and prototype production phases of the ARCT within a very short period. Verification tests involving the long-range firing of the first anti-tank guided missile were performed in the 18th month of the project calendar, and this critical stage was concluded successfully with a direct hit on the intended



target. The tests also saw the firing tests of the coaxial machine gun with the platform both stationary and on the move.

Differently from the approach in which anti-tank missiles are integrated onto an already existing remote-controlled weapon system (RCWS) as an add-on capability, of which many examples can be named worldwide, the ARCT was designed from the onset as a dedicated ATGM turret. This particular feature has been instrumental in the attainment of a highly effective solution in terms of missile effectiveness and system survivability. The main features of the ARCT can be listed as follows:

› **Mission Specific Design:**

The ARCT was designed specifically for the anti-tank role from the very outset and has some important integrated features that turrets with add-on missile capability are lacking. ARCT offers the best optimization for low silhouette, armor protection, ergonomics, easy conversion to tripod launch configuration and sighting system.

› **Modularity:** In line with the ATV Program requirements, the ARCT can be equipped with both KORNET-E and OMTAS ATGM missiles. With the two missile systems requiring very different integration approaches, ARCT is able to meet this challenging requirement through a modular design that relies on a common base structure and modular subsystems for each missile system. Owing to its design, the ARCT is ready from the very outset for integration with different missiles, which grants the users substantial flexibility.

› **Easy Integration:** Unlike conventional manned turrets, the ARCT lacks a basket structure and it is located above the top plate of the vehicle. This increases the vehicle's internal useable volume, while the ARCT's low silhouette and weight enables its integration onto different types of armored vehicles.

› **High Mission Performance:**

Capable of performing continuous 360 degrees traverse, and -25° and +25° degree elevation, the ARCT is armed with two anti-tank guided missiles along with a 7.62 mm coaxial machine gun. By means of its digital fire control system, the turret can automatically perform all the necessary ballistic calculations for achieving the highest hit probability, with both the missiles



© FNSS

and coaxial machine gun. The gunner's sight system including a new generation thermal camera, day camera, laser rangefinder and missile guidance electronics ensure the highly effective use of the weapons day, night and under all weather conditions. In its very first firing test, the ARCT demonstrated its ability to score direct hits on targets even at the maximum range of its missiles. The platform's secondary armament serves to enhance the turret's firepower and expands its mission range. Functions such as charging, firing, electrical extraction of empty cartridges can be carried out automatically from inside the vehicle. The turret is equipped with a digital electric gun turret drive system, and a two-axis stabilization system to increase accuracy while on the move.

› **High Survivability and Reliability:**

Survivability has been one of the primary focus areas of the design and the integrated armor solution provides the best protection with the lightest weight thru the use of advanced armor materials. The gunner, thru his control console, inside the vehicle can carry out surveillance; target detection, identification and missile lock-on and guidance functions, all the while remaining under ballistic protection. In the event of an emergency, mission batteries and smart power distribution system inside the turret enables the use of the turret's drive system, firing

functions and electro-optical systems independently of the vehicle's battery, for an increased duration.

K. Nail KURT, General Manager and CEO of FNSS, speaking about the successful completion of ARCT's first firing tests, said: "FNSS has developed the ARCT in such a way that it is capable of firing two different types of missiles for the same user – a feature for which there is probably no other example around the world. We came up with a design from scratch in 18 months, and successfully executed the firing tests. This success achieved in such a short period single-handedly demonstrates the engineering strength of FNSS, as well as the dedication of our project team. The ARCT turned out be a highly capable solution that is streets ahead of its competitors. I believe that it will attract the attention of friendly and allied nations seeking high performance and reliability, and that it will become a much sought-after product on the market in the coming period."

In the near future, the ARCT will participate in the qualification tests of the KAPLAN-10 and PARS 4x4 vehicles developed under the ATV project. Serial production will commence once all of the tests have been completed, and deliveries will continue until 2021, when the turret will be serving on a total of 260 vehicles.



© FNSS

Otokar Debuted its Light Tank in Paris

Otokar, the leading supplier of Turkish Land Forces, debuted its TULPAR Light Tank at Eurosatory 2018 in Paris, France

Otokar, a Koç Group company, debuted its TULPAR Light Tank for the first time at Eurosatory 2018, Europe's largest defence industry exhibition in Paris, France between June 11th and 15th. Within its wide product range Otokar also displayed its ARMA, COBRA II, KAYA II and COBRA armored vehicles with superior mobility as well as ballistic and mine protection along with turret systems.

Otokar General Manager, Serdar GÖRGÜÇ, said, "Being Turkey's internationally recognized land platform manufacturer and operating in more than 30 countries in the world, we highly enjoy our extensive new vehicle development capabilities born by both our know-how and experience. We are more than happy to carry our experience in designing and developing armored vehicles, and particularly main battle tanks onto the new vehicles. Considering the continuously changing combat conditions and threats, light tanks, effectively serving as reconnaissance and fire support vehicles in modern armies are taking more important role in the world. By getting inspired from different requirements of our clients in different parts of the world, we combined our experience with our engineering and R&D capabilities and debuted newly developed TULPAR Light Tank in Paris. We believe that light tanks will be more apparent in the inventories in the upcoming years."

GÖRGÜÇ stated that Otokar manufactured various armored vehicles and turret systems in different types and versions ranging from 4x4, 6x6, 8x8 wheeled armored vehicles to tracked armored vehicles, "New TULPAR Light Tank is targeting several markets. Otokar is known in the global markets as a company that designed, developed and qualified Turkey's main battle tank and our most important reference in new purchases is our armored vehicles used in more than 30 countries in five continents. We are in talks with the countries that need and demand the light tank in particular."

Serdar GÖRGÜÇ: "From Eurosatory to the World"



TULPAR Light Tank

Pointing out that Eurosatory is one of the most important events of the sector, GÖRGÜÇ said: "When Otokar decided to export Turkey's first armored vehicle our first stop was also Eurosatory. The armored vehicles we exhibited in Paris in the 1990s are still being used by different armies in the world. COBRA, which has been selling as one of the most preferred armored vehicles in the world for the last two decades and ARMA, which received two important export orders in its first year of serial production were also first exhibited here."

We are happy to see that today Otokar stands apart in the defence industry, not only with its land platforms but also global know-how, engineering, R&D and technology transfer capabilities. Last year our subsidiary Al Jasoor signed a significant 8x8 armored vehicle contract for UAE Armed Forces for its RABDAN, which is displayed right beside us, in Al Jasoor stand. Our aim is to be able to respond to the needs and expectations of different users in the best possible way through similar collaborations."

TULPAR Light Tank

Otokar TULPAR Light Tank stands out with its mobility, fire power and protection. The vehicle is integrated with CMI Cockerill®'s 3105 turret with autoloader, which is capable of firing all kinds of 105 mm NATO ammunition and the

Falarick Gun Launched Anti-Tank Guided Missile (GLATGM) with its high pressure 105 mm tank gun. The Fire Control System (FCS) with fully stabilized day/night (thermal imaging) sights and coincidence firing logic provides high first-round hit probability against static or moving targets and Hunter-Killer Capability provides single and multiple target engagements. CMI Cockerill® 3105 turret has a two-man crew.

TULPAR Light Tank offers effective solution for missions requiring high fire and destructive power. Thanks to its superior mobility, TULPAR Light Tank can operate in diverse terrains where the Main Battle Tanks cannot serve due to their weight and size; like bridge capacities or in built up areas.

TULPAR is designed as a multi-purpose vehicle platform in regard to user needs for diverse missions. The vehicle offers an ideal platform for the light tank. Tested in the toughest climate conditions and the most challenging terrains, TULPAR features a modular armor technology that can be configured and scaled according to threats as well as the best mine protection in its class. TULPAR can be integrated with active protection systems and has the capacity to accommodate 3 crew (Commander, gunner and driver) plus 2 personnel. Its outstanding Integrated Logistic Support System provides low lifecycle support costs.

STM Unveiled 'Stand - Off Through the Wall Target Acquisition System' (UHTES) at 2018 Eurosatory

The new member of the Ultra-Wideband Radar Group developed for the Presidency of Defence Industries (SSB) by the STM Savunma Teknolojileri Mühendislik ve Tic. A.Ş. - the Stand - Off Through the Wall Radar System was introduced at the Eurosatory 2018 held on June 11 - 15 in Paris.

Mountable to vehicles, the UHTES is of critical importance in terms of maintaining the life and safety of police and the army engaged in challenging tasks. The UHTES was developed domestically by the STM and security forces will be capable of detecting human presence behind the obstacles from a distance. Functioning mounted on vehicles, the UHTES plays a critical role in operational success by enabling the detection of human beings or living creatures within distant buildings, at the operations site executed in residential areas, when it is impossible to approach the target.

The UHTES, which can be utilized in hostage operations, the fight against terrorism and similar operations, reflects STM's latest radar technology.

With the help of its built-in battery, the UHTES system is capable of operating up to 1.5 hours without the support of a power supply while being able to operate for long hours on account of the power supply of the armored vehicle which it is mounted on. Penetrable to fixed and mobile targets from nearly 40 meters and various wall types, the UHTES is capable of moving to the right or left from an angle of 45 degrees and up and down in a 60 degree angle. The system is also able to define a metallic coating or barrier in front of the target blocking the RF signals as well as measuring the distance of the target from the radar. The UHTES system, the tests of which were completed,



UHTES - Stand-Off Through the Wall Target Acquisition System

is additionally capable of 2D detection of the location of the target behind the building or the wall.

STM presented the Through the Wall Radar (DAR) system for the first time at IDEF 2017, a system which is developed by only a few countries in the world. It utilizes radio frequency waves for detecting locations of people inside closed areas without any visual access or surveillance possibilities.

KARGU – Autonomous Rotary Wing Attack Drone Available for Mass Production

The KARGU which is developed and manufactured indigenously by STM is categorized as an autonomous rotary wing attach UAV or micro UAV. It is capable of carrying three different warhead configurations and was one of the products introduced at the Eurosatory event.



According to the information we acquired, with its warhead selected through automatic target acquisition, the KARGU is capable of destroying the target designated by the operator by diving with a speed of 140 km and with the help of the warhead. Known also as the loitering precision strike munition, the man - portable KARGU can be utilized by mobile units due to its 7 kg weight and though it features fully autonomous task capability, it could be utilized by an operator due to its decision - making capability. With its fully autonomous flight capability, the KARGU is able to conduct flights without requiring GPS and with RF signals and data link, it is capable of changing targets, calling off tasks and recall functions as well.

The KARGU is capable of executing operations in night and day conditions with the help of its electro optical day camera and Infrared night camera. Depending upon weather conditions the KARGU is able to fire at instant opportunity targets within a distance of 5 to 10 km from an altitude of 450 m, within 10 - 15 minutes, with less costs compared with guided munitions. This drone can self-destruct diagonally and quite close to the target and thus cause destruction in a wide area with its 1.6 kg anti-personnel warhead and with the smart fuse. It is capable of carrying thermobaric munition weighing 1.1 kg in order to cause destruction in closed spaces such as caves and buildings. In addition, according to the information we acquired, armor piercing ammunition activities for the KARGU are being conducted.

Due to the image processing algorithm, targets of various types (i.e. vehicle, human being, animal) are identified on the operator's monitor and in this way the operator distinguishes the threats and other civilian components, focusing on the actual target and fires it.

Mass production orders of the KARGU were placed for the Turkish Armed Forces (TAF) and the KARGU is a candidate for becoming one of the most crucial munitions of the TAF in the operational field.



ALPAGU - BLOCK-II Fixed-Wing Autonomous Tactical Attack Drone

The ALPAGU BLOCK-II is a man - portable, fixed - wing tactical attack UAV system carried and fired at asymmetric or conventional warfare. The system is composed of fixed- wing attack UAV, Launcher and ground control station components. Besides the utilization with a single launcher, the ALPAGU BLOCK-II provides the user with coordinated operational capacity at the tactical operational site with its basic level swarm intelligence capacity through its multiple launcher version which was revealed at the Eurasia Air Show 2018 for the first time.

In light of the information we gathered from the STM representatives, the drones simultaneously launched through multiple launchers (six drones simultaneously) as a result of the ALPAGU BLOCK-II swarm drone capability are capable of moving with swarm intelligence in different

tasks. According to operational conditions, a drone is able to assume command control of the operation in a fully autonomous flight and command other drones as well.

The multiple launcher system rather, is planned to be mounted over the vessel platforms, base zones, critical facilities or armored vehicles. The presentation, where the swarm capability of the ALPAGU Block-II system -the engineering prototype of which was completed- is visually defined, is aimed to be accomplished at the IDEF 2019 event.

Compared with the BLOCK-I configuration, the ALPAGU BLOCK-II has a wider wing span and is equipped with more improved target plotting capacity, avionic and sensor kits. The system is capable of carrying a warhead up to 3.1 kg as a result of the increase of its size. It is said that in concern with armor piercing ammunition, activities are still being conducted, similar with the KARGU rotary wing attack Drone.



KARGU – Autonomous Rotary Wing Attack Drone

Cyber Security Cluster Introductory Meeting held in Ankara

The introductory meeting of the Turkey Cyber Security Cluster established under the leadership of the Presidency of Defence Industries (SSB) was held at the campus of the Presidency of Defence Industries in Ankara. President of Defence Industries Prof. İsmail DEMİR, public institutions and organizations, universities, non-governmental organizations and sector representatives attended the meeting.

Taking the floor in the opening ceremony of the introductory meeting, the Presidency of Defence Industries Security and IT Systems Group Head Mustafa ÖZÇELİK pointed out that Turkey has made a significant leap in land, maritime, air and space areas through investments made in the last 15 years and continued: "We have evolved as a producing society rather than just consuming one and have even turned into a country exporting what we produced. When we look at the cyber security side, we see that in the 5th dimension, figuratively speaking our cup is not full, especially in that we have an external dependence in terms of software and hardware. On the other hand, we also see our potential to fill the cup. We have a young population full of potential. In an area where human resources are the majority of our capital, we believe that we can progress more in the cyber area as well, beyond that of which we have achieved in other platforms in the last 15 years. From this point of view, we made sectoral evaluations with various stakeholders in 2017. We gathered all our stakeholders from the public and private sectors and universities in order to reveal sector challenges. We discussed the problems at various events and we put solution suggestions on the table. We then brought these suggestions and the outputs together in our decision-making workshop and publicized them at the Third Cyber War and Security Conference held under the auspices of the Presidency of Defence Industries.. During this period, we established a Board of Directors, including our Presidency,



Prime Ministry, Ministry of Transport and Communications, and institutions related to cyber security, and we have strived to execute the process with the representatives there. In the sectoral analysis made on the basis of these studies, 4 main problem areas emerged:

- › Communication between stakeholders
- › Human resources
- › Standardization, certification
- › Communication within domestic and international markets

A model was put forward to eliminate these problems during the studies. We came together with all the stakeholders and created the cyber security scan model. In this model we designed a structure that brings together and directs supply

and demand, enhancing interaction."

ÖZÇELİK pointed out that they plan to establish a structure to take part under the Defence Industry Academy within the Presidency of Defence Industries to interact with universities in order to minimize human resources deficiencies in the field of cyber security. He also emphasized that it is necessary to establish competent mechanisms to create a cyber security brand and to develop the ecosystem. ÖZÇELİK briefly shared the activities they carried out during the period following the Third International Cyber War and Security Conference in November, emphasizing the need to develop human resources and sectoral capacities and to increase communication among stakeholders in line with this vision. ÖZÇELİK: "We initiated the Cyber Security Cluster Project and we created a budget and in order to carry out these activities, we made an agreement with SSTech A.Ş., a subsidiary of our Presidency of Defence Industries. We established a coordination office within SSTech A.Ş. and we are quickly building up the team structure. During this process, we came together with our stakeholders both at home and abroad. We reviewed what is being done in fieldwork for the resolution of problems. On the international platform, in March 2018 we visited the HSD Cyber Security Cluster in the Netherlands, one of the largest cyber clusters in Europe. Our intention of our visit was to understand the



Head of Cyber Security and IT Systems Group, Mustafa ÖZÇELİK

structure of this cluster. This cluster which has been in existence for five years is a success story. We were introduced to a concept there, which is twenty large clusters gathered around the world and formed a platform. The intention is to increase the interaction between the clusters. When we shared details about activities we have made, they proposed to establish our cluster and apply to join them because they want to see us among them. We attach importance to that. We benefited from the know-how of the clusters of our country such as OSSA and TSSK. We had a meeting with the Academy. We brought together ODTU, İTÜ, Boğaziçi and Gazi Universities to create an activity list for human resources training. We have seen that everyone is aware of the sensitivity of the subject. We created our portal to receive membership applications. Our corporate identity studies have started as well.”

ÖZÇELİK expressed that they would like to accomplish a sectoral breakthrough regarding cyber security in 2018 and said: “Today we have 64 companies here with us. If possible, we would like to take all of these companies abroad in 2018 and attend fairs at the stand level and arrange B2B meetings so that the industry can see the foreign markets. On the other hand, we plan to establish a technical training center that can provide human resources development and international certification. We want to reach our high schools and universities gradually in a layered way. We aim to establish cyber security clubs in universities, to integrate the relevant academicians to the club, to follow human resources of our universities and to form a human resource pool. We want achieve this by conducting awareness training.”

Expressing that the concept of open innovation is currently a hot topic in cyber security, ÖZÇELİK said that large companies do not innovate by themselves today. ÖZÇELİK: “Big companies are not creating innovation by themselves; they are importing and making it through SME companies. We also need to enhance our ecosystem in some way. Of course, our goal is not to turn the entrepreneurs into SMEs and leave them alone. In particular, we aim to provide professional



The President of Defence Industries, Prof. İsmail DEMİR

consulting services to our SMEs on product strategy and how to position themselves in the world.”

Underlining that the companies can actively apply for membership during the cluster process, ÖZÇELİK concluded his words saying that companies are invited to sign up at siber.SSB.gov.tr.

President of Defence Industries Prof. İsmail DEMİR emphasized the critical importance of providing security for our country in many areas from health to transportation, energy to communication and education and the establishment of information security for all institutions and organizations. DEMİR: “The protection of information, people’s communication security; the protection of information of private companies, public institutions, police, security units, armed forces and the sensitive units of our state; the whole chain actually takes part in the defense base. I think it is necessary to look at such a broad spectrum of duties that belong to us as SSB not only in the field of cyber security but also in other matters. While the tasks are listed, a number of duties, such as the development of the Defense Industry, the formation, and the establishment of companies in this field are among the tasks assigned to us. The field of cyber security should not be left unattended. The cyber security projects of the Turkish Armed Forces, our Security Organization are presented to us. We have to realize these projects and we face many challenges, especially in our own organization, when we are handling them. There is a foreign dependency on product usage. On the other hand, each institution

is trying to meet its own needs. Here, there is a task assigned to us in order to provide coordination between institutions. In this context, while we were setting a strategy for the establishment of a structure that is broad-based and has broad participation; where all stakeholders, solution providers and product users gather and create synergy, we decided that clustering is the best environment for this. Collectively we had to lay hands on many issues such as the development of solutions together in a stakeholder mentality, the joint encouragement of development areas, the enhancement of knowledge, the training of human resources, the survivability and support of companies made up of human resources, the usage of domestic products primarily, the maturation of products as they are utilized and the ability of our companies to survive. The hardware issue here should not be disregarded. I think that this area should be taken into account in terms of creating certain stages. Creating local and national solutions is one of our most important issues. As each institution develops national and local products, the testing, certification and qualification processes are fundamentally essential. When you establish this mechanism, all stakeholders can feel confident that any product that has been tested, approved and certified by this structure, that it can be used with ease; but first this structure should be established as immediately as possible. The human resources that will make this happen also need to be created as soon as possible. The Academy project is one of them.”

Suggesting that they are the first steps of the ladder that all stakeholders climb to reach collective goals, Prof. DEMİR concluded by saying that the formation of this cluster would act with the awareness that all stakeholders would cooperate, that added value would be created and that even the slightest contribution of each stakeholder would be helpful for this cluster without exclusion.

The Cyber Security Cluster was established with the participation of all relevant public institutions, private sector and academy representatives last year, with the support of the Presidency of Defence Industries.

The vision of the project carried out by SSTEK A.Ş. was determined as being competitive and to have a say in the global market with a workforce competent in the field of cyber security and with branded domestic and national solutions. Within this context, the aim is to increase the number of cyber security companies in Turkey, support the development of its members in terms of technical, administrative and financial aspects, the development of standards of cyber security ecosystem, the branding of products and services, entry of the companies in the common market more quickly, creation of partnerships in R&D, production and marketing, and increasing export volumes.

With the establishment of the Cyber Security Cluster, the capability acquisition to the sector in the field of cyber security technologies is aimed through the provision of maximum local participation in cyber security projects executed within the Presidency of Defense Industries (SSB) and Turkey in the coming period, the development of some software and hardware components that are considered to be critical with national facilities, establishment of an ideal balance between the targets of ensuring competitiveness and being national.

In line with the industrialization strategy, SSB plans to expand the related acquisitions not only at the level of the main contractor, but also at the level of SME / subsidiary industry. Support will be given to project activities focused on eliminating the Turkey's deficiency in personnel trained specifically in the field of cyber security.

Turkey Speeds up Long-Range Air Missile Defence System Studies with Eurosam

With the written statement made by the Presidency of Defence Industries (SSB), it was shared with the public that the Presidency of Defence Industries was continuing to make efforts to meet Armed Forces needs for the Long-Range Air Defence System through various alternatives. The activities within the scope of the project were continued with a meeting held on May 30, 2018 in Ankara with senior participants.

In the written statement, it was emphasized that the concept definition studies on a more advanced system than the SAMP-T Air Defence System under the partnership of Aselsan, Roketsan and Eurosam were continuing and that the Presidency of Defence Industries was continuing to make efforts to meet Turkish Armed Forces requirements for the Long-Range Air Defence System through various alternatives. It was also stated that the Long-Range Regional Air and Missile Defence System (UMBHFSS) project was being conducted to support the national development model determined by SSB and to be implemented in a gradual program model.

As a milestone of the project, an agreement was signed on July 14, 2017, in which companies declared their intention to work on the identification of possible business alliance models within the scope of the development of a long-range air and missile defence system between Aselsan, Roketsan

and Eurosam (a joint venture company between MBDA Italy and Thales France) and thus the three companies commenced the start of a business partnership. During the NATO Defence Ministers Meeting dated 8-9 November 2017, a declaration of intention between the Ministers of Defence of Turkey, France and Italy was signed within the scope of this project.

The Long-Range Regional Air and Missile Defence System (UMBHFSS) Project Concept Identification Study Contract was signed on January 5, 2018 between SSB and the project partners. Accordingly, the project partners-initiated concept identification studies on a more advanced system than the SAMP-T Air Defence system previously developed by Eurosam.

The studies within the scope of the project were continued with a meeting held on May 30, 2018 in Ankara with senior participants. The Concept Identification Study is expected to be submitted to SSB at the end of 2019.

Aselsan Secures Lucrative Contracts in the First 7 Months of 2018

As a flagship of the Turkish Defence & Aerospace Sector and already a global player in its field, Aselsan, has secured around US\$637.632 Million + Euro455.042 Million + TL4.329,734 Billion in contracts during January 1 – June 30, 2018 from both local and export customers to deliver its NATO-standard compliant, state-of-the-art products. The company also secured lucrative contracts during July 2018. For example, on July 2, 2018 Aselsan secured a Euro94.696 Million contract from BMC to deliver an undisclosed amount of SARP RCWSs to the Turkish Army, the Turkish Gendarmerie General Command and the Turkish Coast Guard platforms. Deliveries will take place during 2018-2021. On July 5, the Company received a US\$254.725,195 Million contract from Turkish Aerospace (TA). Deliveries under the contract will take place during 2018-2022. This order probably has been given under Pakistan Army's T129 ATAK Helicopter Project. On June 5th, Aselsan signed two contracts with the SSB valued at around TL1.5 Billion (around US\$332.8 Million) to deliver a Digital Communication Network and to upgrade existing IFF systems from NATO Mark XII Mode 4 to NATO Mark XIIA Mode 5/S level. Under the contract valued at around TL1.1 Billion Aselsan will perform development and series production as well as integration of a total of 699 NATO XIIA Mode 5/S compatible indigenous IFF Systems (Interrogators and Transponders with National and NATO crypto modules) to replace existing old generation Mode 4 IFF Systems. Under the contract Aselsan will develop long-range (up to 450km) interrogator and a national IFF Mode 5/S System for F-16C/Ds in the TurAF inventory. With this contract Turkey will become one of five countries in the world that has the capability to develop and produce indigenous NATO-standard IFF systems. NATO had declared that the Mode 4 IFF interrogator systems would no longer be used as of 2020. As such, Turkey has to upgrade/replace existing Mode 4 IFF systems with the Mode 5/S compatible systems.



Aselsan, in cooperation with Netaş and TÜBİTAK BİLGEM, has successfully developed indigenous Mk XIIA Mode 5/S IFF System under a contract awarded by the Turkish MoND in December 2006 and delivered the first two prototypes in February 2013. Prototype IFF Systems, with short-medium range interrogation capability, have been installed on a F-4E 2020 aircraft and KALKAN Air Defence Radar in 2012 for performance tests, which performed in November 2012. Then in May 2016 the company secured a new US\$27,975 Million contract from the Turkish MoND to deliver an undisclosed number of IFF Mode 5 systems with short-medium range interrogation capability.

On June 8th, 2018 Aselsan secured around US\$150 Million

contract from Nurol Makina to deliver undisclosed number of SARP RCWSs, KORNET-E ATGM Launcher System and IGLA SAM Launcher Systems to equip Qatar Emiri Special Forces' Wheeled Armoured Vehicles (WAVs). Deliveries will be completed in 2018. Under a contract awarded during DIMDEX 2018 Fair, Nurol Makina will deliver 214 NMS/YORUK 4x4 WAVs to Qatar Emiri Special Forces. During the Aselsan facility tour that took place on May 7, 2018 Aselsan Deputy General Manager Mustafa KAVAL disclosed that Aselsan manufactures 7 SARP RCWSs per day and around 150 in a month and as of May 7, 2018 1.458 SARP/Dual SARP RCWSs have been manufactured, 10% of them were export customers such as Kazakhstan and Qatar.



SAVTEK 9th Defence Technologies Congress

The 9th Defence Technologies Congress (SAVTEK 2018) was held at METU Culture and Convention Center on 27-29 June 2018, organized by METU - BILTIR Center with the coordination and support of the General Staff of the Republic of Turkey, Ministry of National Defence, the Presidency of Defence Industries (SSB), METU and the Defence and Aerospace Industry Manufacturers' Association (SaSaD)

The opening ceremony of the Congress was held at METU Culture and Convention Center Kemal Kurdaş Hall at 10:00am on 27 June 2018, and METU President Prof. Mustafa Verşan KÖK, Acting Deputy Undersecretary of Ministry of National Defence Yunus Emre KARAOSMANOĞLU, Chief of the Main Directorate for Plans and Principles of the General Staff of the Turkish Armed Forces Lt. Gen. Yavuz TÜRKGENCİ, Vice President of Defence Industries Dr. Celal Sami TÜFEKÇİ attended the opening session.

Delivering a speech at the opening of the Congress, President of METU Prof. Mustafa Verşan KÖK: "I would like to express that as METU we are always open to cooperation for both the training of qualified R&D personnel and the establishment of infrastructures involving high technology."



President of METU, Prof. Mustafa Verşan KÖK



© Defence Turkey

Acting Ministry of National Defence Yunus Emre KARAOSMANOĞLU said, "Being powerful in Defence and security areas require generation of information and technology with your own brain power. As known, we are persistently referring to this reality as the "domestic and national industry". Today, Turkey is taking firm steps towards becoming a self-sufficient country in the defence industry which exports technology. We are grateful to all our scientists, engineers and technocrats who allowed our country to experience this pride. Indigenization of defence industry products is a significant factor for not only strengthening our defence but also for closing the budget deficit. The Turkish Armed Forces and our Ministry have entered into a restructuring process. Within this scope, regarding the industry and exports, in order to place bids for the demands of real and legal entities including foreigners and to maintain the development of military factories and shipyards through benefiting from the facilities and capabilities of the Military Factories and Military Shipyards, a company was established under the name of 'ASFAT A.Ş.' with 100% public capital. I would like to thank and pay my respect to all institutions and associations supporting

this Congress that enable the cooperation between the Public - Industry and University."

In his speech, Chief of the Main Directorate for Plans and Principles of the General Staff Lt. Gen. Yavuz TÜRKGENCİ underlined the need for accelerating the R&D processes and touched upon the importance of the nationalization of the systems. TÜRKGENCİ: "Accelerating the R&D processes will keep up the speed of technological developments while contributing to the indigenization of utilized systems. Besides, I would like to once more emphasize the importance of directing the systems designed in the R&D processes in a way to fulfill operational demands. Another point to which we



© Defence Turkey

Chief of the Main Directorate for Plans and Principles of the General Staff Lt. General. Yavuz TÜRKGENCİ

attach importance as the Turkish Armed Forces is our fight against handmade explosives. In this struggle, in order to assess the systems required for achievement, the workshop we held in April 2018 with our procurement authorities, academicians and representatives of our defence industry has been fruitful, we believe that the results will be observed in the long run. I would like to take this opportunity to thank our scientists and representatives of our defence industry which are conducting activities within this context. Following the emergence of nuclear weapons, communication technologies effective in command control and combat environments were revealed as a revolution. And nowadays we are discussing the future of smart systems and autonomous systems. Turkey should under no circumstances miss the development and production of smart systems and autonomous systems. We are prepared to do our best to this end. We started to use smart systems in operations more, as the Turkish Armed Forces (TSK). Robot unit commands will probably exist in the future. This subject will come up to the agenda rapidly in 5 to 10 years. Therefore, I would like to present this subject to your attention. We would be glad if you could execute your studies in this context. There is already a sufficient number of studies in this area within the context of the congress. While these studies are conducted, our scientists attend certain other studies held with other countries and international organizations, instead of executing the activities within an isolated structure. In respect to artificial intelligence, there are quite good studies on human-machine interaction or the training of machines. We expect you to reflect these studies to the Defence industry projects. When speaking of smart systems, one should also speak of cyber Defence. Cyber security will gain more importance in addition to smart systems. A weapon has been revealed

against every weapon developed throughout history. At this point, the most critical national power components are qualified human resources and technology level or the capacity of transforming the technology to a weapon system. When we take a look at the main themes of this congress, our belief in its contribution to both qualified human resources and its effects over the strengthening of our national Defence industry through contributing to our technological preparation level is full.”

Vice President of Defence Industries Dr. Celal Sami TÜFEKÇİ said, “Taking into consideration our experiences in the past as well as existing threats and security problems our country and our region have been facing internally and externally, we are all witnessing the importance of the continuation of an effective defence existence strengthening every day for the future and independence of our country. In order to achieve powerful and self-sufficient defence capabilities, it is obvious that we require the constant modernization of our Army and Security Forces and to be equipped with weapon systems and devices with high strike power and effective enough to compete with enemies. For this reason, the Presidency of Defence Industries, having the main missions of establishing and the strengthening of our national defence industry and modernization of our security forces through our national defence, continues its activities with the target of developing fully domestic and national weapon systems required in the upcoming period. Two critical points emerge when the fact that weapon power, which is our power in defence and security areas; which would be achieved through obtaining technological power which is the strongest factors of weapon power. The first point is building a fully independent defence industry by developing the critical sub systems, components and technologies arising during the design and production of the platforms and systems required



Vice President of Defence Industries, Dr. Celal Sami TÜFEKÇİ

through national facilities within the scope of our existing operational concept. The latter is the necessity to launch the activities that will shape the technologies of future warfare concepts with the encouragement we gain from our experiences in defence technologies resulting from the policies and performance displayed by all shareholders of our defence industry including SSB and especially the approach and political leadership in recent years.

Without doubt, the R&D activities are the most crucial step of achieving technological superiority. In order to increase the R&D activities requiring financial and qualified human resources to a great extent and transforming the outputs into products and elevating their added value to the maximum, we are aware of the requirement of governmental support as the initial priority and for this reason we continue to increase the R&D share in our defence expenses. Additionally, for the efficient use of time and resources, it is essential for our researchers and designers to conduct their activities in appropriate areas, and to this end we have been carrying out project design activities as the Presidency of Defence Industries in line with the priorities of the R&D subjects. This road map which we refer to as the R&D Road Map and under which we form projects with a program management integration

approach in related subjects will continue to be updated with your feedback. Within the scope of the identified R&D projects, we strive to concentrate more on the project models in which our Universities, Research Institutes and SMEs would take more roles and our industry will rather assume the role of a mentor."

The presentation delivered by the Vice Secretary General of SaSaD Yılmaz KÜÇÜKSEYHAN examining the Turkish and World Defence Industry was followed with interest after the opening remarks.

SaSaD Deputy Secretary General Yılmaz

KÜÇÜKSEYHAN: "Turkey allocated US\$ 18.2 billion to the defence industry in 2017"

Stating that either internal tensions or tensions with neighbors have arisen in many regions of the world KÜÇÜKSEYHAN added: "Tensions are increasing day by day, in the region we refer to as the China Sea and in the Oceania region. Up to date, there are 49 crisis zones identified all over the world. A major part of these is currently being experienced in our geography. The trade volume in the world has also been increasing every other day. And without doubt, an increase in the resources allocated to the defence industry is in question. In 2017, the top 15 countries of the world allocated



US\$1.395 trillion to defence. Turkey allocated US\$18.2 billion to the defence industry in 2017 and climbed to the 15th rank in the list. The resources spent on defence by Turkey equals to 1% of the worldwide defence expenditure and 2.2% of the Gross Domestic Product. The resources spent on defence expenses in all the Middle East region is at the level of 5.2% and this ratio was calculated as 10% in Saudi Arabia. In respect to the American region, there are no increases or decreases in the defence budget including the US and Canada. Russia did not place any restrictions on its modernization budget".

Underlining that within the scope of the research conducted by independent research institutes, Turkey stood out as one of the most advancing four countries (Brazil, South Korea and India) in the world, KÜÇÜKSEYHAN stated that Turkey has been proceeding on its path to become one of the six countries (Brazil, South Korea, China, India, South Korea and Turkey) that are expected to become the power elites in their regions as well.

Mentioning that the total turnover of the world's greatest 100 defence industry companies totaled US\$ 374.9 billion, KÜÇÜKSEYHAN shared that three Turkish companies (TAI, Aselsan, Roketsan) were presently among the world's greatest 100 defence companies. Besides the services bringing foreign exchange

earnings, and despite the fact that the US\$1.6 billion in export figures increased to US\$1.7 billion in 2017, KÜÇÜKSEYHAN expressed that as a result of the sharp fall in the aforesaid services, the defence industry export figures of 2017 remained behind the previous year.

Sharing the list of the countries conducting the most exports in 2016, KÜÇÜKSEYHAN noted that the US achieved US\$21.443 billion in exports in 2016 while Russia accomplished exports of US\$14.5 billion, France US\$6.7 billion, Spain US\$4.12 billion, South Korea USD 3.54 billion and Germany achieved US\$1.72 billion in exports and added that Turkey would also be lagging behind countries that did not declare their data such as China, the United Kingdom and Israel and that Turkey remained at the 11th rank in the list in 2016 with its exports of US\$1.66 billion.

Head of the R&D and Technology Management Department at the SSB Şaduman AZİZ: "As the Presidency of Defence Industries, we are executing 604 projects with the total size of US\$90 billion"

Head of the R&D and Technology Management Department at the SSB Şaduman AZİZ provided an overall defence industry evaluation at the congress and stated: "When we take a look at our overall portfolio,



SaSaD Deputy Secretary General Yılmaz KÜÇÜKSEYHAN

we are executing a total of 604 projects under the auspices of the Presidency of Defence Industries. The approximate volume of these projects is US\$90 billion. 63% of these projects were already contracted and they cover 385 projects in figures. Contracts of 219 projects have not been signed yet. In concern with the defence expenditures of the world, with US\$14.9 billion against US\$1.68 trillion, Turkey remains at the 15th rank on the list and takes 1% of this market. Taking a look at the defence and aerospace turnover, within a period of 11 years between 2006 and 2017, we reached the level of US\$6.7 billion with an increase of 3.5 times. In this 11 years' period, our export figures tripled. In respect to R&D expenses, we observe a 14 fold increase in 2017 resulting in US\$ 1.3 billion. In the total employment of the defence industry there is a portfolio of 44,740 people, and if we take a look at its distribution, 35% of the aforesaid figure is composed of production staff, 42% is composed of administration and support personnel, 21% of it consists of production and technology development staff and 2% is composed of executives. We are aware that these figures need to increase. In accordance with the decision adopted by the Supreme Council for Science and Technology, we have been working collectively on achieving the target of training a research team of 300 thousand people for the year 2023. Considering R&D and technology management, while R&D expenses remained at 0.5% in 2004 of the Gross Domestic Product, it reached the level of 1% in 2016-2017. Of course it is still not sufficient. Our aim is to elevate this figure to the level of 3% by the year 2023. When we compare Turkey's R&D expenses with the R&D expenses of the Defence industry, we come across that the R&D expenses of the defence industry remain at US\$1.3 billion within overall R&D expenses of US\$ 8.2 billion. On the other hand, if we focus on the public and private sector portions, we observe that this figure is at the level of



Head of the R&D and Technology Management Department at SSB, Dr. Şaduman AZİZ

28% within the defence expenses under the private industry's R&D expenses. Is this enough? Of course, it is not".

During the three day program 125 manifests in the following main themes were presented: "Land / Sea/ Air - Space Platforms", "Weapon - Ammunition - Propulsion Systems", "Armor, Protection and Invisibility Technologies", "Protection from Hand Made Explosives and their Detection and Destruction", "Unmanned Systems", "Communication, Electronics, Information, Surveillance and Reconnaissance Systems", "Electro- Optics and Sensor Technologies", "Electronic Warfare Systems", "Cyber Security Technologies", "Modelling, Simulation, Augmented Reality, Virtual Reality", "Micro and Nano Technologies", "Power and Energy Technologies towards Defence Applications", "Material Technologies", "CBRN Defence Technologies", "Operational Research and Decision Support Systems", "Network Centric Warfare", "Demand and Resource Management in Defence", "Human Factor and Health", "Logistics Management", "System, Project, Production and Risk Management", "Innovation, R&D and Technology Management", "Public - University - Industry Cooperation in Defence", "Qualification / Certification/ Accreditation" and "Digital Transformation, Artificial Intelligence and Big Data Analysis in Defence".

Within the scope of SAVTEK 2018, the "Next 20 Years of Defence Industry Panel" took place on Wednesday afternoon, 27 June 2018. In the panel moderated by Secretary General of SaSaD Hüseyin BAYSAK, the expectations of FNSS on Land Vehicles, Turkish Aerospace (TA) on Air Platforms, DESAN on Naval Platforms and Aselsan on C4SIR in the next twenty years and information on the preliminary work of such institutions in this direction were delivered. Moreover, a presentation was made on the completed and ongoing projects of the The Presidency of Defence Industries (SSB) and on the projects included in their program for the next 20 years.

On the last day of the Congress, the panel titled "Big Data, Artificial Intelligence and Cyber Security" moderated by Prof. Gözde BOZDAĞI AKAR was conducted with the participation of Air Defence Colonel Şakir Cumhuri SOMER, Mustafa ÖZÇELİK (SSB), Mustafa DAYIOĞLU (TÜBİTAK), Dr. Emin İslam TATLI (SSB), Orçun DAYIBAŞ (Havelsan), Dr. Atilla ÖZGİT (METU - BILTİR) as panelists.

Approximately 500 participants composed of Turkish Armed Forces, Universities and Industrialists attended the Congress and the panels, manifests and speeches of the invited speakers were followed with interest.

Turkey's Defence Industry Meets at "SAHA EXPO 2018"

Established with the mission to turn Turkey into an independent and competitive power in the world through its manufacturing strength and technological infrastructure regarding the defence, aerospace/aviation and space industries, SAHA Istanbul is organizing the SAHA EXPO Defence, Aerospace/Aviation, Space Industry Fair on September 13-15, 2018. At SAHA EXPO 2018, which will be realized with the participation of SAHA Istanbul member companies, companies of different sizes in the defence industry supply chain will explore opportunities to introduce themselves, to show their production capabilities and potential

The Defence Industry of Turkey, which is located in quite a strategic geography, has become first on the agenda with especially the intense developments in neighboring countries and cross-border operations in recent years. Turkey is dependent on foreign countries in this field, however being "independent in the defence industry" has become one of the agenda items of the state and successful endeavors are being conducted with determination in pursuit of becoming "nationalized".

Founded 3 years ago with the mission to realize Turkey's dream to become a country capable of producing its own aircraft, ship and weapon system, SAHA Istanbul Defence, Aerospace/Aviation and Space Cluster plays an important role in Turkey's move for nationalization. With its 301 members today, SAHA Istanbul is Turkey's largest and fastest-growing cluster and brings together companies that perform production activities in the defence, aerospace, maritime and space industries, that are able to be involved in the national and international supply chain in these fields, and that have advanced technology and manufacturing capabilities under the same roof. SAHA Istanbul acts as a bridge between its members and the national and international public and private sector institutions operating in these sectors.

"We have to be a powerful state"

Pointing out that the nationalization issue is a must for Turkey, SAHA EXPO Chairman



Hasan BÜYÜKDEDE said, "The notion of distrust of foreigners and the development of our own defence industry, which started with the Cyprus Operation, has shown that we have to develop our indigenous and national industry in the last 15 years and that we need to have independent capability in

this regard. Our geography and history necessitate that we should be a powerful state". Emphasizing the importance of independence in the defence industry, Büyükdede said, "No product in the world can be called 100% domestic. The world exchanges products with each other, but it is essential to minimize that dependency. No need to fall in dispute. Countries like us, who are in the middle of war in its neighborhood and who are fighting terrorism, must be careful".

SAHA EXPO will be the Meeting Point of National Defence

SAHA Istanbul, which has achieved significant success in integrating industrialists into the defence industry for 3 years, is organizing the SAHA EXPO Defence, Aerospace/Aviation and Space Industry Fair for the first time this year. Companies performing manufacturing activities for defence, aerospace, maritime and space industries, the giant companies of Turkey that are capable of becoming a brand



in the world in these fields, as well as companies in various sizes that have developed advanced technology manufacturing systems and products and that could take part in national and international supply chain will attend the SAHA EXPO 2018, which will be held on September 13 - 15, 2018 at Istanbul Expo Center 11th Hall.

Baykar Makina, which produces manned and unmanned aerial vehicles, and Aselsan, the pride of Turkey are the platinum sponsors, Ziraat Katılım is main sponsor of SAHA EXPO 2018; other sponsors BMC, Kale Group, Roketsan, Akım Metal, Altınay Robot and Istanbul Chamber of Commerce (İTO). MSI and Defence Turkey magazine are the press sponsors and European Security & Defence magazine is the international press sponsor. Other supporting institutions are Istanbul Chamber of Industry (İSO), Teknopark Istanbul, Maritime Commerce Chamber, Istanbul Anatolian Side Organized Industry Zone, Turkey Exporters' Assembly and İMES Organized Industry Zone.

SAHA Chairman Hasan summarizes his expectations from the SAHA EXPO 2018 as: "We would like to bring together our main industry companies and subindustry companies first and introduce them each other in this Fair and would like them to evaluate their opportunities to meet each other's demands. We expect that our members will be able to create demands and that they will renew themselves, review their certifications and capacities in accordance with the possible requests."

SAHA EXPO Offers International Network Opportunity

SAHA EXPO 2018, which will include events for companies within the scope of the International Competitiveness Improvement (UR-GE) Project, will exhibit products of companies working on the design, development and production of sub-systems and components



of the most modern platforms to be used in the operational environment in defence, maritime, aerospace/aviation and space industries.

At SAHA EXPO 2018, which will be realized with the participation of SAHA Istanbul member companies, participating companies will meet with national and international main producer companies and will find opportunities to introduce themselves, and to present their production capabilities and their potential. The Fair will host representatives of public and private institutions from home and abroad as well as the procurement delegations. The building of strategic business alliances that

will contribute significantly to Turkey's nationalization move are expected to be established at this spotlight event.

At SAHA EXPO 2018 companies contributing to the production of all fields within the defence industry will attend; from unmanned armed and unarmed air vehicles to helicopters, aircraft, armored vehicles, weapons, missiles and ammunition, from submarine and war ships to tanks and communications equipment and to cyber security software and hardware development. This influential event is expected to flourish into an international platform where Turkey's production power is introduced to the world.



High Technology Solutions from CES Advanced Composites (CES)

One of the major contributors to the increasing success of Turkish defence and aerospace industry is not only the support of major platform and system producers but also the indigenous solutions created by companies such as CES Advanced Composites (CES).

CES is a platform component provider operating in the space of advanced composite manufacturing. It designs and produces innovative and durable defence and ballistic ware, as well as providing armour and defence solutions for vehicle and personal protection. CES has been undertaking projects that have redefined the standards of the industry and is now gearing up to further extend its reach to satisfy the requirements of international companies from friendly and allied nations, along with domestic clients. At Eurosatory, CES showcased its ballistic products personal and vehicle products to users from around the globe.

Açık Group's Venture into Defence and Aerospace with CES

CES operates as a subsidiary of its parent company, Açık Group. The parent company itself has been changing the dynamics of the industries it operates in, with its pioneering mind set and forward looking enterprises. Açık Group operates a total of 14 different companies under five different company brands, employs more than 1000 employees and has a turnover in excess of 1 billion TL. Operating in various sectors such as telecommunications, air conditioning, data centre system integration, cybersecurity, aviation and defence, Açık Group is a trusted provider of its global users, with its utilisation of latest technologies serviced from its local companies in Azerbaijan, Saudi Arabia, Kazakhstan, United Kingdom, Vietnam and Germany as well as Turkey.

Among Açık Group's primary ambitions is to strengthen its position among the prominent companies in the global scene, through CES's production of high-technology and high-standard products in the defence and aerospace sector.

Reliable Solutions in Ballistic Protection

From its premises established in an area of nearly 20,000 square metres, CES Advanced Composites provides its business partners with a wide spectrum of services, ranging from conventional methods to highest standard production techniques that require the highest level of aviation certification. Through its recent major investments, CES has now the largest production and R&D capacity in Turkey, that enables the company to fulfil its wide production portfolio in both advanced composite and advanced armour areas.

CES develops solutions while paying close attention to the needs of today's global markets and has been manufacturing personal ballistic protection equipment according to the highest of world standards. With its experienced engineering staff, the company designs and produces products that offer protection against the highest levels of threat. In the design of its personal protective equipment, such as helmets, vests, inserts and shields, CES focuses on providing advantage and ease of use to the end user out in the field, in terms of ergonomic design, optimum weight and easy accessory integration. CES is also advancing with its innovative solutions in spall liner and add-on armour for land, air and naval platforms, which is an area witnessing significant investments in Turkey. CES Advanced Composite products are today being used on many armoured vehicle platforms, as well as tank modernisation projects.

CES is the only company in Turkey which developed modular ballistic floor panels, armoured wing panels and pilot seat armour for air platforms.

With its engineering power, CES has become the only local supplier for land vehicle platforms for add-on armour solutions and the largest supplier for spall liners.

Production in World Standards

Having been certified to AS9100 standard for the last five years – the highest indication of quality in aerospace and defence sectors –



CES Advanced Composites is today a reliable solution partner for global companies such as Airbus, Leonardo and Sikorsky.

The company is the proud owner of the highest capacity advanced composite manufacturing facility in Turkey and has a National and NATO Facility Security Clearance Certification.

CES utilizes its expertise in aviation and high-quality standards both in composite and armour segments in every manufacturing process.

Target for 2020: Global Success

In terms of its goals for 2020, CES Advanced Composites is aiming to be delivering 50 per cent of its products to global customers and to become one of the world's leading companies in the field of composites. Allocating a significant percentage of its turnover to R&D, the company has been declared as an R&D centre by the Turkish Ministry of Economy.

CES Advanced Composites is in the process of renewing hundreds of metal parts with high technology composites as contracted by major Turkish land vehicle manufacturers such as FNSS, Otokar and BMC, and is expanding its R&D team accordingly.

CES is set to continue its advanced production, enhance its technological infrastructure and achieve its targets in R&D in the coming years. CES will be taking part in numerous global defence and aerospace sector exhibitions in 2018.

A Contract Awarded for the Electromagnetic Launch System Field Prototype

The “Electromagnetic Launch System Field Prototype Supply Project Contract” was signed between the Presidency of Defence Industries (SSB) and Anadolu Yönlendirilmiş Enerji Teknolojileri A.Ş.

The “Electromagnetic Launch System Field Prototype Supply Project Contract” was signed between SSB and Anadolu Yönlendirilmiş Enerji Teknolojileri A.Ş. The President of Defence Industries Prof. İsmail DEMİR, OSTİM Chairman Orhan AYDIN, OSTİM Defence and Aviation Cluster (OSSA) officials and sector representatives attended the signature ceremony held at the SSB premises.

Delivering a speech at the signature ceremony, the President of Defence Industries Prof. İsmail DEMİR said that the electromagnetic launch system is amongst the critical technologies for the future and that few countries in the world are currently working on this system. Stating that the targets are shot with

gunpowder, fuel or explosives in the conventional weapons, whereas in electromagnetic gun system, electrical energy is used instead, Prof. DEMİR said that the ammunition launched by this energy has a very high kinetic energy and hypersonic speed and that the target is also destroyed by shooting with this high energy.

Prof. DEMİR: “The greatest advantage of this technology is that the firing costs are affordable in comparison with the conventional artillery systems. Thanks to their hypersonic speeds, we are talking about a high-speed and efficient system. For the first time in 2013, a prototype was developed nationally and domestically by the private sector and nearly 1000 test firings

have been made so far. We aim to transform this prototype system into a weapon system platform that our security forces will use. It is also pleasing that other institutions continue to work at the same time together with this project”.

Stating that within the scope of the Project they aim to see the field performance of the system, the contribution is the achievement towards the weapon system studies and the utilization of it in possible operations, Prof. DEMİR said that to this end a contract was signed today with Anadolu Yönlendirilmiş Enerji Teknolojileri A.Ş. for the supply of one field prototype having similar features with the prototype which was developed at the laboratory environment.

Turkish Aerospace Selected Dassault Systèmes for the TF-X National Combat Aircraft Program

Turkish Aerospace (TA) will use the 3DEXPERIENCE platform for end to end development of next generation, TF-X National Combat Aircraft Program

The decision follows Turkish Aerospace’s comprehensive evaluation of solutions available on the market and the successful completion of a proof of concept. It also reflects Dassault Systèmes’ 30-year legacy that continues to shape the aerospace and defence industry.

Turkish Aerospace will use the Winning Program, Co-Design to Target, Test to Perform, Ready for Rate and Build to Operate industry solution experiences based on the 3DEXPERIENCE platform to develop its next generation, multirole aircraft from design through production. More than 2,000 project participants at Turkish Aerospace, its partners and suppliers will collaborate by relying on a single source of data across all

digital design, engineering, simulation, manufacturing, business analytics and governance applications.

“The size of the TF-X Program presented us with an opportunity. We wanted to select a software solution suitable for this project that also allows us to streamline our business process with Aerospace best practices,” said Temel KOTİL, Ph.D, President&CEO of Turkish Aerospace. “Dassault Systèmes’ 3DEXPERIENCE platform and its integrated applications convinced us of the need for taking a next step. Our company will gain extensive capabilities for aviation design, development and production, and be able to demonstrate its determination to accomplish large projects.”

“Aircraft development, considered one of the most technologically advanced projects in any industry, is growing more complex. As companies integrate sophisticated systems and technologies, they seek new ways to conceptualize, design, manufacture, test, certify and sustain products while collaborating across functions and geographies,” said David ZIEGLER, Vice President, Aerospace & Defence Industry, Dassault Systèmes. “The 3DEXPERIENCE platform provides them with the digital capabilities to accelerate such programs by up to 50 percent. Turkish Aerospace can therefore improve decision-making, reduce risks, and transform its end-to-end development.”



Laser Gun from Aselsan Against Bomber UAVs

Field tests were executed at the final stage of the defensive laser systems defence program being conducted with Aselsan's own resources. The Laser Defence System (LSS) was integrated on the armored vehicle for land and residential use.

The Aselsan Laser Defence System (LSS) was developed for the detection and destruction of suspicious objects and hand-made explosives, temporary obstacles such as tarpaulins and canopy, and mini-unmanned aerial vehicles. The President of the Defence Industries (SSB) Prof. İsmail DEMİR also attended the system tests conducted in Ankara hosted by Aselsan's Chairman of the Board and CEO Prof. Haluk GÖRGÜN.

The President of Defence Industries Prof. DEMİR put a sticker on the vehicle, symbolizing the commercial unmanned aerial vehicle that LSS inactivated during the tests.

Mini Unmanned Aerial Vehicle is Exploded via Laser

In the tests, the LSS's capabilities such as its quick deployment to the desired area on a moving land vehicle, its effectiveness against handmade explosives, temporary roadblocks like tarpaulins and canopies, and commercial drones flying for attack or intelligence purposes were demonstrated. LSS managed to explode the commercial unmanned aerial vehicle having explosive material at a safe distance. LSS also inactivated the camera of the mini unmanned aerial vehicle by igniting it.

The system's high-power laser, precise tracking and stabilization capable turret structure, thermal camera and daytime camera for targeting and optical structure focusing laser beam to the target were designed by Aselsan with local and national facilities. LSS was manufactured nationally without being subject to any license or export permit.

Firing Cost – Cost Efficient

The Laser Defence System will contribute to the safety of civilian and friendly elements with its superior targeting capability and adjustable efficiency. The cost of firing is in the order of a few cents and it is capable of firing uninterruptedly as long as the vehicle is fueled. Thus, it can be used cost-effectively against mini / micro unmanned aircraft attacks.



Boeing Awards Contract to Turkish Aerospace (TA) to Produce 737 MAX

Boeing has announced it has awarded a new contract to Turkish Aerospace (TA) to produce Elevators for the 737 MAX airplane.

The agreement between Boeing and TA expands the portfolio of Boeing Commercial Airplane products produced by TA and will support increased Boeing production rates of its popular 737 MAX models. The close industrial collaboration of the two companies supports the 737 program's performance and affordability while furthering the longstanding relationship in the aerospace industry between Boeing and Turkey.

"TA is a globally competitive and important partner in international aviation projects. I hope that through this agreement, our already close cooperation will gain new momentum and become even stronger. In the field of aviation TA has been taking critical responsibilities and continues its contribution to the country's economy. With the latest agreement, TA reached a new level of success. The Boeing 787 Elevator, Boeing 787 Cargo Barrier and Boeing 787 Horizontal Leading Edge are among the ongoing projects of our company that have been providing hundreds of thousands of parts and components for Boeing platforms for the last 20 years," commented Temel KOTİL, Ph.D, the President



© Turkish Aerospace

& CEO of TA.

The 737 Elevator, located on the airplane's horizontal stabilizer, controls the airplane's vertical ascent and descent. TA also has produced Elevators for the 787 since the program's inception and became a direct supplier of this component to Boeing in 2013.

"Boeing is proud to strengthen our industrial partnership with TA in ways that support our customers and advance the capability and quality of Turkey's aerospace industry," said Marc ALLEN, President, Boeing International. "TA has been a high-performing 787 supplier, working closely with Boeing to meet quality, on-time delivery and affordability goals. We appreciate TA's skill and commitment to build the world's most innovative airplane."

Executives from the two companies recently signed the contract during the Global Supplier Conference held in Portland, Or, U.S. The conference culminated with the Supplier of the Year Awards where TA received the "Alliance Award" for contributing to Boeing's success by sharing risk and through long-term relationships that support and advance Boeing's strategic objectives.

TA, ranking among the top one hundred global players in the aerospace and defence industry, is a center of technology in design, development, modernization, manufacturing and life cycle

support of integrated aerospace systems, from fixed and rotary wing air platforms to unmanned aerial vehicle (UAV) systems and space systems. The "ANKA" Medium Altitude Long Endurance (MALE) UAV System, "HÜRKUŞ" New Generation Basic Trainer, T129 "ATAK" Attack and Tactical Reconnaissance Helicopter, Telecommunication and Surveillance/Reconnaissance Satellites, Space Systems AIT Center, aircraft upgrade and modernization, aerostructures for military and commercial airborne platforms are among TA's major products and activities. TA has built its worldwide success on the foundation of the technological excellence of its products and solutions, participating in international aerospace programs such as JSF/F-35, A400M, A320, A330, A350 XWB, B737, B787 and B777.



The President & CEO of Turkish Aerospace, Temel KOTİL, Ph.D



The President of Boeing International, Marc ALLEN

SEDEC Event Held in Ankara

SEDEC, organized with the support of The Presidency of Defence Industries (SSB) and Defence and Aerospace Industry Exporters' Association (SSI), has been Turkey's first organization focusing on border and homeland security and it included fairs, conferences and B2B negotiations. The event was successfully held from July, 3 – 5 at ATO Congressium, Ankara.

3800 visitors attended the event which lasted for three days and a total of 4,200 B2B negotiations (3,800 planned and 400 which arose during the event) were conducted within the scope of the event. Approximately 158 industrialists and industrial enterprises from Ankara, Bursa, Eskişehir, Adana, Konya and Kayseri attended the event. Moreover, the decision makers and end users regarding the purchase of military and police equipment were invited from Jordan, Ukraine, Kenya, Kuwait, Germany, France, Sudan, the United Kingdom, Italy, Korea, Canada, Lebanon, the United Arab Emirates, Venezuela and South Africa and they gathered with the Turkish security and defence industry manufacturer companies throughout the event.

Ivedik Organized Industrial Zone Chairman of the Board Hasan GÜLTEKİN, SAHA İstanbul Chairman of the Board Hasan BÜYÜKDEDE, ATO President Gürsel BARAN, SSI Deputy Chairman of the Board Mustafa KAVAL and Vice President of Defence Industries Dr. Celal Sami TÜFEKÇİ and President of the Information and Communication Technologies Authority Ömer Fatih SAYAN participated in the opening ceremony of the event.

Participating in the event on behalf of the Presidency of Defence Industries, VP of Defence Industries Dr. Sami Celal TÜFEKÇİ commenced his speech by wishing that SEDEC would be beneficial for all. SEDEC is a critical business platform gathering all international and national players in the areas of homeland security, border security, interior security and defence systems. TÜFEKÇİ: "These types of events are becoming more and



more important for following the developments in the security area, gathering and interaction of the parties and their coordination. Therefore, within the scope of the SEDEC event organized with the support of the Presidency of Defence Industries and Defence and Aerospace Industry Exporters' Association, we aimed to gather all the international and national players in homeland security, border security, interior security and defence systems fields, and to enable information sharing in line with an effective cooperation between the parties through fairs, conferences and bilateral business negotiations. The necessity of a powerful defence industry is quite obvious due to the highly strategic position of our region. Therefore, our The Presidency of Defence Industries has accelerated its activities with all its strength, particularly in recent years, in order to provide all types of support to our companies in security and areas of defence in close cooperation with all institutions and enterprises. We can observe the reflection of this momentum through the 2017 SaSaD Turkish Defence and Aerospace Industry performance report's data as well. The point at which we have arrived since 2002 in the defence industry is witnessed by the public not only through the figures but also with the output. These achievements are the source of our nation's pride and motivate us for achieving greater goals while further accelerating our activities.

During this period Aselsan (57th), Turkish Aerospace (61st) and Roketsan (98th) entered into the list

of the world's greatest 100 defence industry companies. We have full faith that they will climb higher and more of our companies will be included in this list.

Much progress has been achieved since 2004 in the defence industry which is a critical part of industrialization and development as a whole. At the point reached today, our defence industry has become one of the most crucial industries of our country with its indigenous products, exports, main contractors, subcontractors, SMEs, research institutes and universities. Turkish defence industry companies have been exporting numerous products abroad such as armored vehicles, unmanned air vehicles, air defence systems, missile systems, simulators, coast guard vessels, military communication systems, command control systems and software, smart motive ammunition and various weapon systems. Many of our systems and platforms such as the ANKA, BAYRAKTAR, MILGEM, KIRPI, ATAK, HURKUŞ, ALTAY, SOM, MPT, GÖKTÜRK satellites and many more will continue to be the success and source of our country. We should fulfil our tasks to achieve a Powerful Turkey, we should achieve more than what is expected from us.

At this point, I would like to share certain activities that the SSB has been working on. In respect to the credit and incentive mechanisms of the defence industry, the SSB has been continuing its activities towards rendering the maximum utilization of our domestic industry's facilities and capabilities and procurement of the critical components of the

systems through domestic means in the projects as part of the activities conducted toward developing and supporting the SMEs and sub industry. As the SSB, we have two support mechanisms for supporting our companies. The first mechanism is the qualified product and infrastructure support program and the second one is the EYDEP (Industrial Competency Assessment Program). Within the scope of the qualified product and infrastructure support program incentive, we are supporting machinery and equipment investments, test, qualification, accreditation and certification items. Whereas, as part of the EYDEP, we launched the support activities for encouraging our rather smaller enterprises that have not yet seized the opportunity to express themselves, helping them enter the market and to take greater steps toward becoming a subcontractor. Within the scope of Small and Medium Enterprises Development Organization - KOSGEB product development incentives, a framework protocol has been signed with our Undersecretariat and KOSGEB. Within the scope of this protocol, SME, technological product investment program and strategic product support program credit mechanisms have been launched by KOSGEB.

The Presidency of Defence Industries presently has a quite powerful eco system with the Turkish Armed Forces Foundation. However, we had several initiatives with the awareness of the possibility of achieving technology development merely through focusing. Regarding the defence industry area, company models were built for the identification and indigenization of high value-add products that can be manufactured in Turkey, but which are imported. Also, the launching of existing and new projects in areas of critical technology through the formation of a sustainable and competitive technology base in the defence industry. In this model, regarding areas of critical technology, one of the companies under the auspices of the SSB, Savunma Sanayi Teknolojileri A.Ş. was established with the mission of developing and manufacturing high

technology systems required for the country's security, as an umbrella organization and 100% affiliate of the SSB, by becoming partners with the companies to be newly established or with the existing companies. The affiliates of this affiliate, DeltaV Inc. and Roketsan were established in order to develop hybrid fueled missile technologies and launched its activities. Moreover, ULAK Communications Inc. was established with a joint structure with other communication companies with which we negotiate with Aselsan. TR Motor Güç Sistemleri A.Ş. (Engine Power Systems Inc.) was founded to conduct activities in engine and power transmitting systems that will elevate our country higher in the path of full independence. This company has launched its activities and will advance our country in engine technologies, turbo engines being in the first place. Our company TRD Mikro Elektronik A.Ş. which executes its joint activities with Aselsan was established for the development of detectors (with foreign dependency) of the cameras utilized in UAV systems, aircrafts and helicopters through national facilities.

In addition to all the aforementioned points, products and platforms in areas of defence and security are systems that require high performance product quality criteria. And perhaps the test and qualification of these systems leave the design of the systems behind. We have launched the Tr - Test Inc. that will enable the platform for testing and approving all these high criteria.

Also, our support to increase the private sector's existence in this area continues through offset mechanisms such as credit support for infrastructural investments, R&D activities, and industrial participation. We have launched HAB Aviation Space Specialization Organized Industrial Zone as well.

Similar to Teknopark Ankara, we completed the establishment process of the technology development zone we named as Tekno Hab within the Organized Industrial Zone. We will be launching this concept as Tekno Hab which Gazi University's first activity under

the name of EKTAM is - Additive Technologies Research Institute. All of the aforesaid require an emphasis on industry's requirement for qualified human resources as well. We have established the SSB Academy in order to support on-the-job training, pre-service training and vocational training under a wider roof and in a way to support the academies formed under the auspices of our foundation companies in particular. To this end, we will be the most fundamental supporter of launching various activities conducted for training human resources composed of blue collar personnel, white collar personnel and R&D personnel. We have been active in the defence industry with slightly less than 50 thousand personnel, yet our targets and projects require quite a larger volume of qualified individuals. Moreover, hereby, I would like to express that we will be training researchers in high technology areas by launching various scholarship programs.

We believe that SEDEC will enable us on our path toward achieving a global perspective and strengthen our communication networks in all these activities. The partnerships both with foreign industries and within our own industry will increase. To this end, as the increase of such partnerships means global awareness and the strengthening of Turkey's position in the defence and security industry, we believe that SEDEC will be contributing to the industry in our endeavors to reach our goals as a country."

Following the opening ceremony, the conferences comprised of five different sessions started. The first session of the conference was titled as, "Border Security Policies"; the second session was titled as the "Homeland Security"; the third session, "Supply Chain"; the fourth session "Border Security Technologies" and the fifth session titled as "Secure Cities". The sessions were executed with the contributions of esteemed moderators and speakers.

As a candidate for becoming one of the most critical events accomplished to this end, the aim is to hold the SEDEC event biyearly.

New Era for the Presidency of Defence Industries and Türk Loydu

A letter of intent was signed between the Presidency of Defence Industries and Türk Loydu on June 12, 2018 in order to extend areas of successful collaboration and to maintain bilateral business relations at the top level for new activities.

Türk Loydu has 25 years of experience in nearly 150 Military Vessel Classifications and is one of the leading classification institutions in the world. They have been conducting many projects with the Presidency of Defence Industries for the construction of modern military vessels using national resources in order to meet the operational needs of the Turkish Naval Forces. Having collaborated with the Presidency of Defence Industries on many projects which led to the development of Turkey's defence industry capacity and capability Since the beginning of 1990s. Türk Loydu has successfully taken part in many projects which are the source of pride of the Turkish Navy such as the TCG Yb. Kudret



Güngör, Milgem, New Type Patrol Boats, Fast Amphibious Ship (LCT), TCG Bayraktar, TCG Sancaktar, TCG Işın, TCG Akin, TCG Alemdar and the under construction TCG Anadolu.

The letter of intent between the Presidency of Defence Industries and the Türk Loydu was signed by Alper KÖSE, Head of the SSB Naval

Operations Department, and Alper ERALP, General Manager of the Türk Loydu Conformity Assessment Services Corporation. With the letter of intent, the successful contributions of Türk Loydu to the defence sector such as classification, material certification, plan and approval are aimed to be expanded, in line with the technical qualifications of Türk Loydu.

Turkish Aerospace Debuts New Logo

Turkish Aerospace, which maintains its position as a leader in the Aerospace industry of Turkey, is getting a fresh look with a new logo and identity. The company, which from the very first day of its establishment up until today is a "source of pride" of the industry, has introduced its new logo. The swallow's unique characteristics, which represents freedom, played a significant role in the logo identification process; and the subsequent selection of the "swallow bird" logo.

The new logo will not only enhance the company's international notoriety but also, empower their vision and mission to become one of the Most Prominent Aerospace Companies of the industry. Turkish Aerospace which strives to strengthen brand awareness through its developing range of products, aims to "bring a breath of fresh air" and raise its reputation to

the highest level through the new logo.

"We have changed our logo by bringing "our glorious flag" and the domain of our products of "the sky" together. Thus, we started out in the belief that a new logo will improve our company's culture to ensure our employees are ambitious, which can lead to increased profitability. This change will make a significant contribution in bringing our company up to the level of global competitiveness and in creating a



brand known throughout the world".

While creating the new logo Temel KOTİL, Phd the President & CEO of Turkish Aerospace, carefully followed all the process and reassured his staff: "We have started a totally new period with our new corporate identity within our activities which will shape the future by our power coming from the past. We are changing along with who we are and becoming transformed by our power. We are happy to reveal our new logo."



First Batch of TGGC's BAYRAKTAR TB2-S Block 2 UAVs Delivered

On May 30th, 2018 Selçuk Bayraktar, Baykar Makina Chief Technology Officer (CTO) announced with a tweet that following the successful completion of acceptance tests the company carried out the delivery of 6 BAYRAKTAR Armed UAVs to the Turkish Gendarmerie General Command (TGGC), 7 months ahead of contract schedule.

The delivered BAYRAKTAR TB2-S Armed Tactical UAVs are in Block 2 configurations (having two underwing pylons/hard points under each wing and equipped with a CMX-15D FLIR payload) and constitutes the first batch of 12 aircraft ordered on May 11, 2017 during the IDEF '17 Exhibition. According to Baykar Makina along with 6 BAYRAKTAR TB2-S Block 2 UAVs, 3 Ground Control Stations (GCSs), 7 Ground Data Terminal (GDTs) and 10 Remote Video Terminals (RVTs) also have been delivered to the TGGC. BAYRAKTAR TB2-S Block 2 Armed UAVs carry Roketsan's two MAM-Ls and two MAM-C smart munitions.

As of June 14, 2018 Baykar Makina has delivered a total of 52

BAYRAKTAR TB2s (Surveillance) and TB2-Ss (Armed) UAVS to Turkish end users. 13 TB2s and 21 TB2-Ss to Turkish Land Forces (TLF) Command, 6 TB2s to the Security General Directorate (Turkish Police) and 4 TB2s and 8 TB2-Ss (2 in Block 1 and 6 in Block 2 configurations) to the TGGC. The BAYRAKTAR TB2 Tactical UAV, which entered TLF service in 2015, and TB2-S Armed Tactical UAV, which has

been in use since June 2016, took part in Operation Euphrates Shield and Operation Olive Branch. As of June 14, 2018 BAYRAKTAR, TB2 and TB2-S UAV fleet accumulated a total of 50,000 flight hours. According to the Turkish MoND, Turkey will procure as many as 151 BAYRAKTAR TB2 UAVs of which 112s would be in armed (TB2-S) configuration.



Boeing and Turkish Technic Announce Global Fleet Care Supplier Agreement

Boeing and Turkish Technic Inc., the maintenance, repair and overhaul (MRO) arm of Turkish Airlines, announced the signing of a Global Fleet Care supplier agreement.

Turkish Technic is now a strategic Boeing supplier for line maintenance, heavy maintenance of airplanes, component service and repair. Boeing and Turkish Technic will collaborate together in the training and certification of technicians from different parts of the world.

"We provide a broad portfolio of MRO services in 50+ International Line Maintenance locations as well as our existing base maintenance facilities in Istanbul and Ankara. In addition to the current services we provide, more will be available to our customers at our brand-new facilities, located Istanbul New Airport as of 29th October 2018. We are so glad to announce such a remarkable collaboration with

Boeing today, which will significantly contribute and add value to our business in our new home base. Within the extent of Boeing Global Fleet Care program including aircraft maintenance, repair and training, Boeing operators will be able to experience the world class quality of Turkish Technic's MRO services through this agreement," said Ahmet KARAMAN, General Manager of Turkish Technic Inc.

Last year, Boeing and the Turkish Government announced the Boeing Turkey National Aerospace Initiative, launched to support the growth of the Turkish aerospace industry, in conjunction with the targets set by Turkey's Vision 2023 that specially designed for the 100th anniversary of the establishment of the Turkish Republic. The initiative outlines a strategic framework that aligns Boeing investment and programs with the Turkish Government, Turkish airlines, aerospace service companies and industry suppliers in



the areas of research, engineering and skills development.

"Turkey is one of the Boeing's top strategic growth countries, and we see strong capability and growth potential in aviation services and maintenance in Turkey," said Marc ALLEN, President of Boeing International. "Positioning Turkey as a global player in aviation services is one of the key elements of the Boeing Turkey National Aerospace Initiative we announced last year. With this agreement, we are taking our successful collaboration with Turkish Technic one step further in a manner that aligns to the growth of Boeing and Turkey."

Peli Products Announces its Expansion in Turkey

As part of its continued growth in the EMEA region, the Company opens new offices in Ankara, Turkey. June 2018

Since the European distribution and sales office was opened in Barcelona in 1997, Peli Products -the global leader in the design and manufacture of high performance protective cases and advanced portable lighting systems- has been following a plan of continued expansion with a high dynamism in its development.

Over the last ten years, Peli Products has progressively increased its presence in European, Middle East & Africa countries. It has opened operational offices in many countries including France, Germany, the United Kingdom, the United Arab Emirates, Israel, South Africa, Italy, Poland and now, Turkey. Furthermore, in 2007 the company started manufacturing its most popular Peli Protective Cases

models in Germany, and in 2017 the company doubled the size of its UK Engineering facilities.

As part of the ongoing growth, Peli Products is expanding the local Turkish team and opening new offices in Ankara. This step forward strengthens the local team which has been present in Istanbul since 2011. The new office will enable the company to be centrally placed in the region of Ankara and establish new relationships with local customers. Having the Peli team closer to them will translate into a better understanding of their demands and facilitate the company's adaptation to the preferences of the Turkish market.

"We have detected truly important business opportunities in Turkey in recent years. Therefore, the strategic

response to this continuous growth is establishing Peli in the region by having our local team in a centric location. This new office in Ankara is an additional asset for Peli Products, which contributes toward further extending the global presence of the brand. Moreover, it encourages the proximity with our local stakeholders" said Piero MARIGO, Peli Products EMEA Managing Director.

Peli's products are used by professionals in the most demanding markets including firefighters, police, defence, aerospace, entertainment, industrial and consumer. Peli products are designed and built to last a lifetime. The company operates in 140 countries, with 29 offices and 6 manufacturing facilities across the globe.

Aselsan's Submarine Intercept Sonar System ASIST Installed On-Board Three Ay Class Submarines

Aselsan continues to add new products to its product portfolio. Domestic and National Sonar Systems have started to be used in Ay Class Submarines.

Aselsan, increasing its success in the field of Underwater Systems with each passing day, has successfully completed the acceptance tests of the Aselsan Intercept Sonar System (ASIST) that it developed in accordance with the military standards to meet the needs of the Naval Forces. The systems have started to be used in the Ay Class submarines.

The system, which was developed entirely by local means from the acoustic sensor directory to the in-vessel units, had the title of the "First National Submarine Sonar System".

The Submarine Intercept Sonar System developed by Aselsan, which is designed according to military requirements, has capability to detect, track and analyze active acoustic signals within 1 kHz - 100 kHz frequency range.

Submarine Intercept Sonar System consists of Intercept Sonar Acoustic Sensor Array, Processing Unit, Control and Display Unit, DC/DC Converter and SUR Interface Adaptation Units (SAUB). Acoustic Sensor Array includes pre-amplifiers, analog-digital converters (ADC) and hydrophone arrays which convert acoustic signals to electrical signal.

Submarine Intercept Sonar can be used as stand-alone system or can be integrated to Combat Management System.

System simultaneously detects, analyzes and provides parameters of at least 4 pulses which are separable in frequency



domain. The following parameters of detected pulses are displayed:

- › Detection time
- › Relative and true bearings
- › Pulse frequency
- › Pulse amplitude
- › Pulse duration
- › Pulse repetition interval (PRI)
- › Pulse mode

Submarine Intercept Sonar System displays the following graphics of detected pulses in real time:

- › Polar Diagram
- › Spectrogram Plot
- › Waterfall Plot



HSwMS Gotland Relunched After Mid-Life Upgrade

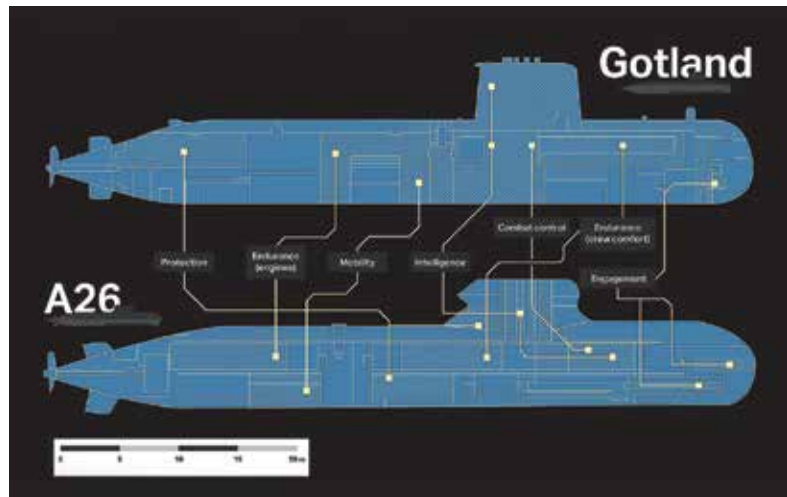
After a comprehensive mid-life upgrade (MLU) to meet tomorrow's naval challenges, HSwMS Gotland has been relaunched with a ceremony in Karlskrona on June 20, 2018 and is ready to start her sea trials.

Strategically important in Swedish defence, submarines are designed to operate for decades in challenging environments whilst remaining adaptable given the advance of technology and future threats. To keep them at the cutting-edge of technology, Sweden's Gotland Class submarines have received regular overhauls and upgrades during their operational life.



Due to this MLU, the Gotland submarine has capabilities that will be found in the next generation of Swedish submarines, the A26.

"The relaunch of Gotland is an important milestone in the evolutionary development of Swedish submarines. After a comprehensive upgrade, integrating the latest generation of important systems such as the Stirling engine, modern sensors and new management functions, Gotland is almost a new submarine, ready to



take on missions around the world," says Gunnar WIESLANDER, Senior Vice President, head of business area Kockums at Saab.

The Gotland was designed and built by Kockums in Malmö in the early 1990's and commissioned in 1996. The mid-life modification consists of upgrades of onboard systems and technology, sustaining the submarine's operability, and ensuring service to Sweden beyond 2025.

The upgrade process entails many important systems, such as the Stirling Air Independent Propulsion (AIP). Sensors and management system are replaced with updated versions. Even the traditional optical periscope is replaced with a new optronic mast.

This updated version of the Gotland will pave the way for one of the most modern AIP submarines under production today: the A26 for the Royal Swedish Navy. More than 20 systems on-board the new Gotland Class will be

implemented in the A26. The MLU of Gotland therefore contributes to the test and qualification of some of the innovative solutions to be implemented in the future Swedish A26 submarine class.

The Building Contract Modifications of two submarines, verification incl. Set to Work (STW), Harbour Acceptance Test (HAT), Sea Acceptance Test (SAT), training, documentation, spares and upgrade of land-based Training Facility Delivery end of 2018 and 2019 respectively Mid-life Upgrade Submarine is cut open in the mid-tank section, adding a new section including sea water cooling, fresh water cooling, water chiller units

Improved capabilities; Stirling AIP MkIII, Masts, Sensors, Communication, Special Ops, New rules and regulations: IMO, Security, Crew Comfort, End-of-life and obsolescence issues: Combat and Ship's Management Systems Experience based improvement

Facts about the MLU of Gotland

Length overall	62 m
Beam	6.2 m
Displacement	1.580 tons (surfaced)
Weapons	Torpedoes, bow tubes, swim-out
Propulsion	Single-shaft, diesel-electric and Stirling AIP
Endurance	Weeks (submerged)
Hull	Single pressure hull, two pressure tight compartments
Crew	25

Roketsan and Raytheon Partnership Continues with Excellence Award

Roketsan and Raytheon continue their strategic partnership on the Patriot Program as per the contract signed on 16 May 2018 for additional Production of Patriot GEM-T Air Defence Missile Control Section Assemblies (CSA). The partnership started in 2009 and proceeded successfully with the completion of three projects for different end users.

Awarded the 'Supplier Excellence Award' for ninth consecutive year since 2009, Roketsan has been awarded a second time with the '4-Star Supplier Excellence Award' as an outcome of the performance demonstrated in 2017.

Raytheon's Integrated Defence Systems business instituted the annual Supplier Excellence Awards program to recognize suppliers who have provided outstanding service and partnership in exceeding customer requirements. Award candidates are judged on certain criteria, including overall quality and on-time delivery. Roketsan was one of 55 companies recognized



by Raytheon's Integrated Defence Systems business for 4-Star honors.

2017 Supplier Excellence Award was presented to Hayri TORUN, Vice President of Roketsan Company and Anıl KARAÇAY, Project Leader of Patriot CSA Program by Steve MURPHY and John BERGERON, Vice Presidents of Raytheon IDS, with a ceremony in Boston, Massachusetts, United States on 17 May 2018.

Being awarded to this prestigious award for the ninth

time, is a significant indication of Roketsan's ability to fulfill its responsibility for delivering products to customers at the required quality and time, and also fulfill the success that is achieved in international projects.

As the sole source in the world for the 'Patriot GEM-T Air Defence Missile Control Section Assembly (CSA) Production', Roketsan continues to hold the status of 'Raytheon Preferred Patriot Supplier'.

ODTÜ Teknokent Defence Industry Cluster (TSSK) New Board of Directors

ODTÜ TSSK New Board of Directors was shared with the public with a written statement made by ODTÜ Teknokent administration. In the statement, it was stated: "The Board of Directors of TSSK has been renewed after the General Assembly held on April 4, 2018. The former TSSK Board of Directors, whose term of office expired in April 2018, has been constituted with the approval of the representatives of TSSK companies having different capabilities for the purpose of gaining different points of view and fresh blood. The first board meeting was held on May 15, 2018 with the new Board of Directors and the structure of the new Board of Directors of TSSK was determined as follows:"

Founded in 2010 by ODTÜ Teknokent and expanded with the participation of other teknokent companies in the region, TSSK is currently conducting about 550 active R&D projects in the defence industry with more than 2,140 R&D personnel. As of the end of 2017, it is stated that the exports of the cluster exceeded \$135 million.



Chairman of the Board	Zeynep ÖKTEM
Vice Chairman of the Board	Fatih ÜNAL
Vice Chairman of the Board	Gökçe Yıldırım KALKAN
Board Member	Ali İhsan ASLAN
Board Member	Atilla BİLER
Board Member	Burak AKBAŞ
Board Member	Gökhan KOYUNCU

A 20-Year Track Record of Success Continues

Emergent BioSolutions, a US-based global life sciences company, has a 20-year track record of providing the US government and its allies with critically needed medical countermeasures to protect their military and civilian populations from serious public health threats. The company develops and manufactures vaccines and therapeutics for biological weapons such as anthrax, smallpox, and botulism, as well as devices to address exposure to chemical warfare agents. Its development programs include product candidates for emerging infectious diseases (EID) like Zika, Ebola, Nipah, and pandemic influenza.

"This year is a special year for the company as we approach our 20th year in operations," said Daniel J. Abdun-NABI, CEO of Emergent BioSolutions. "Our history of growth began in Lansing, Michigan, USA with one site, one product – our anthrax vaccine, and approximately 180 employees."

Emergent currently employs 1,300 professionals who are committed to the company mission – to protect and enhance life. It now has 13 locations that include a network of advanced development and manufacturing facilities across North America as well as sales and marketing offices in Singapore, the UK, and Germany. One of its Maryland-based facilities is designated by the US Department of Health and Human Services as a Center for Innovation in Advanced Development and Manufacturing, which is designed to provide surge manufacturing capabilities during a public health emergency.

"Through the dedication of our employees and under focused leadership grounded on the belief that we can make a difference in public health, we delivered on our development and procurement contracts year after year and built our reputation as a reliable partner to the US government," said Abdun-NABI. "This has helped us penetrate other markets."

While the bulk of its customer base is in the US, Emergent is committed to growing its international

footprint, particularly across Europe and Asia to help support the CBRN and EID preparedness goals of the international community. With its longstanding history of supplying products to the US Strategic National Stockpile, Emergent is uniquely positioned to offer its expertise in providing chemical and biological threat preparedness solutions not only to governments, but also to international organizations such as the European Commission, North Atlantic Treaty Organization (NATO), and the World Health Organization (WHO).

To that end, as the manufacturer of the only licensed anthrax vaccine in the US and Singapore, Emergent announced a goal of expanding its global presence and increasing product sales from international markets. In 2012, the company received market authorization for its anthrax vaccine to be sold in Germany. This enabled the initiation of a mutual recognition procedure for its anthrax vaccine to be licensed in five additional countries in Europe. With the completion of this procedure in 2018, Emergent has received market authorization for its anthrax vaccine in five additional countries, namely, Italy, France, Poland, the UK, and the Netherlands. In 2017, Emergent also announced a contract with the US Department of State to supply a nerve agent antidote autoinjector out of Germany.

Under today's climate of heightened threat awareness, initiatives such as the European Commission's Joint Procurement Agreement, which aims to secure equitable access to medical countermeasures and an improved security of supply, coupled with more balanced pricing for participating EU countries, make it easier for member countries to focus on preparedness against CBRN threats and emerging infectious diseases. This is an important component of global security. As the threat assessment has evolved significantly over the past few years, the company has also prioritized offering protection to first responder teams and intergovernmental and non-governmental organizations that



operate in potentially high-risk areas such as NATO, WHO, Red Cross, and Doctors Without Borders.

Emergent reported total annual revenues of \$560.9 million in 2017. Product sales were \$421.5 million, 67% of which came from the US market and 8% from international markets. This included sales from its anthrax vaccine and therapeutic, botulism antitoxin, vaccinia immune globulin, and devices against chemical threats. The company is targeting \$1 billion in total revenue by 2020, with at least 10% of total revenue from ex-US customers.

Nearer-term, one of Emergent's goals is to have a prototype Mobile Manufacturing Unit by year-end. The plan is to scale down the company's Winnipeg-based large-scale validated manufacturing process to fit into a trailer truck that could potentially be deployed to combat emerging infectious diseases, such as Zika, MERS, or Ebola, in the field. The concept is to deploy the unit where the outbreak is, collect plasma from those who have recovered from the disease, and convert plasma into finished product that is ready to administer right in the truck.

"One of Emergent's strengths as a company lies within our agility not only to meet our government customers' changing needs, but also to find innovative ways of addressing these rapidly evolving public health threats," said Abdun-Nabi. "This, coupled with our core competencies in government contracting and advanced development and manufacturing, and supported by our state-of-the-industry infrastructure, ensures that the company remains on-track for sustained growth and to achieve our vision of protecting and enhancing 50 million lives by 2025."

Iveco Defence Vehicles is Awarded Contract to Deliver Amphibious Platform to the US Marine Corps in Partnership with BAE Systems

Iveco Defence Vehicles will provide its 8x8 amphibious armored platform design, core components and services under a contract arrangement worth up to \$US400 million for the first four years, to support BAE Systems in the frame of their contract with the US Marine Corps.

Bolzano, Italy - In the frame of the contract awarded by the US Marine Corps to BAE Systems' team for the manufacture of the next generation of Amphibious Combat Vehicles (ACV), CNH Industrial subsidiary Iveco Defence Vehicles will provide its 8x8 amphibious armored platform design, core components and services.

"This award represents a milestone in the transformation of Iveco Defence Vehicles into a global player", said Vincenzo GIANNELLI, President and CEO of Iveco Defence Vehicles. "Through our partnership with BAE Systems on this program, our know-how and technical excellence have been recognized and are placed at the service of the US Marine

Corps. We now have the privilege of contributing to building the future of its amphibious combat vehicles".

The initial award by the US Marine Corps is for 30 vehicles, with options for a total of 204 vehicles.

The ACV is an advanced 8x8 open ocean-capable vehicle that is equipped with a new six-cylinder, 700hp engine, which provides a significant power increase over the current Assault Amphibious

Vehicle. The vehicle delivers best-in-class mobility in all terrain and has a suspended interior seat structure for 13 embarked Marines, blast-mitigating positions for a crew of three, and improved survivability and force protection over currently fielded systems. The team has conducted extensive risk mitigation testing and evaluation for water operations, land mobility and survivability that have proven the solution's capabilities.

Iveco Defence Vehicles and BAE Systems teamed together in the very early phases of this program to offer a superior solution to the US Marines for their ACV



requirement. As a result of this successful teaming relationship, the first 16 prototypes were delivered to the Marine Corps in 2017. Over the past 15 months, the companies supported the US Marine Corps' Developmental Testing and

Operational Assessment of these vehicles whose performance achieved superlative results for water operations, land operations, carry/payload, and protection.

As a leading provider of protected and integrated mobility solutions to military and civil protection customers, Iveco Defence Vehicles brings proven experience, having designed and built more than 30,000 multi-purpose, protected and armored military vehicles in service today.



Leonardo to Supply the Next-Generation BSA Heavy Torpedo to the Italian Navy

In June 2018 the Italian Navy has selected Leonardo's Black Shark Advanced (BSA) Heavy Torpedoes to equip its Todaro Class U212A U212A 2nd Series AIP Submarines. The new torpedoes are expected to significantly improve the Italian Navy's (ASW) anti-submarine combat capability. Leonardo also agreed to provide associated logistical support services as part of the agreement.

The Black Shark Advanced is an evolution of the Black Shark heavy torpedo, already acquired by many countries including Chile, Indonesia, Malaysia, Portugal and Singapore.

This latest version integrates an innovative energy production section that can be optimized, according to the use of the system, for training or operational purposes. When the BSA is used for training activities, a newly developed rechargeable battery is used that allows a higher number of launches



- up to one hundred – compared to that of previous versions, providing significant cost savings. In the operational configuration, the BSA is equipped with an innovative battery that ensures an increase in capabilities and performance. The new solution also delivers a significant reduction in life cycle

costs.

Made in Italy at Leonardo's Livorno plant, the Black Shark Advanced torpedo is an example of national excellence in the underwater defence sector and is the result of extensive and successful collaboration between the Italian Navy and industry.

Bell Boeing to Begin U.S. Navy CMV-22B Production Work Under \$4 Billion Contract

Contract provides a total of 58 tiltrotors to United States Navy, Marines, and Air Force, and the government of Japan

Bell Boeing Joint Program Office, Amarillo, Texas, is awarded \$4,191,533,822 for modification P00008 to convert the previously awarded V-22 tiltrotor aircraft advance acquisition contract (N00019-17-C-0015) to a fixed-price-incentive-fee multiyear contract. This contract provides for the manufacture and delivery of 39 CMV-22B aircraft for the Navy; 14 MV-22B aircraft for the Marine Corps; one CV-22B for the Air Force; and four MV-22B aircraft for the government of Japan.

"Bell Boeing is pleased to extend production of the V-22, supporting our warfighters with one of the most

versatile and in-demand platforms in the U.S. arsenal," said Chris GEHLER, Bell Vice President for the V-22 Program. "This multiyear production contract provides program production stability through at least 2024."

The U.S. Navy will use its new CMV-22B for transporting personnel and cargo from shore to aircraft carriers, eventually replacing the C-2 Greyhound, which has been in service since the mid-1960s.

"By combining aircraft for three services and a key U.S. Ally into one multiyear order, the U.S. Navy gets more capability for its procurement dollar," said Kristin HOUSTON, Vice



President, Boeing Tiltrotor Programs and Director, Bell Boeing V-22 Program. "It also enables the U.S. Navy to begin advancing its carrier onboard delivery fleet with modern tiltrotor aircraft. It's a true win-win."

KMW and Nexter Join Forces on Main Ground Combat System

The French and the German governments on the joint development of a new Main Ground Combat System and a new Common Indirect Fire System. The Letter of Intent signed yesterday is a significant step forward in the defence cooperation between the two countries and in Europe. This close cooperation was the key motivation for the foundation of KNDS in 2015, where Nexter and KMW cooperate as national system houses for land systems.

MGCS will develop a new generation of Main Battle Tanks, providing their users enhanced, innovative, and best-in-class systems with the most advanced technologies. Thus, Germany and France are jointly launching the most strategic project in European land defence for the 30 years to come, a program package that will shape the future of European armies' main combat capabilities and contribute to Europe's sovereignty and strategic autonomy.

The skills and background of KMW and Nexter qualify both companies as suitable and particularly powerful and pivotal industrial partners for the Franco-German land-system-program MGCS. Thus, in close cooperation with leading technology companies, KMW and Nexter will substantially contribute to a strengthened European defence capability.

The agreement of both nations to capitalize on the success of the German and French MBT programs and to base the industrial leadership for the MGCS program in Germany demonstrates the strong commitment towards a unique European cooperation in land systems. Beyond that, it strengthens Europe's excellence in providing leading edge land- systems- technologies for the years to come.

Lockheed Martin Delivered 300th F-35 Aircraft

The F-35 Joint Program Office and Lockheed Martin delivered the 300th production F-35 aircraft, demonstrating the program's continued progress and momentum. The 300th aircraft is a U.S. Air Force F-35A, to be delivered to Hill Air Force Base, Utah.

"The F-35 weapons system is a key enabler of our National Defence Strategy and is providing our warfighters the combat proven, advanced capabilities they need to meet mission requirements," said Vice Admiral Mat WINTER, program executive officer for the F-35 Joint Program Office. "The 300th production aircraft delivery is a significant milestone that highlights the effective F-35 Enterprise collaboration across the JPO, U.S. services, partners and industry. Moving forward, our F-35 team remains committed to driving costs down, quality up and faster delivery timelines across our development, production and sustainment lines of effort."

The first 300 F-35s include 197 F-35A conventional takeoff and landing (CTOL) variants, 75 F-35B short takeoff/vertical landing (STOVL) variants, and 28 F-35C carrier variants (CV) and have been delivered to U.S. and international customers. More than 620 pilots and 5,600 maintainers have been trained, and the F-35 fleet has surpassed more than 140,000 cumulative flight hours.

"This milestone is a testament to the hard work and dedication of our joint government and industry team as we collaborate to deliver transformational F-35 capabilities

to the men and women in uniform," said Greg ULMER, Lockheed Martin vice president and general manager of the F-35 program. "We are focused on reducing costs, increasing efficiencies, and ensuring the highest level of quality as we ramp to full rate production and sustainment of the operational fleet."

Increasing Production, Reducing Costs

As production volume increases and additional efficiencies are implemented, Lockheed Martin is on track to reduce the cost of an F-35A to \$80 million by 2020, which is equal to or less than legacy 4th generation aircraft. With the incorporation of lessons learned, process efficiencies, production automation, facility and tooling upgrades, supply chain initiatives and more, the F-35 enterprise has already significantly reduced costs and improved efficiency. For example: The price of an F-35A has come down more than 60 percent from the first contract. Touch labor has been reduced by about 75 percent over the last five years as well as the production span time has decreased by about 20 percent since 2015.

The F-35 enterprise met its 2017 delivery target of 66 aircraft, representing more than a 40 percent increase from 2016. In 2018, the team is targeting 91 aircraft deliveries and is preparing to increase production volume year-over-year to hit a rate of approximately 160 aircraft in 2023.



Boeing and Embraer to Establish Strategic Aerospace Partnership to Accelerate Global Aerospace Growth

Boeing and Embraer announced they have signed a Memorandum of Understanding to establish a strategic partnership that positions both companies to accelerate growth in global aerospace markets.

The non-binding agreement proposes the formation of a joint venture comprising the commercial aircraft and services business of Embraer that would strategically align with Boeing's commercial development, production, marketing and lifecycle services operations. Under the terms of the agreement, Boeing will hold an 80 percent ownership stake in the joint venture and Embraer will own the remaining 20 percent stake.

"By forging this strategic partnership, we will be ideally positioned to generate significant value for both companies' customers, employees and shareholders – and for Brazil and the United States," said Dennis Muilenburg, Boeing's Chairman, President and Chief Executive Officer. "This important partnership clearly aligns with Boeing's long-term strategy of investing in organic growth and returning value to shareholders, complemented by strategic arrangements that enhance and accelerate our growth plans," MUILENBURG said.

"The agreement with Boeing will create the most important strategic partnership in the aerospace industry, strengthening both companies' leadership in the global market," said Paulo Cesar de Souza e Silva, Embraer Chief Executive Officer and President. "The business combination with Boeing is expected to create a virtuous cycle for the Brazilian aerospace industry, increasing its sales potential, production, creating jobs and income, investments and exports, and in doing so, adding more value to customers, shareholders and employees."

The transaction values 100 percent of Embraer's commercial aircraft operations at \$4.75 billion and contemplates a value of \$3.8 billion for Boeing's 80 percent ownership stake in the joint venture. The proposed partnership is expected to be accretive to Boeing's earnings per share beginning in 2020 and to generate estimated annual pre-tax cost synergies of approximately \$150 million by year three.

The strategic partnership will bring together more than 150 years of combined leadership in aerospace and leverage the two companies' highly complementary commercial product lines. The partnership is a natural evolution of a long-standing history of collaboration between Boeing and Embraer over more than 20 years.

On finalization, the commercial aviation joint venture will be led by Brazil-based management, including a President and Chief Executive Officer. Boeing will have operational and management control of the new company, which will report directly to MUILENBURG.

The joint venture will become one of Boeing's centers of excellence for end-to-end design, manufacturing, and support of commercial passenger aircraft, and will be fully integrated into Boeing's broader production and supply chain.

Boeing and the joint venture would be positioned to offer a comprehensive, highly complementary commercial airplane portfolio that ranges from 70 seats to more than 450 seats and freighters, offering best-in-class products and services to better serve the global customer base.

In addition, both companies will create another joint venture to promote and develop new markets and applications for Defence products and services,

especially the KC-390 multi-mission aircraft, based on jointly-identified opportunities.

"Joint investments in the global marketing of the KC-390, as well as a series of specific agreements in the fields of engineering, research and development and the supply chain, will enhance mutual benefits and further enhance the competitiveness of Boeing and Embraer," said Nelson SALGADO, Embraer's Executive Vice President, Financial and Investor Relations.

Finalization of the financial and operational details of the strategic partnership and negotiation of definitive transaction agreements are expected to continue in the coming months. Upon execution of these agreements, the transaction would then be subject to shareholder and regulatory approvals, including approval from the Government of Brazil, as well as other customary closing conditions. Assuming the approvals are received in a timely manner, the transaction is expected to close by the end of 2019, 12-18 months after execution of the definitive agreements.

"This strategic partnership is a natural evolution of the long-standing history of collaboration between Boeing and Embraer on a range of aerospace initiatives over almost three decades," said Greg SMITH, Boeing Chief Financial Officer and Executive Vice President of Enterprise Strategy & Performance. "It is aligned with Boeing's enterprise strategy of pursuing strategic investment opportunities where they demonstrate real value and accelerate our organic growth plans. This partnership will strengthen the vertical capabilities of Boeing and enhance value for our customers through the full lifecycle of industry-leading products and services."

Boeing and Embraer will benefit

from a broader scale, resources and footprint, including global supply chain, sales and marketing, and services network, which will enable them to capture benefits from best-in-class efficiencies across the organizations. Additionally, the strategic partnership will provide opportunities to share best practices in manufacturing and across development programs.

The transaction will have no impact on Boeing and Embraer financial guidance for 2018 or Boeing's cash deployment strategy and commitment to returning approximately 100 percent of free cash flow to shareholders.

Forward-Looking Information Is Subject to Risk and Uncertainty

Certain statements in this release may be "forward-looking" within the meaning of the Private Securities Litigation Reform Act of 1995, including statements regarding benefits and synergies of the joint venture and future business prospects, as well as any other statement that does not directly relate to any historical or current fact. Forward-looking statements are based on current assumptions about future events that may not prove to be accurate. These statements are not guarantees and are subject to risks, uncertainties and changes in circumstances that are difficult to predict. Many factors could cause actual results to differ materially from these forward-looking statements. As a result, these statements speak only as of the date they are made and neither party undertakes an obligation to update or revise any forward-looking statement, except as required by law. Specific factors that could cause actual results to differ materially from these forward-looking statements include the effect of global economic conditions, the ability of the parties to reach final agreement on a transaction, consummate such a transaction and realize anticipated synergies, and other important factors disclosed previously and from time to time in the filings of The Boeing Company and/or Embraer with the Securities and Exchange Commission.



EMBT Showcased at Eurosatory 2018

On June 11, 2018 France's Nexter and Germany's Krauss-Maffei Wegmann unexpectedly unveiled a new Euro Main Battle Tank (EMBT) concept at the Eurosatory 2018 Fair; this was their first attempt at combining national technologies to develop a next-generation pan-European tank.

The EMBT was developed by KNDS, a joint company between German Krauss-Maffei Wegmann (KMW) and French company Nexter – and combines a Leopard 2A7 chassis with a Leclerc 120mm turret operated by only 2 crew members instead of 3 thanks to the autoloader.

The development effort for the EMBT has been ongoing since January 2017, with the prototype platform conducting live fire trials only a month ago. "This is the first step in having a common product from Nexter and KMW," said Sebastian BENT, Project Manager for EMBT for KMW. "This is a demonstrator, but the next step

will be to have a prototype or pre-series production" he added.

Since the Leclerc features a lighter autoloading turret, compared with the manually loaded Leopard 2A7, the EMBT is lighter and has a growth potential of around 6t (10% of the EMBT's 60t GVW). This effort has been funded by KNDS and is not a German or French Government program. Work done on the demonstrator is expected to provide information regarding technology and cooperation requirements for a future MBT that will enter service in the 2030s.

The German and French Governments are currently studying a new joint MBT under a program known as the Mobile Ground Combat System (MGCS).

For the EMBT, one of the main challenges has been to integrate the electronic and mechanical interfaces between the turret and chassis. The chassis is based on the latest A7 variant of the Leopard 2, with mobility trials also completed with the Leclerc turret integrated.



Contract Worth 200M NOK, Naval Strike Missile for Norway and Germany

On June 20, 2018 Kongsberg Defence & Aerospace AS (KONGSBERG) announced that they have entered into contract with the Norwegian Defence Materiel Agency worth 220M NOK (around US\$27 Million) for a cooperation agreement on the Naval Strike Missile (NSM).

The Norwegian Government announced February 2017 the Strategic Cooperation with Germany for acquisition of new submarines, where Germany intends to acquire NSM for their Navy. Norway and Germany will cooperate in a long-term evolution of the NSM for their vessels. This contract is the first phase in this cooperation and has a duration of one year.

"This contract is an important milestone in a long-term Norwegian-German cooperation on missiles. The NSM is a product of the unique triangle cooperation developed between the defence industry, FFI and the Armed Forces", says Eirik LIE, President Kongsberg Defence & Aerospace AS.

In addition to the NSM, Germany and Norway are cooperating on the construction of four Type 212 CD (Common Design) submarines for Norway and two for Germany. A joint contract for the submarines is expected to be signed in 2019 with deliveries starting from the mid-2020s.

This is the second NSM contract publicized by KONGSBERG in June, 2018. On June 1, it was disclosed that the U.S. Navy has selected the Naval Strike Missile (NSM), offered by Raytheon Company and Kongsberg Gruppen (KONGSBERG), to meet its over-the-horizon (OTH) requirement for littoral combat ships and future frigates. The NSM,



which was a joint submission between KONGSBERG and Raytheon, was widely expected to win the competition after its main competitors - Boeing's extended range Harpoon and Lockheed Martin's Long-Range Anti-Ship Missile - dropped from contention.

Raytheon and KONGSBERG will manufacture and deliver over-the-horizon weapon systems under a US\$14.8 Million contract for offensive missiles loaded into launching mechanisms, and a single fire control suite. The contract includes options, which, if exercised, would bring the cumulative value to US\$847.6 Million. Meanwhile on July 12, the U.S. Army successfully launched

the NSM and struck the USS Racine (LST-1191) Newport Class tank landing ship (LST) target during a live fire exercise. The test was the first live fire demonstration of the weapon and was executed as a part of the RIMPAC 2018 multi-national exercise.

Featuring the IIR seeker and inertial/GPS navigation the NSM is a 3.96m long missile able to strike both sea and land targets at a distance of around 100 nautical miles. The sub-sonic missile weighs 407kg and has a combined blast and fragmentation warhead weighing 120kg. The NSM is capable of reaching high subsonic speeds and can approach its targets in sea skim mode.





Thank You Competitors!
Since...



...imitation is the sincerest form of flattery.



nurolmakina.com.tr
ejderyalcin.com

f t y in | NurolMakina



NEXT GENERATION COMBAT MISSION SOLUTIONS

