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TURKISH DEFENCE REVIEW

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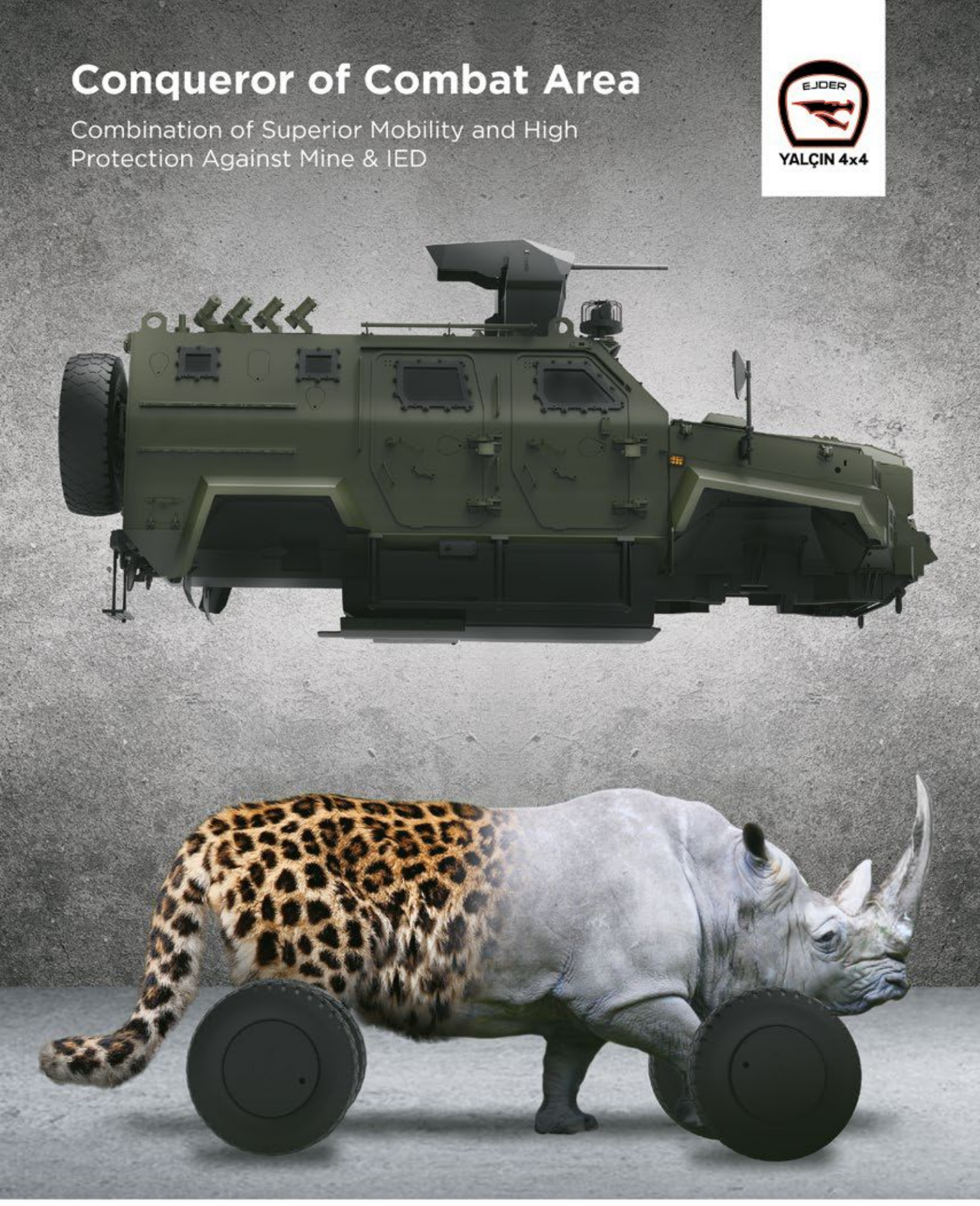

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Decree Law Number 696 Brings Fundamental Changes to the Turkish Defence and Aerospace Industry

While December has been an intense month for the industry, these many important developments have largely been overshadowed by the changes brought by Decree Law number 696.

Among these changes, which we had been expecting for some time, the most important is the attachment of the Undersecretariat for Defence Industries (SSM) to the Presidency. The new Decree Law also brings the removal from Law number 3238 of articles related to the Defence Industry High Coordination Council, and the addition of the President of the Republic of Turkey to the Board of Trustees of the Turkish Armed Forces Foundation as its Chairman. The President also becomes the Chairman of the Defence Industry Executive Committee (SSIK), which has been transformed into an organisation that determines, single-handedly, the general strategies deemed necessary for the development of the defence industry.

Perhaps we should pause here for a moment...

In the past 15 years, President Recep Tayyip Erdoğan has, as the Prime Minister of the time, presided over many SSIK meetings, including the May 2004 meeting that changed the course of the defence and aerospace industry, and saw decisions being taken for many important projects whose products and outputs we are discussing today.

We have followed developments closely throughout this process, and took notes to help form the corporate memory of the industry. We are aware of, and have been following from the very beginning, President Erdoğan's sensitivities regarding the industry. Looking at the past and present, we expect that the most important changes resulting from the affiliation of the SSM to the Presidency, and from President Erdoğan becoming the Chairman of the SSIK, will be an overall gain in momentum for the industry, and an acceleration of project-related processes.

We would like also to underline that the changes brought with this latest Decree Law have taken the SSM into a more important position and even higher level in terms of ensuring the development of the Turkish defence and aerospace industry and meeting user requirements.

ARES: Countdown for New Projects

In December, ARES Shipyard continued with the deliveries of the boats constructed for the Qatar Coast Guard. The project covers 17 boats in total, with one of the two last boats to be delivered being a 48 m ARES 150 HERCULES, which ARES Shipyard is delivering to a user for the first time. The boat stands out as the largest composite hulled vessel ever to be manufactured in Turkey, and the fact that the boat's first customer is Qatar can be seen as an indication of the level of trust placed in ARES.

Another interesting aspect of this project, which began with the contract signed in April 2014, is that its progress has been ahead of schedule – a situation that is rather uncommon in this field. Initially planned with a schedule of four-and-a-half years, the project is now one-and-a-half years ahead of the contract schedule. And this achievement is even more remarkable when we consider that the project involves a platform with a 48-metre composite hull that is being produced for the first time.

Aside from the fact that the project is progressing ahead of schedule, the project is also witnessing the construction of platforms that exceed the performance criteria specified in the contract, with no increase in costs. These are features that reflect positively not only on ARES, but also on the Turkish defence and aerospace industry.

ASELSAN Continues to Make a Difference with SSTKON'17

Another important development in December was the conference organised by the ASELSAN Defence System Technologies (DST) Vice Presidency under the slogan "Technologies Without Borders". The figures shared at this event, which this year had the theme "Succeeding Together", clearly illustrate that productivity is increasing in the ASELSAN DST team, and that this is being achieved by working together and succeeding with others. Readying itself for a period of intense deliveries, the total volume of works under contract at ASELSAN DST for the coming years has reached almost $2 billion, corresponding to a two-fold increase on 2015's figures. Furthermore, despite the growing workload, the number of personnel at ASELSAN DST has only increased by around seven percent.

The upcoming period will be marked by an increased workload for ASELSAN DST's solution partners. Seeking to grow several-fold over the course of 2018, ASELSAN DST will also increase the production levels and volume of work it requests from its subcontractors. Addressing DST personnel, Mustafa Kaval, DST Vice President at ASELSAN, said, "We will be handling this workload together, partly by increasing the number of personnel, but mainly by increasing the number and quality of our business partners", in a statement that signals that the solution partners who will bear the brunt of this workload will certainly have more work to do.

Product Ownership and Institutionalisation within the Industry

The 35th meeting of the TOBB Turkey Defence Industry Assembly, also held in December, shed much light on the industry, not only through the topics on its agenda, but also in the speeches and presentations given during the meeting. We believe that some of the topics covered by the presentation entitled "SSM Sectoral Activities" given by Bilal Aktaş, Head of the SSM Department of Industrialisation, were particularly relevant for the industry's future.

First and foremost among these was the 2018-2022 Defence Industry Sectoral Strategy Document, expected to be published in early 2018. The most notable points to be highlighted in the document will be product ownership and institutionalisation. These two subjects, which will be further emphasised in the strategy document, were mentioned as follows in Aktaş' presentation:

- Defining the technology and subsystems to be acquired in the coming period, to ensure technology and subsystem ownership for a sustainable defence industry.
- Laying out future forecasts concerning the industry and to determine the strategic targets for each subindustry, as well as the activities required to achieve them.

Other novel points in the strategy document will be the removal of any classification differences between small- and medium-sized enterprises (SMEs) and subsidiary industries, as well as increases in both the amount of work given to SMEs and the share of design-related activities in these allocated works, so as to promote design efforts among them.

We should also mention that the SSM has expressed its expectations from companies to keep their information up-to-date on the sanayilesme.ssm.gov.tr website.

The Industry Shows its Energy

The month of December was host to numerous important developments, including events that brought the industry together. Standing out among these events were those organised by HAVELSAN, TEI and ASPİLSAN Energy.

In line with its strategy to grow inorganically together with its business partners, HAVELSAN organised its 2nd Business Ecosystem Workshop on December 7, to meet with subsidiary industry companies and SMEs with which its plans to work long-term. Through its Business Ecosystem Management System, HAVELSAN has laid out the profile of the subsidiary industry companies and SMEs it wants to work with in the longer run. HAVELSAN's efforts in this regard, which touches many companies within the ecosystem, also bears parallels with the EYDEP-related activities of the SSM.

The Turboshaft Engine Subsystems Workshop, held by TEI between December 18 and 19, brought together 250 companies, and gave hope for the future of projects being conducted in this field. The Turboshaft Engine Development project being conducted by the company seeks to fill an important gap in Turkey in field of subsystems. It is also planned that the variants of the engine to be developed in this project will, in the future, be used in platforms such as the T129 ATAK, HÜRJET and TF-X, as well as in various unmanned aerial vehicles. Using the event to gather the strength to produce the engines of the future, TEI has also submitted in December its proposal for the engine of the TF-X National Combat Aircraft, opening up a whole new page in the competition between the parties vying for this tender. TEI and Kale Aero, which had previously competed in other projects such as the one for the development of a turbojet engine, will now be competing for the TF-X engine as well.

Another event in December was the 2nd Workshop for Cell Technologies and Battery Systems Used in Aviation, organised by ASPİLSAN Energy in Kayseri between 21 and 22 December, which brought together the public institutions, universities and companies operating within the ecosystem. The level of interest generated by the event was all too apparent during the question and answer sessions, where the event's attendees contributed nearly as much as the speakers themselves.

Let us conclude by adding that, in addition to assuming an important responsibility through this event in forming a cooperative environment between the parties interested in the subject, ASPİLSAN Energy has also nearly completed the EASA certification process it had initiated to produce batteries for civilian aircraft.

We hope to see you again next month in our February issue, in which we will be sharing the most important and noteworthy developments from the month of January.

Ümit Bayraktar
Executive Editor

HAVELSAN Strengthens Collaborations for a Stronger Turkey

Held for the first time on October 1, 2014 with the theme of "Stronger Collaboration, Growing Domestic Contribution", the second Business Ecosystem Buluştay (a type of meeting whose name is derived from the combination of the Turkish words Buluşma and Çalıştay, which respectively mean Meeting and Workshop) was organised by HAVELSAN in Ankara on December 7, with the slogan "Joining Forces and Strong Collaboration for a Stronger Turkey". The meeting highlighted the developments that have taken place since the last event, some of which are mirrored in its slogan, as well as the ground covered by HAVELSAN and its business partners.

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Emphasising inorganic growth over organic growth in its long-term strategies, HAVELSAN aims to grow its business through the use of subcontractors, which it describes as its business partners. The items at the top of the agenda during the 2014 buluştay included the transfer of HAVELSAN's procurement principles and practices to SMEs and the subsidiary industry; and outlining the profile of the SMEs and subsidiary industries with which HAVELSAN plans to work in the long-term within the scope of its business ecosystem applications. The agenda of this year's event, on the other hand, focused on inorganic growth and on rewarding successful business partners, thus demonstrating the progress.

Collaboration to Achieve Strategic Targets

Ahmet Hamdi Atalay, General Manager and CEO of HAVELSAN, was the first to take the stage at the event. He began his speech by listing HAVELSAN's strategic targets:

Protocol members come together for a group photograph

Ahmet Hamdi Atalay

Prof. Dr. Cevahir Uzkurt

- By 2023, HAVELSAN aims to have a turnover of $1.5 billion and to take its place among the world's top 100 defence companies. As a sub-goal associated with this broader target, the company also aims to gain one-third of its turnover from defence projects, one-third from civilian projects and one-third from export projects.
- Having generally developed project-specific products in the projects it has undertaken to date, and in which it has applied more or less the same processes, HAVELSAN aims to transform itself from a project-oriented company to a product-owning one.
- In the export markets, HAVELSAN's primary goal is to become a regional force; and to this end, the countries that are friendly and allied to Turkey, such as the Gulf countries and Pakistan, are first on HAVELSAN's list. In line with this goal, the company has already opened offices in Qatar, and there are ongoing efforts to establish a local company in Qatar and to open offices in Kuwait and Saudi Arabia.
- Preferring to grow together with the business ecosystem rather than growing organically, HAVELSAN is working to develop a Business Ecosystem Management System since 2016. Following the implementation of its trial version in 2016, the system is seeing extensive use since the beginning of 2017.

Noting that the business ecosystem represents the most important factor in HAVELSAN efforts to achieve its 2023 targets, Atalay said: "To give you an example, one of the companies we're going up against in the Qatari Ministry of Defence's Enterprise Resource Planning (ERP) tender is IBM... I can proudly say that we've submitted an offer that has better technology and pricing than IBM's. The companies we're competing with have turnovers in double- or even triple-digit billions of dollars, and it is only by collaborating and joining forces with you, in the business ecosystem, that we can successfully compete with them."

A New Era in Collaboration

Atalay also spoke about the Business Ecosystem Management System established by HAVELSAN. To join the ecosystem, companies must first apply to HAVELSAN, after which they must pass a thorough evaluation process. Companies are initially assessed according to certain criteria set by HAVELSAN through an auditor company that works for HAVELSAN. At the end of this assessment, the auditor issues a report, and depending on their scoring in different criteria, the companies are categorised as


Cenk Özen


Mehtap Yılmaz

A, B, C or D. The companies are then visited by HAVELSAN employees, who make an on-site evaluation of their capabilities. Both the inspection and audit take place without placing any financial burden on the companies. The companies thus become included in the system, allowing them to start submitting offers to HAVELSAN's tenders. In the ensuing period, the companies' performances are monitored continuously in the works they undertake.

After sharing these points, Atalay stressed the following points concerning the system: "This system functions, and will continue to function, based on objective criteria. It will stay fair and transparent. No company will be treated unfairly. When I say this, it shouldn't be interpreted as meaning 'companies used to be treated unfairly before;' but we were receiving complaints from time to time, saying 'We aren't being invited' or 'We're not being allowed to compete in tenders.' I promise that our system will allow you to compete fairly and equally, and that its results will be transparent. You can call us into account in every way about this. We'll share with you, clearly and transparently, the outcome of the offer you've made, as well as the reason why it was evaluated positively or negatively."

Atalay also stressed that they attach great importance to seeing their business partners choose a specific field of technology and working to become the best in that area. Speaking on the upcoming period, Atalay said: "We want to develop our business together with our business partners – especially with our A-class strategic business partners. We want to go beyond the model in which they just do the work we send their way; we want to develop our business together. We want to move forward by developing technology and developing products with them... We want to introduce them in markets overseas. At the exhibition in Kuwait, we will let them set out their own stalls and stands at HAVELSAN's stand."

At the end of his speech, Atalay said that the capabilities of US-based Quantum3D, a HAVELSAN subsidiary, are open for all companies of the industry seeking to do business in the United States.

KOSGEB Wants to Draw Prime Contractors into the Field

The second speaker of the opening session was Prof. Dr. Cevahir Uzkurt, President of the Small and Medium Business Development and Support Administration (KOSGEB). Prof. Dr. Uzkurt said that HAVELSAN's business ecosystem, as well as the system it is implementing for this ecosystem, largely overlap with what KOSGEB is looking to achieve. For the coming period, KOSGEB plans to support SMEs by following a new approach that involves creating company- or industry-oriented support models in which it provides support to SMEs that develop products for the benefit of prime contractors. The organisation, in this way, aims to pave the way for the commercialisation of products that receive support and grants, and to ensure that Turkey's requirements that are normally covered through imports are instead met by local and indigenous solutions. Prof. Dr. Uzkurt said they are open to new models,


Taner Düvenci presents a plaque to Prof. Dr. Cevahir Uzkurt to commemorate the day and event.


Taner Düvenci presents a plaque to Nurettin Özdebir for his contributions.

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emphasising that they take every recommendation they receive seriously.

Following the opening speeches, Taner Düvenci, Deputy Chairman of the Board at HAVELSAN, presented plaques to Prof. Dr. Uzkurt and Nurettin Özdebir, President of the Ankara Chamber of Industry, after which a group photograph was taken with all the members of the protocol.

HAVELSAN's System Gradually Maturing

The speeches at the event continued with a presentation entitled "HAVELSAN's Business Ecosystem and Procurement Process Applications", given by Cenk Özen, Vice President of Operations at HAVELSAN. Özen provided an overview of HAVELSAN's Business Ecosystem Management System

HAVELSAN aims primarily to create a system that is transparent, fair and objective, Özen explained. This will allow the company to reduce the cost, duration and risk of its projects, while also increasing performance and customer satisfaction.

As part of work being done for this system, companies from all across Turkey have been registered as business partner candidates, with 178 companies from Turkey's Marmara Region, 9 from the Aegean Region, 3 from the


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Ahmet Hamdi Atalay ve Erdoğdu Paker signed the Cooperation Protocol for Supplier Funding between HAVELSAN and Akbank.

The Qualified Cooperation Development Award was presented by Ahmet Hamdi Atalay to Mehmet Yenen, Strategy Consultant at YALTES.

Gökçe Yıldırım Kalkan, CEO and Co-Founder of Simsoft, receives the Qualified Cooperation Development Award from Ahmet Hamdi Atalay.

Mediterranean Region, 293 from the Central Anatolian Region, 2 from the Black Sea Region, 3 from the Eastern Anatolian Region and 2 from the Southeastern Anatolian Region having been defined as candidates. On a province basis, the following number of companies have already had their registration process completed: A total of 82 in Istanbul, 5 in Bursa, 4 in Kocaeli, 6 Izmir, 1 in Antalya, 1 in Mersin, 1 in Adana, 177 in Ankara, 3 in Eskişehir, 1 in Konya, 1 in Kayseri, 1 in Trabzon, 1 in Elazığ and 1 in Diyarbakır. Of the inspected companies, 6 percent ranked in group A, 50 percent in group B, 37 percent in group C and 7 percent in group D.

From January 2017 up until the beginning of December, HAVELSAN launched 83 open tenders within its business ecosystem with a total value of □70,956,043. Within these tenders, a total of 874 requests for proposal were forwarded to 280 companies, 10 percent of which were in group A, 47 percent in group B and 21 percent in group C. Furthermore, as a practice that would remain limited to this year alone based on the fact that the company classification procedure had only recently been launched, the remaining 22 percent of the requests for proposal were sent to companies whose evaluation process is still ongoing.

The rate of response to these requests was lower than expected, with a total of 232 requests receiving a response, representing a return ratio of 26 percent. At company level, the ratio of responding companies was 44 percent, with a total of 123 companies forwarding their proposals to HAVELSAN. Özen said that this overall picture stemmed from two reasons:

1. When registering to the HAVELSAN Business Ecosystem Management System, certain companies had marked areas on the respective forms that were not relevant to their actual areas of activity. As a result, these companies were unable to respond when a request for proposal was issued in these areas.

2. HAVELSAN's requests for proposals are sometimes misunderstood by the recipient companies, being interpreted instead as requests for personnel renting services.

HAVELSAN is also developing its own technology management system, which it will also share with its ecosystem. In parallel with works conducted by the Undersecretariat for Defence Industries (SSM), the system also includes functions such as technology taxonomy and level of technological readiness. Once the system enters into service, HAVELSAN will be able to evaluate in a tangible way the technologies of its business partners, as well as the level

of readiness of these technologies. Decisions concerning the development of new capabilities will be taken based on these evaluations, which will help prevent any unnecessary repetition of capabilities.

Özen went on to list the new practices they will launch in 2018:

- Supplier funding support,
- Free-of-charge training support for business partners,
- For B and C group companies, the opportunity to apply to be audited once again, with a view to moving up to the next higher group (without incurring any additional charges), and
- The organisation of HAVELSAN Promotional Days for business partner candidate companies.

Akbank Supports Business Ecosystem

Özen's presentation was followed by a ceremony to mark the signing of a Cooperation Protocol for Supplier Funding between HAVELSAN and Akbank. The protocol will allow SMEs to receive credit from Akbank upon presenting evidence of business received from HAVELSAN, without the need for additional collateral. Taking the floor before the signing of the protocol, Mehtap Yılmaz, Director of Transaction Banking, Corporate Sales and Marketing at Akbank, said HAVELSAN will forward to Akbank a list of companies in need of funding, and that the bank will provide other means and advantages for these companies, such as promotions for salary accounts. The protocol was signed by Ahmet Hamdi Atalay and Erdoğdu Paker, Head of Transaction Banking and Foreign Trade at Akbank. In the upcoming period, HAVELSAN plans to expand this type of cooperation to include also Halkbank.

New Programmes by KOSGEB

Following the signing ceremony, Ahmet Dursunoğlu, Head of the KOSGEB Technology and Innovation Supports Department, gave a presentation to explain KOSGEB grants. KOSGEB has launched a variety of new programmes for the indigenous production of intermediary goods that have a high level of import-dependence. Among these programmes, the Strategic Product Support Programme provides SMEs with up to ₺5 million in support/grants, 70 percent of which will be non-repayable. For purchases of machinery and equipment, the non-repayable ratio can be increased to 85 percent. The programme covers projects with a schedule of up to 36 months. In special cases, the level of support can be raised to ₺10 million, and the project duration to 42 months. Upon a request from the company, up to 25 percent of the sum to be provided for support can be paid in advance. Projects that are completed successfully are monitored for three more years, to observe their results and the implementation. Within the scope of this program, KOSGEB has already signed cooperation protocols with SSM, ASELSAN, TAI, SaSaD and ICTA, and is in discussion with ROKETSAN for the signing of a similar protocol.

Speaking about the offered support, Dursunoğlu emphasised the importance of cooperation between prime contractors and SMEs: "We believe that demand driven by the prime contractors is more valuable, because in the past we have seen problems in the commercialisation of products developed through R&D and innovative efforts. You may develop new products, but once you try to commercialise them, you may find that the market and industry aren't ready for them. So you don't see the demand you expected or planned. This is why it's crucial for us to have the prime contractors say, 'Yes, we want this product, we need this product, and it'll be good to invest in it,' and to sign a preliminary protocol with an SME about this."

Another Qualified Cooperation Development Award was presented by Ahmet Hamdi Atalay to Haldun Topçuoğlu, Owner and Co-Founder of Siren Informatics & Software.

The Technology Development Award was presented by Savaş Yanık, Vice President of Command Control Combat Systems at HAVELSAN, to Ömer Günel, General Manager at KONNEKA.

Kerem Çalışkan, CEO of InfoDif, receives the Technology Development Award from Savaş Yanık.

SSM to Ensure Standardisation with EYDEB

The final presentation of the event was given by Evren Yücel, Director of Electronic and Software Sector at the SSM's Industrialisation Department. Stating that "Our country and industries will reach higher levels by riding on specialised SMEs", Yücel listed the support provided by the SSM to SMEs under three main headings:

The other Technology Development Award was presented by Savaş Yanık to Assoc. Prof. Dr. İlkay Yavrucuk, CEO of Aerotim.

Having worked on and successfully completed 11 different projects with HAVELSAN to date, BİTES was awarded the Long-Term Cooperation Award. The award was presented to Uğur Çoşkun, CEO of BİTES, by Dr. Mehmet Demirer, Vice President of Cyber Security and Information Technologies at HAVELSAN.

Serkan Özleme, Business Development Director and Board Member at Ante Group, receives the Competitive Approach Award from Cenk Özen.

The Promising Company Award was presented to Erkan Durdağı, Product and Business Development Manager at Xinerji, by Assoc. Prof. İzzet Gökhan Özbilgin, Director of Technology and Academy at HAVELSAN. As the award was announced, it was also emphasised that Xinerji holds four patents. Delivering a brief speech after receiving the award, Durdağı said they are aware of the importance of the ecosystem, and that this awareness has prompted them to open an office in Ankara.

- Support Credit for Quality Products and Infrastructure
- The Industrialisation Portal, and
- The Industrial Competency Evaluation and Support Programme (EYDEP)

Among these, the EYDEP, which is a new support programme, aims to have certain prime contractors carry out inspections of subcontractors under the coordination of the SSM. At the same time, there are also plans to collect information about the companies' competencies in a single database.

Yücel also shared with the participants the developments concerning the EYDEP following its launch in 2017, underlining the activities that have been completed within the scope of the programme:

1. Existing sectorial assessment processes have been evaluated,
2. Question sets have been developed,
3. Draft Code of Practices have been prepared,
4. Pilot studies have been carried out,
5. Question sets and scoring levels have been optimised, and
6. Auditor Training Models and Plans have been formed.

The prepared question sets consist of a set of common questions along with five sets of domain-based questions:

- General/Common Questions
- Analysis Questions Related to Production Skills
- Analysis Questions Related to Design Skills
- Analysis Questions Related to Software Skills
- Analysis Questions Related to Design Skills
- Analysis Questions Related to System Skills

Within the scope of EYDEP, companies will be entitled to a range of supports and grants that will focus on enhancing knowledge and institutionalisation.

Two boards relating to EYDEP were also formed:

- **The EYDEP Advisory Board (ETK):** Comprises the Head of the SSM Industrialisation Department, Directors of the SSM Industrialisation Department, Procurement Managers of the Turkish Armed Forces Foundation (TAFF) Companies and representatives of other Institutions.
- **The EYDEP Higher Board (EÜK):** Comprises the Undersecretary for Defence Industries, the Deputy Undersecretary for Defence Industries and the head of SSM Department of Industrialisation.

The assessment of companies within the scope of EYDEP is still continuing.

The Supplier Awards Ceremony was held after the presentations, with the following companies receiving awards:

- **Qualified Cooperation Development Award:** YALTES, Simsoft and Siren Informatics & Software
- **Technology Development Award:** Yepsan, KONNEKA Information and Communication Technologies, InfoDif and Aerotim
- **Performance Improvement Award:** MilSOFT
- **Long-Term Cooperation Award:** BİTES
- **Competitive Approach Award:** Ante Group
- **Promising Company Award:** Xinerji

The awards for the companies whose representatives were not present were handed out later, and the event continued into the afternoon with one-to-one cooperation meetings with suppliers. ◆

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Moving Forwards as a Groundbreaking Company, ARES Shipyard's Delivery of Coast Guard Boats to Qatar Continues Full Speed

Prior to the ceremony, the guests of the event, including Ahmet Arslan, Minister of Transport, Maritime Affairs and Communications, examined the boats to be delivered, while accompanied by Kerim Kalafatoğlu, Chairman and Executive Director of ARES Shipyard.

As part of the project conducted to meet the Qatar Coast Guard's requirements, ARES Shipyard has performed the delivery of the first ARES 150 HERCULES boat and one ARES 110 HERCULES boat with a ceremony held in Antalya on December 8. The ceremony, which was attended by Ahmet Arslan, Minister of Transport, Maritime Affairs and Communications, stood as one of the important milestones for ARES Shipyard and the Turkish military shipyard, especially since it involved the first delivery ever of the 48 metres-long ARES 150 HERCULES.

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The project in question was launched following a tender in which ARES Shipyard outcompeted 18 companies, with the project contract being signed with the Qatar Ministry of Interior on April 14, 2014. The project involves the construction of the following boats, which all have composite hulls:

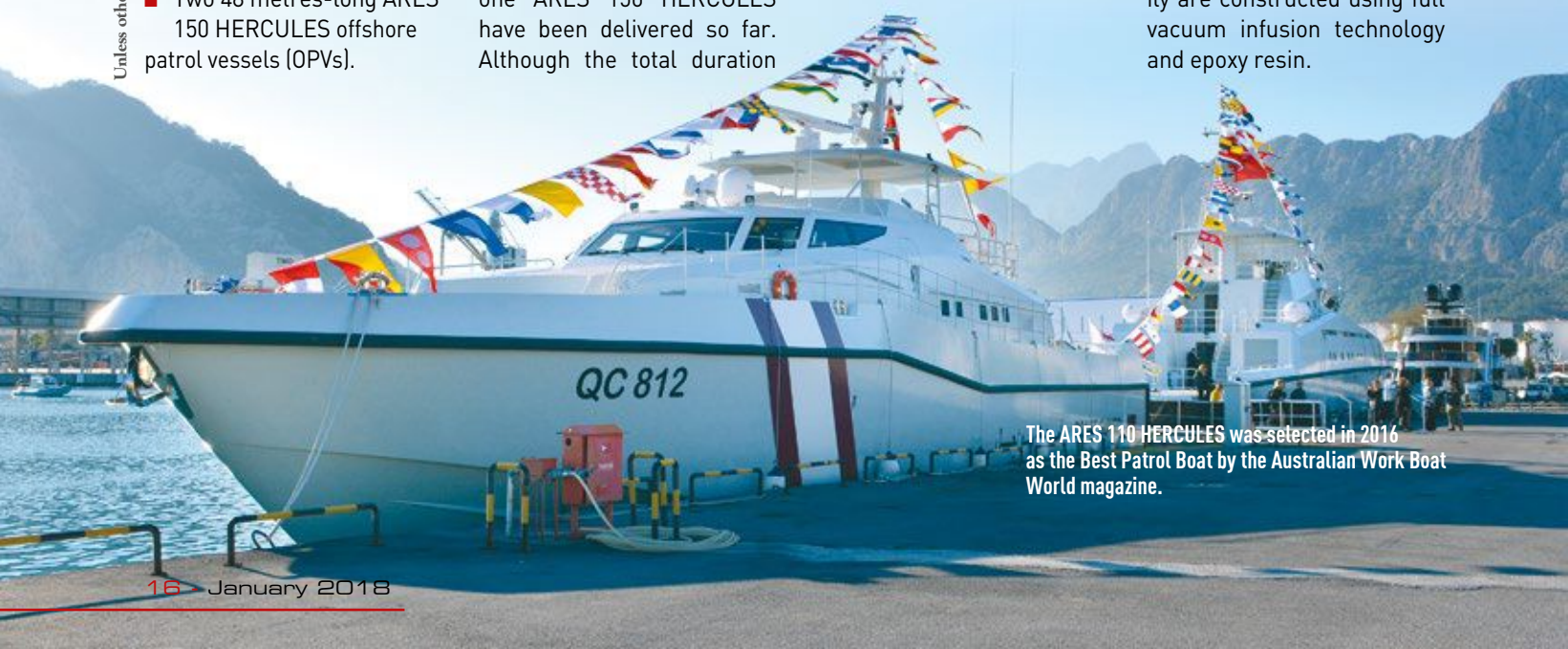
- Five 24 metres-long ARES 75 HERCULES fast patrol boats.
- Ten 34 metres-long ARES 110 HERCULES fast patrol boats.
- Two 48 metres-long ARES 150 HERCULES offshore patrol vessels (OPVs).

Furthermore, each ARES 110 HERCULES also transports one 7.5 metres ARES 24 HARPOON fast intervention boat, while the ARES 150 HERCULES transports two of such boats. The cost of project is around $300 million.

Deliveries Continue 1.5 Years Ahead of Schedule

As of the date of the ceremony, deliveries for all of the ARES 75 HERCULES have been completed, while seven ARES 110 HERCULES and one ARES 150 HERCULES have been delivered so far. Although the total duration of the project was initially envisaged as 4.5 years, the delivery schedule is moving 1.5 years ahead of the contract schedule.

ARES 150 HERCULES also stands out as the largest composite hulled ship ever to be built in Turkey. Company officials also highlight that, with its speed of 37 nautical miles per hour, the ARES 150 HERCULES is the world's fastest ship in the OPV class. Meanwhile, in 2016, the ARES 110 HERCULES was selected as the Best Patrol Boat by the Australian Work Boat World magazine. The hull of all boats of the HERCULES family are constructed using full vacuum infusion technology and epoxy resin.



The ARES 110 HERCULES was selected in 2016 as the Best Patrol Boat by the Australian Work Boat World magazine.


Özgün Utku Alanç


Kerim Kalafatoğlu


Staff Brigadier Ali Ahmad Al-Bedeed


Mustafa Köse

HERCULES Boats Stand Out with High Their Manoeuvrability

The entire HERCULES family uses water jets as its primary system of propulsion. The boats also use water jets to change course and manoeuvre. As a result, the boats lack a conventional propeller or rudder, which means safer navigation in shallow waters, and also for sea life.

Perhaps the most important attribute the water jet system confers to the boats is high manoeuvrability. Thanks to these water jets, boats can, in addition to their standard manoeuvres, also execute movements such as moving sideways without changing the direction of its bow. To have the boats perform these types of manoeuvres, the helmsman (the seaman who holds the helm) would normally have to manage multiple complex controls at the same time; however, with these systems, the only device the helmsman needs to use is a simple joystick. This enables the boats to execute even the most sensitive manoeuvres; and whenever deemed necessary, the boats can even be moved solely by using the joystick. The joystick is only one of the ship control systems. Furthermore, the water jets have various control mechanisms that permit the water entry and exit directions to be adjusted separately. All of these systems can be managed from the bridge as well as the consoles located on the uppermost open deck. In these types of surface platforms, open decks are used in low threat environments to provide a wider angle of view, such as during port manoeuvres. In addition, the water jets in the ARES 75 and ARES 110 can also be controlled via a classical ship's wheel.

During the acceptance tests at sea, the ARES 110s were tested at speeds more than 10 percent above the speed requirements listed in the contract, and these boats can operate in conditions of up to sea state five. Similarly, the ARES 150s were tested at speeds more than 20 percent above the speed requirements listed in the contract, and the boats can operate in conditions of up to sea state six. The shape of the ships' hull is said to also enable operations in the ocean. Furthermore, in addition to their cruising range of 1,600 nautical miles, the ARES 150s have a reverse osmosis system that eliminates the boats' need for water replenishment.

ARES Shipyard: Leaving Its Marks in History

The ceremony began after the tour and inspection of the boats destined for Qatar by the event's attendants, which included Ahmet Arslan, Minister of Transport, Maritime Affairs and Communications. The first speech of the ceremony was delivered by Özgün Utku Alanç, Deputy General Manager at ARES Shipyard, who shared information both about the project and the HERCULES platforms.

After Alanç's speech, Kerim Kalafatoğlu, Chairman and Executive Director of ARES Shipyard, took the stage, and began his speech by saying: "In every day of the 11 brief years since we established it in 2006 with great ideals in our minds, ARES Shipyard has been a source of both joy and excitement for us." The speech of Kalafatoğlu

Hulls of the HERCULES series boats are produced in a single step and as a single piece, by utilising full vacuum infusion technology and epoxy resin.

The water jets of the ARES 110 HERCULES. Thanks to their "reverse bucket" system, the water jets on the port and starboard side of the boat not only serve to propel the ship forward, but can also move the ship astern. The reverse bucket can be described as a bucket-like mechanism that turns and covers the exit of the water jet. The water jet in the middle provides forward thrust. The ARES 75 boats are different in that they lack the middle water jet.

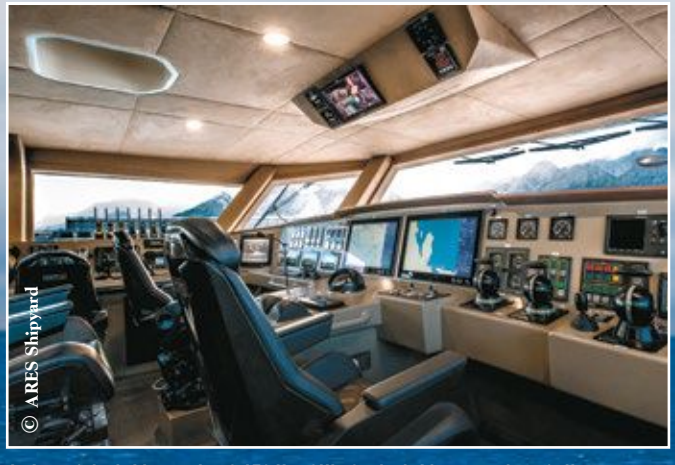

Staff Major General Saad Bin Jassim Al Khulaifi


Münir Karaloğlu


Ahmet Arslan

included many details about ARES Shipyard's accomplishments in between the lines.

- **Export Capabilities of ARES:** "ARES is Turkey's shipyard with the most exports. It is with great pleasure that I must say that, both with the work it assumes internationally and the ships it manufactures, our company is our country's pride. Speaking for 2017, ARES has, as of today, broken the export records for ships, becoming the country's largest ship exporter."
- **Added Value by ARES:** "From the perspective of added value, we can see an even greater achievement [for our company]. While Turkey's exports have an average value of $3 per kilogram, the average value of the ships we are delivering today is $152 per kilogram."
- **ARES Ranking High in Production Numbers:** "ARES' success can be seen even more clearly when we look from the perspective of productivity. For shipyards building this class of ships and yachts, the average annual production in the Netherlands, for example, is 9.14 ships [per year]. In Turkey, however, this average number is unfortunately at 2.6. But with the great dedication of ARES' outstanding team, our shipyard has surpassed Turkey's average by a factor of four, exceeding even above the average for Europe, producing and delivering, for example, 11 ships in 2017. We have now reached the point where we can export technology and know-how on advanced composite and aluminium hulled [ships]."


© ARES Shipyard

A view of the bridge on ARES 150 HERCULES. The bridge consoles of all HERCULES series boats are nearly identical. Similarly, the boats of three different sizes have many subsystems that are similar or identical, which is important in terms of logistics and manageability.

ARES Shipyard Makes Dreams Come True

Taking the stage after Kalafatoğlu, Staff Brigadier Ali Ahmad Al-Bedeed, Director General of Coast and Borders Security, gave a speech in which he emphasised the robustness and competitive prices of the ships built by ARES Shipyard. Mustafa Köse, Parliamentarian from Antalya, described the con-

tributions ARES Shipyard will make to relations between Qatar and Turkey, while Münir Karaloğlu, Governor of Antalya, said the following: "It is my hope that the naval vehicles we have delivered today will reinforce both the friendship between Qatar and Turkey and the formation of the Qatari Coast Guard."

At the ceremony, Staff Major General Saad Bin Jassim Al Khulaifi, Director General of Public Security, also gave a speech in which he described the importance of the HERCULES boats for Qatar through several anecdotes: "It was 2002, when I was serving at the Coast Guard Command. We were considering that we should build a new fleet for our organisation, and we were meeting with many companies to this end. But it was at that time that I was assigned to the headquarters as

Table 1. Platforms to Be Delivered to the Qatari Coast Guard under the Project

	ARES 75 HERCULES	ARES 110 HERCULES	ARES 150 HERCULES
GENERAL INFORMATION			
Type	Fast Patrol Boat	Fast Patrol Boat	Offshore Patrol Vessel
Total Number to Be Delivered	5	10	2
Number of ARES 24 HARPOON Fast Intervention Boats Carried Onboard	-	1	2
DIMENSIONS			
Length (metres)	24.1	34.47	48.09
Width (metres)	5.8	7.56	8.95
Draft (metres)	1.2	1.45	1.78
Displacement (tons)	59	130	275
PERFORMANCE AND SUBSYSTEMS			
Maximum Speed (knots)	40	32	37
Economic Speed (knots)	25	15	15
Cruising Range (nautical miles)	360	800	1,600
Main Engine	2 x MTU 12V 2000 M84 Diesel	3 x MTU 12V 2000 M84 Diesel	3 x MTU 16V 4000 M63L Diesel
Propulsion System	2 x Rolls Royce 50A3 Water Jet	3 x Rolls Royce 50A3 Water Jet	3 x Rolls Royce S71-4 Water Jet
Auxiliary Engine	2 x Caterpillar C4.4 series	2 x Caterpillar C4.4 series	2 x Caterpillar C7.1 series
NUMBER OF PERSONNEL			
Officers and Non-Commissioned Officers	4	7	10
Enlisted	4	16	18
WEAPON SYSTEMS			
12,7 mm ASELSAN STAMP	1	2	2
30 mm ASELSAN SMASH	-	1	1

With its ability to operate in conditions of up to sea state six and cruising range of 1,600 nautical miles, the ARES 150 HERCULES is classified by ARES Shipyard as an offshore patrol vessel (OPV).

During this speech, Kerim Kalafatoğlu, Chairman and Executive Director of ARES Shipyard, was accompanied at the stage by Yonca Kotiloğlu (far right) and Ersan Kotiloğlu (far left), Members of the Board at company, and by Mert Kalafatoğlu (second left), General Manager of the company.

the Director General of Public Security. However, the dream of building a new coast guard fleet always stayed with me. During those years, I was afraid I would retire before this dream would be realised. But in 2017, at this very moment, our dreams have come true, and these new ships are now patrolling around Doha. The last remaining three or four ships will soon be following them. I would like to thank Turkey and ARES Shipyard for finally making my dreams to come true."

Minister Arslan Describes the HERCULES' Features

Delivering the last speech of the ceremony, Ahmet Arslan, Minister of Transport, Maritime Affairs and Communications, highlighted the ARES 150 HERCULES' manoeuvrability: "I asked earlier about the ship's turning radius, which is one of the most important criteria for determining a ship's manoeuvrability. When a ship wants to make a turn, the tighter it turns the better. Now, this 48-metre long boat can turn with a radius of 74 metres, which is a very good performance. And the esteemed [Qatari] director general also asked, 'Where is the ship's wheel?' concerning this ship. But it has no wheel; there is just a joystick... You command the ship through a joystick that provides very high manoeuvrability. You can literally move the ship around with the touch of a finger. This is an important feature. The boats also have a type of bow propeller we call the bow thruster, which is usually seen in the very luxurious and high technology ships known as cruise ships."

ARES' Groundbreaking Production Numbers

Minister Arslan also highlighted the advanced technology of the boats, as well as ARES Shipyard's delivery schedule that is significantly ahead of initial plans: "Every type of technology that you can think about finding on a ship, as well as the most advanced tools, instruments, equipment, machines and electronic devices, have been used [on these boats]... You have clearly striven to do the best, and have become an excellent example in the process. This is something that we also emphasise: Instead of describing your capabilities by saying 'I do this or that', it is far better to demonstrate them through your products... It is also good to see the number of boats you are able to produce in one year. It is of course always possible and rather straightforward to produce more than one ship of the same type. However, producing different types of ships at the same time, while also reaching the annual production numbers you mentioned earlier, is certainly a great feat... Besides, 17 boats is not a small number. We are also extremely pleased to see the production being done in such a short period, and the delivery being performed ahead of the envisaged time frame."

Warships with Mega-Yacht Standards

Minister Arslan also touched on the quality of the ships and the level of comfort in the personnel's living quarters: "We are of course speaking about warships – ships used for military purposes. And ARES precisely makes these types of ships. Globally, [Turkey] ranks third in terms of mega yacht production. I want to congratulate you for your boats that have the quality and standards of

ARES 150 HERCULES is described as the world's fastest offshore patrol vessel (OPV).

mega yachts, which we discussed while touring one of the boats. No one will ever reproach you by saying 'Why have you something very good, why have you done the best?' And those who keep saying 'Did these boats have to be this luxurious or high-quality?', just ignore them, don't listen to them. You have to be different from others in a positive way, so that others will follow your example. The things you have done should not be limited to Qatar; you should utilise your capabilities and means for other countries as well."

ARES Shipyard Opens a New Page in Maintainability

Each one of the ships constructed by ARES Shipyard certainly have their own distinguishing features. However, there is also a notable detail in their design: Some of the subsystems used in these three boats of different size and class are actually identical, which is particularly important from the standpoint of the ships' maintenance and sustainment. Furthermore, this feature affects the operational capability of the ships in a positive way.

This can be explained with a simple example: In case a ARES 110 HERCULES boat becomes inactive due to a malfunction in a critical subsystem, a functional copy of the same subsystem can be taken from an ARES 75 HERCULES that is currently under maintenance, and be fitted into the ARES 110 HERCULES to render it active and operational once again. Furthermore, the use of common subsystems is also important from the Qatari Coast Guard's standpoint, in terms of reducing purchasing costs when procuring the spare parts it will need in the future.

Some of the common subsystems used in these platforms of different types are as follows:

- **Main Engines:** ARES 75 and ARES 110 both use MTU's 12V 2000 M84 diesel engines. The only difference between them is that the smaller of these boats has two of these engines, while the other has three. ARES 150s also an MTU engine belonging to the same family, namely the MTU 16V 4000 M63L.
- **Water Jets:** The situation with the boats' water jets is similar to the one with the main engines: The ARES 75 has two of the Rolls-Royce 50A3 water jets, while ARES 110 has three. On the other hand, the ARES 150 has three Rolls-Royce S71-4 water jets.

- **Weapon Systems:** The weapon systems to be used on the ships include ASELSAN's 30 mm SMASH and 12.7 mm STAMP systems.
- **Auxiliary Engines (Generators):** ARES 75 and ARES 110 use Caterpillar C4.4 series generators. The generators of these two boats of different sizes have the same diesel machines. The only differences between them are the alternators being used and their power output. ARES 150's auxiliary machines use the C7.1 model of the same manufacturer.
- **Bridge Consoles:** The bridge consoles of the HERCULES series boats and ships are nearly identical. Only the ARES 150's manoeuvre controls are slightly different than the other boat's, due to the bow thruster on its bow.

In addition to its cruising range of 1,600 nautical miles, the ARES 150 HERCULES is also capable of producing its own drinking water, thanks to its reverse osmosis system.

- **Electronic Systems:** All of the navigation, electronic, communication and electro-optic systems used in the HERCULES series are almost entirely the same. The only difference in this regard is in the radar systems. The ARES 75 features two Kelvin Hughes X-Band radars, while the ARES 110 and ARES 150 both use one X-Band and one S Band radars, also made by Kelvin Hughes.
- **Air Conditioning Systems:** All of the boats are equipped with İKS Coolmar brand air conditioning systems, which only differ with respect to their heating and cooling capacities.
- **Hydro-Mechanic Systems:** The hydro-mechanic systems used in the boats, such as the pumps and valves, are largely the same.

The fact that the boats have so many common systems also affects the training requirements of the personnel. Any personnel trained to serve on the smallest member of the HERCULES family can quickly adapt to the family's largest vessel within a very short period. That is why it would not inaccurate to say that, rather than purchasing three different types of platforms for its inventory, the Qatari Coast Guard has actually purchased different-sized versions of the same platform. ◆

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During the ceremony, Minister Arslan emphasised the 48-metre long ARES 150 HERCULES' manoeuvrability by noting that it has a turning radius of 74 metres.

Left to right: Ahmet Arslan, Staff Major General Saad Bin Jassim Al Khulaifi and Kerim Kalafatoğlu

Kerim KALAFATOĞLU, Chairman and Executive Director of ARES Shipyard:

"As ARES, we have signed the world's largest single-contract composite hulled military ship export project in terms of the number of vessels and project costs involved."

We met with Kerim Kalafatoğlu, Chairman and Executive Director of ARES Shipyard, to learn more about the project's position in the Turkish military shipbuilding industry, as well as ARES Shipyard's goals for the future and the tenders in Turkey to which it is planning to submit bids.

MSI TDR: Mr. Kalafatoğlu, if we go back to the very beginning, you won this tender that covers the construction of three different types of surface platforms by pulling ahead of 18 other companies, competing in this process against the world's leaders in the field. Can you tell us the story behind this success?

Kerim KALAFATOĞLU: I would first like to point out that it is a great source of pride for us to have won this tender on the basis of technical superiority and price, competing against the world's largest shipyards, at a time when our relations with Qatar were not at their current level and were just beginning to gain strength. Actually, the story of how we won the tender is quite simple. First, we made a good analysis of the needs of the Qatari Coast Guard, and offered the best technical solution that achieved of the highest technical score. Second, we knew quite well that technical superiority alone would not be enough to give us the tender, and so we also offered a reasonable price, and then gave a five-year hull guarantee for our boats, illustrating our confidence in both ourselves and the boats we will produce. Given that you have manufacturers [in the industry] who consider even two-year guarantees excessive, I think you can very well imagine what this move signified.

MSI TDR: So what is this project's position within the military shipbuilding industry in Turkey?

Kerim KALAFATOĞLU: This project, involving the construction of 17 ships with composite hulls, has a budget of around $300 million, which means that ARES has signed the largest single-contract composite hulled military ship export project in the world to date, in terms of the number of vessels and project costs involved. The epoxy resin full-vacuum infusion method used in the construction of the vessels in this project is generally used in the manufacture of aircraft; and until now, this technique has not been adopted by any shipyard in Turkey for military shipbuilding. The ARES 150 HERCULES that will be constructed within the scope of the project also holds the title of the world's fastest patrol boat. Furthermore, as a rare example for the military shipbuilding industry in Turkey, the project will be completed one-and-a-half years ahead of schedule. For an industry that is used to late deliveries and the associated penalties, this is a target that many would find unachievable.

ARES Shipyard to Expand with New Facilities

MSI TDR: With this project, you have raised the bar quite high. What is your next goal? After this project, what is waiting for ARES Shipyard and the industry?


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Kerim KALAFATOĞLU: Just as our successes and targets keep growing, so does our customer portfolio and the expectations placed on us. Presently, ARES is the only Turkish company that is shortlisted in different projects in a number of different countries. The three different production facilities we currently have in the Antalya Free Zone, with a total indoor area of 15,000 m2, have started to become insufficient [for our needs]. In the first quarter of 2018, we will build a new production facility that will increase our total indoor area to 25,000 m2, and this new production facility will be equipped with serial production lines, various capabilities, and welding and assembly robots, the likes of which are not found in Turkey. Towards the end of 2018, we will start constructing larger tonnage ships with lengths of 100 to 120 metres, such as offshore patrol vessels, corvettes, fast patrol boats and logistic ships.

MSI TDR: While the project's contract schedule covers a four-and-a-half year period, your delivery schedule is one-and-a-half years ahead. Unless it is a commercial secret, could you tell us how you achieved this?

Kerim KALAFATOĞLU: ARES has a dedicated and hard-working team. Together with our subcontractors, we have about 500 employees, and all our team is tightly and inseparably knitted together. We have a logistic and supply chain management that is always two or three ships ahead of production. In other words, before starting the construction of the next ship, we already have the necessary structural materials and equipment waiting in our warehouses. All our production processes are tracked through an ERP programme, and for every work produced through the ERP programme, the numbers of man-hours are determined in a logical manner and then closely monitored. In a shipbuilding industry that is, as I mentioned earlier, used to late deliveries and penalties, I think that we have brought new blood, and have become a cornerstone in this field. Meanwhile, while we are working to ensure rapid production, we also have a training team of six in Qatar consisting entirely of retired Naval Forces Command and Coast Guard Command personnel. This team is giving classroom, port and navigation training to 275 personnel of Qatar Coast Guard Command for a period of 650 business days, or almost two-and-a-half years. So while the boats are being constructed rapidly and without problems, we are also providing training to the personnel who will use the boats, both technically and operationally. And we are moving forward with this entire process one-and-a-half-years in advance. It is through our competent team that we successfully manage this intricate process that depends on so many independent factors.

ARES Shipyard Exceeds Expectations

MSI TDR: You describe ARES 150 HERCULES as the world's fastest ship in its class. Can you tell us how the ship manages to be so?

Kerim KALAFATOĞLU: Certainly. With a maximum speed of 37 nautical miles per hour, the 48-metre ARES 150 HERCULES offshore patrol vessel holds the title of the world's fastest ship in its class. However, there is something else I would like to mention first: While the speed requirement specified in the contract was 30 nautical miles, we have made an effort to provide an actual speed nearly 25 percent above this value. These ships will be executing long-range patrol missions in the Arabian Gulf. Their priority missions will be to protect critical structures, such as the oil and natural gas platforms in Qatar's territorial waters and exclusive economic zones, against possible conventional or terrorist attacks, and to also combat trafficking and illegal human trafficking. Therefore, these vessels not only need to navigate swiftly, but they also need to be capable of carrying out their missions in the open seas and under high

ARES 150 HERCULES has a total crew of 28, 10 of which are officers and non-commissioned officers, and 18 who are enlisted personnel.

© ARES Shipyard

sea states, without interruption. This is a responsibility that we also bear, together with the end user. For this reason, we have, without any additional cost, provided the Qatari Ministry of Interior a speed value that is substantially above the minimum requirements, as well as a cruising range of 1,600 nautical miles, which is twice what was required.

If we go back to the technical aspects, the value we add to the ship's capabilities has, indeed, put a number of additional burdens upon us in terms of design and equipment costs. We have had to do a serious amount of engineering work to make the form of the boat suitable both for high speeds and difficult sea conditions. To increase the speed, we were very meticulous when choosing the ship's main propulsion system. In design and production, we had to further elaborate our quality control processes. But all these works, the additional costs, the hundreds of tests and the experiences we gained were all certainly worth it, and we have, through our toils and efforts, successfully delivered ships that hold various records.

Serdar Demirel, Deputy Undersecretary for Defence Industries, was among those touring the ships and being briefed after the ceremony.

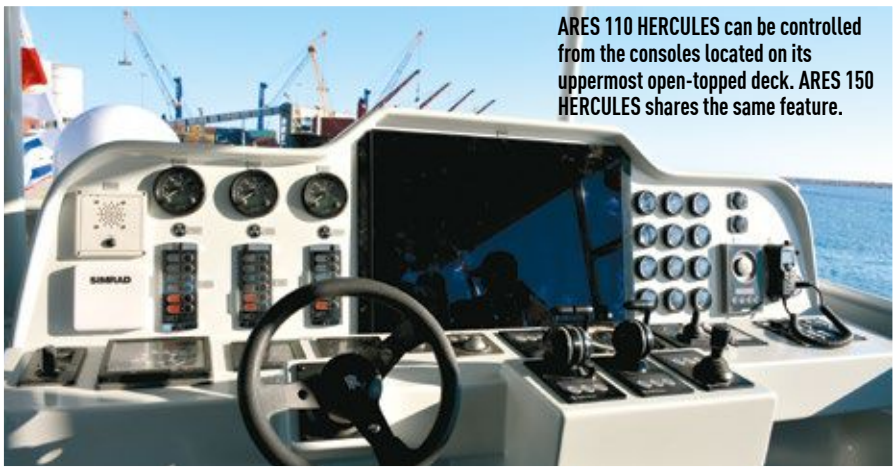
In a five-year shipbuilding project involving 17 ships, we have reached the point where we are going to complete, one-and-a-half years in advance, the delivery of boats with superior capabilities in terms production technology and equipment, and which possesses features way above the technical requirements. We are not, of course, saying that what we did is a miracle. However, "doing what others say is unfeasible" has become ARES' motto.

Working with a Human Focus

MSI TDR: As expressed by Ahmet Arslan, the Minister of Transport, Maritime Affairs and Communications, your company's boats are – without losing anything of their identity as combat platforms – offering a high level of personnel comfort that can almost compete with luxury vessels of the mega-yacht class. So could we say that "ARES Shipyard places great importance on personnel comfort, regardless of additional costs"? Can you share with us your thoughts about this?

Kerim KALAFATOĞLU: ARES has a very large product portfolio, ranging from warships to patrol boats, from ambulance boats to fire-fighting ships, and from passenger ships to yachts. While these platforms each have very different capabilities and characteristics, they all have one thing in common. We know full well that there will be people of different professions, classes, ages, genders and tasks working and living aboard these ships, and we attach great importance to them. We know from our forefathers as well as our own experiences that being a seaman is a gruelling occupation. We are aware that spending your life on those ships requires many sacrifices.

That's why, in every solution ARES has produced to date, we have not only strived to meet operational requirements to the highest possible degree, but also worked with a human focus. And we will continue to the do so. This is an innovation that ARES has introduced to the military shipbuilding industry. Although we have come under criticism from our competitors for this, we think that even if we are producing warships, it is important to provide a measure of comfort to the people who will be serving for months at sea, away from their families. Obtaining favourable feedback [from users] in this regard, years after delivery, provides us a 10-fold return, at a spiritual and moral level, over the additional costs we had to make in design and production.



ARES 110 HERCULES can be controlled from the consoles located on its uppermost open-topped deck. ARES 150 HERCULES shares the same feature.

Team Work: The Secret behind Our Success

MSI TDR: In such a competitive tender with such an intensive production schedule, you have been able to deliver, without any problems, highly capable and comfortable ships at standards that even exceed the project requirements. What is the secret behind this?

Kerim KALAFATOĞLU: Looking at the global shipbuilding industry, we see that the success we've had has no comparable examples. In a five-year shipbuilding project involving 17 ships, we have reached the point where we are going to complete, one-and-a-half years in advance, the delivery of boats with superior capabilities in terms production technology and equipment, and which possesses features way above the technical requirements. We are not, of course, saying that what we did is a miracle. However, "doing what others say is unfeasible" has become ARES' motto.

Superior engineering, infrastructure

and technological capabilities have certainly had an impact on this success; but these are assets that any enterprise can acquire, given a sufficient amount of money. And yes, we do possess these assets. However, beyond these, there is also an excellent team spirit at ARES, which can be thought of as a large family of individuals focusing on the same goal. Thanks to this team spirit, we have ensured highly effective project planning, excellent design, high quality production and customer-oriented after-sales support. Thanks to our team, which works compatibly and harmoniously, the result has naturally been a very good final product, delivered at a record schedule, and with 100 percent customer satisfaction.

MSI TDR: **Could the boats you have delivered to Qatar also meet Turkey's requirements? In this respect, are there any tenders you are waiting to be opened in Turkey? Or, speaking more generally, are there any tenders in Turkey to which you have, or are planning to, submit proposals?**

Kerim KALAFATOĞLU: The boats we are building for Qatar were, following negotiations with the Qatari Minister of Interior and the Qatari Coast Guard, designed especially for the sea conditions and operational requirements of Qatar. The same hull shapes can, of course, be optimised to suit Turkey's requirements, in line with Turkish Coast Guard Command's (TCGC) needs, with several modifications at a system and device level. In the end, these boats have, in a design and operational sense, proven themselves in every way.

There are a number of tenders we expect to be opened within the context of the TCGC's requirements. In this regard, we prioritise the interests of our country, and have shared our design and construction experiences with TCGC officials. Our doors are always open to them, so that they may examine, on-site, our production infrastructure and capabilities. We know that the TCGC has a need for boats as part of one of its priority areas, namely the prevention of illegal migration. In line with such a requirement, we have produced indigenous solutions, designed specifically for Turkey's seas and territorial waters, for use in combating illegal migration. Soon, or whenever we are asked, we will be presenting solutions that will best respond to the TCGC's needs, and our foremost priority in this regard will, as always, be our country's interests.

I would like to highlight once again – as I proudly express on every platform – that we also stand as the strongest candidate for the "Fast Patrol Boat Project", which involves the modernisation of the assault boat fleet in line with the requirements of Turkish Naval Forces Command, and for which development and procurement is planned for 2018.

On behalf of our readers, we would like to thank Kerim Kalafatoğlu, Chairman and Executive Director of ARES Shipyard, for taking the time to answer our questions and for providing us with such valuable information.

Collage: © MSI TDR / Şebnem Akgöl Kara

With ROBOİK Contest, SSM Turns Dreams into Reality

The award ceremony of the ROBOİK Unmanned and Autonomous Land Vehicles Design Contest, organised by the Undersecretariat for Defence Industries (SSM) under the slogan "Go After Your Dreams," was held in Ankara on December 14. The Unmanned and Smart Systems Seminar, organised before the ceremony, provided an overview of the latest situation in the works in this field. The event also included a mini showroom areas that featured company stands.

K. Burak CODUR / b.codur@milscint.com
Alper ÇALIK / a.calik@milscint.com

ROBOİK, the first design contest to be organised by the SSM, attracted 302 individual applications, as well as 21 institutional and 103 team applications. Of these, 17 made it to the finals, and their posters were displayed in the ceremony area. The total number of applicants was 634.

In the contest, designs were evaluated according to the following criteria and coefficients:

- Innovative approach – 0.275
- Ability to meet requirements – 0.225
- Manufacturability and applicability – 0.175
- Visual evaluation – 0.175
- Concept elaboration – 0.150

The jury panel consisted of the following members:

- Prof. Dr. Metin Yerebakan (Istanbul Commerce University – Head of the Jury Panel)
- Dr. Celal Sami Tüfekçi (SSM)
- Bilal Aktaş (SSM)
- Gökhan Uçar (SSM)
- Dr. Şaduman Aziz (SSM)
- Nuri Erginer (SSM)
- Prof. Dr. Hüseyin Rıza Börklü (Gazi University)
- Prof. Dr. Alpay Er (Özyeğin University)
- Assoc. Prof. Dr. Aydın Öztoprak (TOBB University)
- Assoc. Prof. Dr. Cem Alpay (Istanbul Technical University)
- Assoc. Prof. Dr. Hakan Ertem (Marmara University)
- Ece Arıburun Kırca (Istanbul Technical University)

- Ozan Korkmaz (TÜBİTAK)
- Fatih Karahan (Turkish Patent and Trademark Office)
- Şahan Sümer (Katmerciler)
- Uğur Turhan (Otokar)

For the SSM, ROBOİK is the first of several such competitions it plans to organise in other fields. To be repeated in 2018, the ROBOİK contest will undergo a number of changes. This year, for instance, all contestants, even those in different categories, were evaluated together. In 2018 on the other hand, there will be two categories that will be evaluated separately. One of these will be the "Universities" category, in which students from universities and technical vocational high schools, as well as other individual designers, may participate and have their innovation-based designs compete and undergo evaluation. Participants will be expected to apply with studies that are in their design or algorithm development phase. The other category will be "Companies", which will mainly be performance-based and include prototype development. Both categories will consist of two stages, preceded by a pre-elimination step. In the second stage of the Companies category, the prototype cost will be covered up to a certain limit. Various scenarios will be used during the contest, which will be based on the inputs of the Turkish Armed Forces (TAF), Gendarmerie General Command and the Turkish National Police (TNP). Further details of ROBOİK 2018 are expected to be announced in the first months of the year.

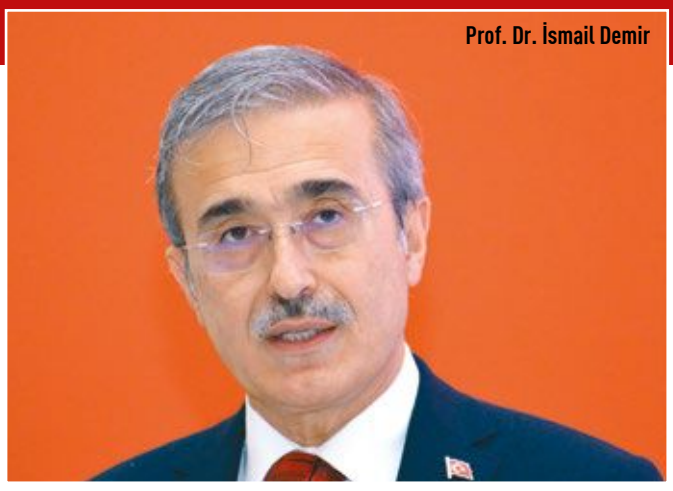
Gökhan Uçar

SSM's Vision Includes Robotic Soldiers

The first to take the stage at the workshop's opening session was Gökhan Uçar, Head of the SSM Unmanned and Smart Systems Department. Briefing the audience on the SSM's works in the field of unmanned systems and the contest, Uçar described the SSM's vision as follows: "Our goal is a combat environment where land, sea and air units operate jointly, and where even robotic soldiers can take part in combat. We're shaping our future plans according to this goal." Uçar went on to list the types of unmanned aerial vehicles components that have been indigenised so far: Ground control station, data link, satellite image terminal, satellite ground terminal, engine, image processing, EO/IR camera, SAR, wide area surveillance, mission planning software, ammunition, flight control computer, mission computer, autopilot and automatic take-off and landing system.

The Beginning and the First Step

The other speech of the opening session was given by Prof. Dr. İsmail Demir, Undersecretary for Defence Industries, who shared his thoughts on the contest: "Today marks a new



Prof. Dr. İsmail Demir

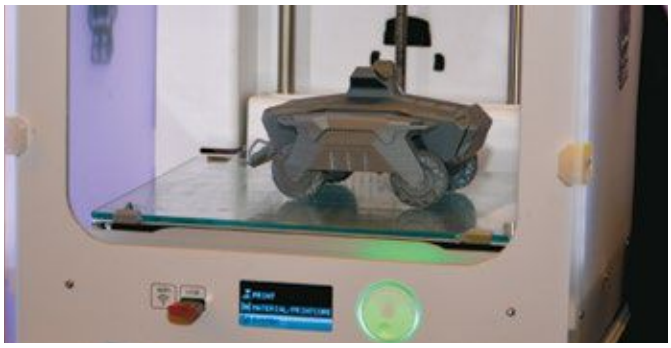
Efe, the first place winning design

Dost, the second place winning design

OTASAR, the third place winning design

Unless otherwise stated, all photographs: © MSI TDR

In the hall in which the workshop and ceremony were held, a three-dimensional printer operated from the start of the event to produce the first place winning design (left and right), which was initially unknown to the event's participants. So as the event continued and the design gradually took form, the participants and onlookers tried to guess, with curious glances, which design had actually won first-place. The printing processes was completed right before the award ceremony began.



ALPERA displays its unmanned land vehicle solutions at its stand.

beginning. ROBOİK is an idea that we, at the Undersecretariat, have been discussing for quite some time, and one from which we expect a lot. It is also the beginning and the first step of a move that will mobilise our young people, designers and entrepreneurs, spark their interest [in this area], and ensure commitment and results in the upcoming period."

Prof. Dr. Demir also mentioned the role they expect the SSM to play in future competitions: "Relative to the amount of projects we're conducting at the Undersecretariat, our manpower and personnel are insufficient for the implementation of these types of conceptual and strategic policies. In a sense, we see our role as creating, nurturing and implementing an idea, and then attracting the necessary stakeholders and ensuring its launch. We afterwards want to leave the cycle to industry, the academia, and individuals. We'll provide every form of support for this."

Prof. Dr. Demir said that there may have been a number of hiccups during the competition, in that it was organised for the first time, and noted that they are open to feedback from every group in this regard. He also called on the contestants to continue persevering in this field and path, even if they do not make it into the top rank.

The opening session was followed by the First Land Group Vision Sharing, Air Group Vision Sharing, Second Land Group Vision Sharing and Naval Group Vision Sharing panels. During these panels, companies operating in the industry described their visions and works related to unmanned systems.

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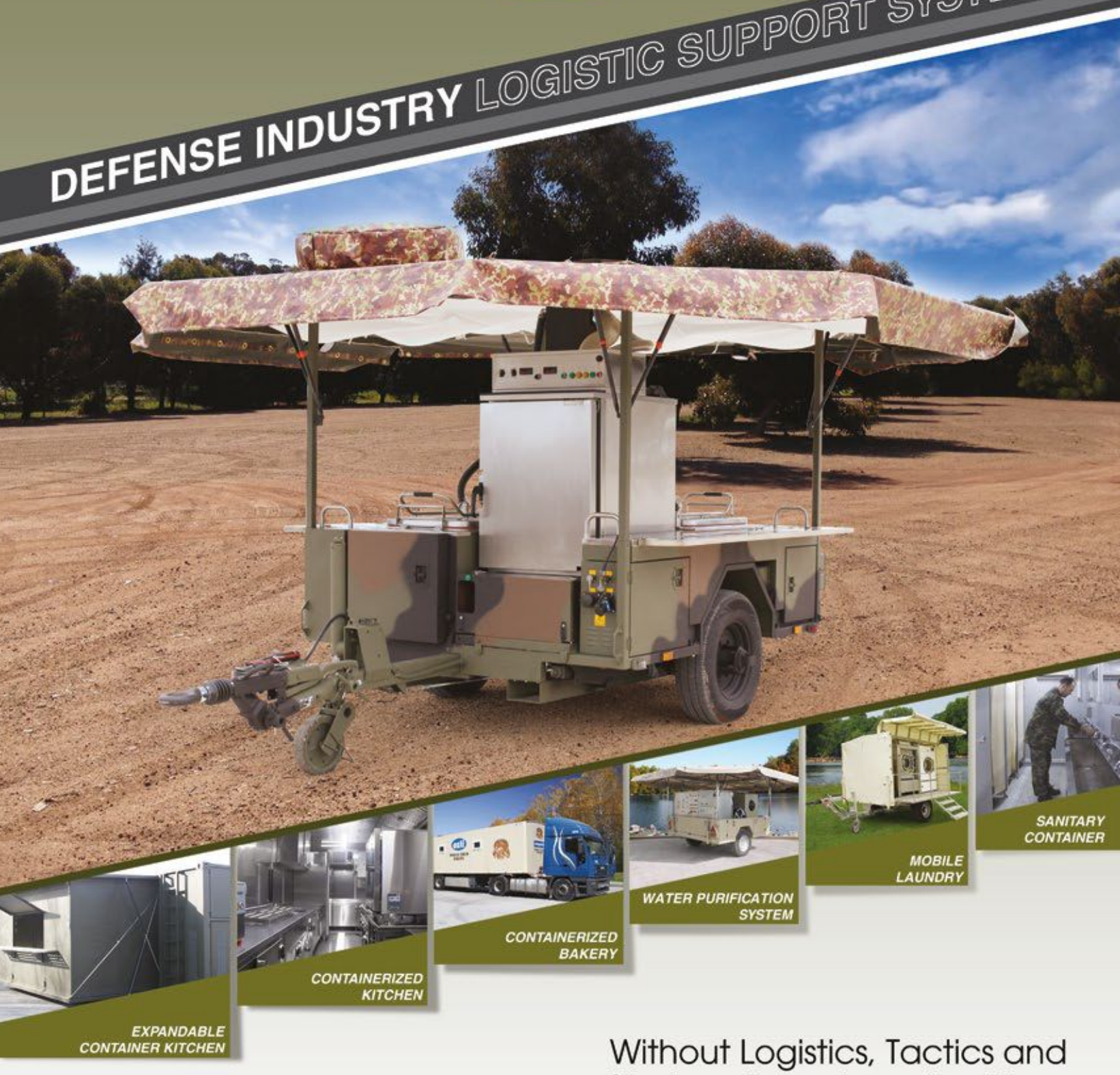

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Altınay's Road Map Is Ready

Murat Koç, Business Development Manager at Altınay Aerospace and Advanced Technologies, gave a presentation during the Air Group Vision session in which he described Altınay's road map for unmanned aerial vehicles (UAVs).In the field of UAVs, the company is cooperating closely with ASELSAN, and some of ASELSAN's solutions are utilizing Altınay's UAVs. For example, the SERÇE system showcased at the event at ASELSAN's stand is based on an Altınay-made Y6-850. Koç said they have a prime contractor-sub contractor relationship with ASELSAN that stands as an example in the defence industry.

In the product family described by Altınay, 200 units of Y6-850, classified as a medium-class UAV, were delivered to TAF in 2016, while another 1,500 were delivered in 2017. The vehicles have performed a total of 10,000 flight hours to date, and the product family is planned to be expanded with the following additions:

- **X4-S Mini UAV:** With the first prototype planned to make its maiden flight in 2018, the X4-S will be a Mini UAV with endurance of 20 minutes. Its take-off weight will be 1 kg, while its payload will be 200 g. The vehicle's dimensions will be 90 x 120 x 300 mm, and it will be controllable from up to a distance of two km in line of sight.
- **X4-700 Medium Class UAV:** The X4-700 will be Y6-850's high-performance version. For 2018, the goal is to achieve a flight duration of 45 minutes, and in the following years, this will be raised to 60 minutes. This aerial vehicle is expected to be used in the TEPEGÖZ project.
- **X8 High Carrying Capacity UAV:** This vehicle, which measures 1,400 mm across the tips of its rotors, is planned to carry such ammunition as the MAM-C. The take-off weight of this UAV will be 35 kg, while its payload will be 15 kg. It will be controllable from a distance of up to 10 km.

Altınay showcased its unmanned land vehicle solution at its stand. In this area, company is cooperating closely with ASELSAN. The company is also working with the SSM on the development of an throwable unmanned ground vehicle.

- **VTOL Fixed-Wing UAV:** The prototype is planned to perform its maiden flight in 2019.

Based on a request from the PTT, Altınay is also working on a UAV for package transportation purposes. The company is also holding talks with the PTT and the Directorate General of Civil Aviation concerning a UAV Control Centre.

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Çiğdem Şen Özer


Kubilay Çınar

ASELSAN Focuses on Making Systems Unmanned

ASELSAN's approach to unmanned systems is not as a company that develops the platform on which these systems are used, but rather as a solution partner that can convert any platform into an unmanned version. The company's unmanned solutions cover all areas, including land, sea and air. At the workshop, ASELSAN highlighted primarily its land and naval solutions. A presentation was given by Çiğdem Şen Özer, Project Manager for Unmanned Ground Vehicles at ASELAN, during the First Land Group Vision Sharing panel, and another was made by Kubilay Çınar, Unmanned Land and Naval Vehicles Programme Directors at ASELSAN's Microelectronic, Guidance and Electro-Optics Vice Presidency.

ASELSAN unmanned land systems product family consists of the KAPLAN and ERTUĞRUL robots, the Automatic Tractor Steering (OTAK) system, and systems for unmanning already existing vehicles. Of these, the ERTUĞRUL robots continue to be serially produced for the TNP.

ASELSAN's road map for unmanned land vehicles includes the following systems and technologies: The Tactical Armed Unmanned Land Vehicle, the Throwable Robot, the KAPLAN Indigenous Improvised Explosive Device (IED) Detection Robot, the Backpack Transportable Robot, the IED Disposal Robot, Joint Unmanned Vehicle Control and Convoy Tracking.

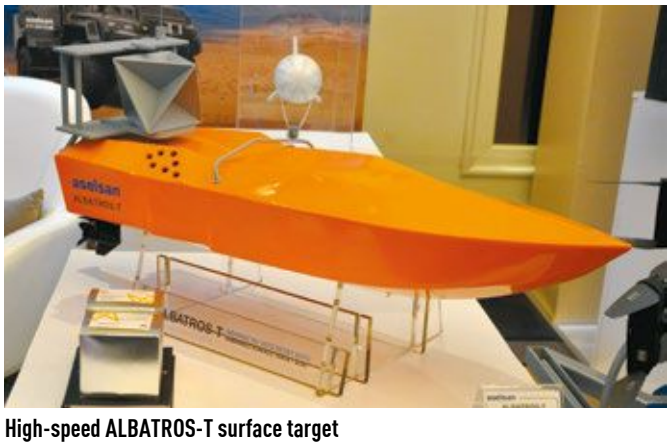
ASELSAN's work on unmanned naval systems concentrates primarily on ensuring realism in training activities. The company's ALBATROS-T high-speed surface target has been in use since April 2017 by Turkish Naval Forces Command (TNFC), particularly in scenarios involving asymmetric threats. The ARI-1T rotary-wing UAV, on the other hand, serves to provide information on firing accuracy.

ASELSAN has also the LEVENT unmanned surface vehicle, developed upon a request from the TNFC for a platform to carry out reconnaissance, surveillance and patrol missions, and which is currently stationed in the Gölcük Shipyard. This vehicle can carry a range of payloads that includes radars, electro-optic systems and a 7.62 mm remote-controlled weapon system. There are also plans to use a version of LEVENT as a vehicle for towing surface targets.

ASELSAN's road map for unmanned naval systems includes a semi-autonomous unmanned surface vehicle, the MESAHA, which will be used for mapping the seabed starting from 2018. Willing to carry its activities related to training to a whole new level, the company also plans to open a firing test training centre in a coastal area.

Another topic on ASELSAN's agenda is unmanned underwater vehicles for use in mine warfare. These are expected to be deployed on mine-hunting ships, and on such future platforms as TCG ANADOLU.


ASELSAN showcased the ERTUĞRUL robot at its stand.



High-speed ALBATROS-T surface target

The multi-rotor SERÇE-1 UAV is one of ASELSAN's aerial solutions.

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Tayyar Süngü

Baykar Makina Looks to Carry its Success to the Future

During the Air Group Vision Meeting, Baykar Makina's work in this field were described by Tayyar Süngü. At the time the panel was held, TAF had 32 BAYRAKTAR TB2 Tactical UAVs in its inventory while the TNP had 6, all of them with a combined total of 35,000 flight hours. Of these vehicles, 15 serve as armed UAVs. There are currently a total of 220 Baykar Mini UAV Systems in the inventories of the TAF and the TNP, and the total flight hours of these vehicles is in excess of 100,000.

Süngü emphasised that there is an ongoing paradigm shift in the military, with the concept of network centric warfare becoming more prevalent as a result of the development of computer and network technologies. In this environment, Bakyar Makina expects UAVs to become more important, and for unmanned combat aircraft to begin entering the inventory by 2035. In this overall picture, the use and protection of the electromagnetic spectrum will become even more important.

Baykar Makina is working on the establishment of a Joint UAV Command and Control Centre (MİKOM), and is also conducting activities for the inception of centres of excellence in the fields of training, testing and technology.

BMC Ready to Make Inroads into the Field of Unmanned Systems

Speaking at the First Land Group Vision Panel, Doruk Akyıldız, Project Manager at BMC, shared with his audience the company's approach to unmanned solutions. To date, BMC has not developed an unmanned land system, or converted a pre-existing vehicle into an unmanned version. "However, there will of course be such vehicles in the future. We have plans about this. What we're mainly working on at this stage is integrating unmanned systems into our vehicles and evaluating them, and our biggest solution partner in this regard is ASELSAN," Akyıldız said. Within the scope of these activities, BMC has successfully completed the AMAZON vehicle's firing tests in Qatar with the ASELSAN-made SARP DUAL remote-controlled weapon system. In the TTA-2 project it signed with the SSM on August 8, the company will integrate ASELSAN's ÇAK-II Robotic Arm and the Tactical Vehicle Command Kit (TAK), which will allow the remote control of the KİRPİ vehicle and its payload.


Doruk Akyıldız

Akyıldız also shared details on BMC's other activities. To meet the requirements of the Gendarmerie General Command, BMC is integrating ASELSAN's 120 mm automatic mortar system onto the VURAN vehicle. It is also working on a 4x4 vehicle smaller than the AMAZON, named ŞAHİN.

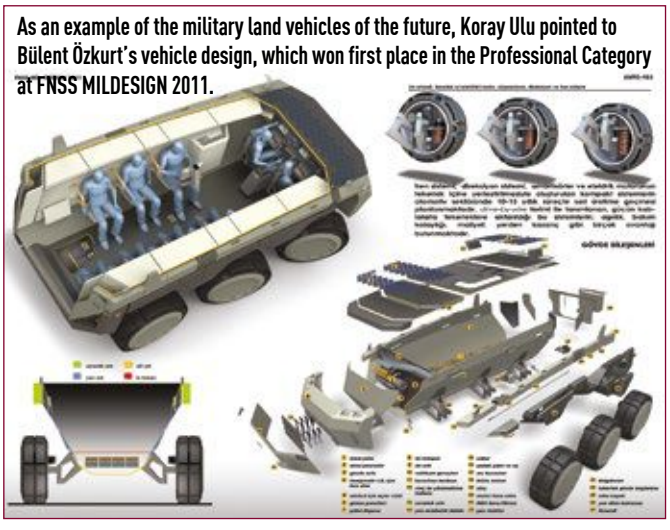
Akyıldız told the panel participants that BMC has already allocated 10,000 man-hours of engineering work and ₺1 million of funds from its own resources for the integration of unmanned systems.


Münir Cansın Özden

DATUM to Meet the Industry's Testing Requirements

During the Naval Group Vision Sharing panel, Münir Cansın Özden, Founder of DATUM, described the work they are conducting with Istanbul Technical University (İTÜ). As part of a technology development liability in an SSM project, work is being carried out at İTÜ to develop a cavitation tunnel and manoeuvring trial system for naval vehicles, and the company is also working on the testing of submarine designs and propeller forms. The successes of the company to date include the production of propellers with five axis CNC machines at a high level precision that renders them suitable for testing in cavitation tunnels.

The ÇAK-integrated KİRPİ vehicle was showcased at IDEF 2017.



As an example of the military land vehicles of the future, Koray Ulu pointed to Bülent Özkurt's vehicle design, which won first place in the Professional Category at FNSS MILDESIGN 2011.

© FNSS

Koray Ulu

FNSS Sets Sights on Transferring Civilian Technologies to the Military Field

Koray Ulu, Programme Manager for New Products at FNSS, gave a presentation at the First Land Group Vision Sharing panel, in which he argued that automotive-related investments in the civilian industry will also have an impact on the defence industry. It is expected that work in the civilian industry on hybrid and electric vehicles and their batteries will soon cross over into military vehicles.

Noting that sensors, vehicle computers and power and powertrain systems are the main components of autonomous vehicles, Ulu said: "At FNSS, our goal is to create an infrastructure that will enable us to use in our vehicles the advantages conferred by the sensor technologies, and to integrate them rapidly."

Katmerciler: A Pioneer in Unmanned Land Vehicles

Having unveiled its Remote Controlled Weapon Platform, the UKAP, at IDEF 2017, Katmerciler participated to the event as the only prime contractor company with an unmanned land vehicle solution" already on the market. Yusuf Öztoprak, Defence Products Market Segment Manager at Katmerciler, gave a presentation at the Second Land Group Vision Sharing panel, in which he described how the UKAP came into being. Katmerciler had previously developed a Remote Controlled Armoured Tracked Excavator and a Remote Controlled Armoured Articulated Wheel Loader to meet the requirements related to antiterrorism operations that emerged in recent years in the urban areas of South-eastern Anatolia, and these systems are still serving successfully in the region. The deployment of these vehicles highlighted the need for highly reliable control systems, as well as a highly sensitive and ergonomic operator station, and Katmerciler continued to further develop its solutions based on user feedback. Based on the knowledge and experience it acquired through these vehicles, Katmerciler went on to develop the UKAP.

Yusuf Öztoprak

Work on the UKAP began in 2016. The vehicle is capable of being equipped with hybrid power packs of different levels, and the platform comes in fully electric-based, electro-hydraulic and fully liquid fuel-based versions. The vehicle's electronic and electromechanical systems, shock absorbers and drive systems have all been designed by Katmerciler.

Katmerciler's approach to unmanned land vehicles is principally to develop simple and functional solutions. Öztoprak summarised this approach as follows: "Contrary to Boston Dynamics's approach, we believe there will be a greater preference for systems based on simpler technologies that are easily replaceable, and which everyone already knows and can develop themselves; and most importantly, there will be a preference for systems that can be readily sacrificed."

Öztoprak went on to stress two specific points. First, that new generation unmanned land vehicles can move beyond the typical design framework of manned vehicles – examples of which have been seen in ROBOİK. The other point highlighted by Öztoprak was the safety of unmanned land vehicles. Differently from UAVs, unmanned land vehicles are more exposed to threats, making several layers of safety measures necessary.

UKAP can assume a variety of different missions.

© Katmerciler

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UKAP's width (left) and height (right) are both adjustable.

Biggest Surprise of IDEF 2019 to Come from Nurol Makina

Kemal Uyar, Vice President of Administrative and Financial Affairs at Nurol Makina, described Nurol Makina's activities in the field of unmanned land vehicles at the Second Land Group Vision Sharing panel. Until now, the company has worked on integrating unmanned systems onto vehicles and providing remote control abilities to vehicles. All Nurol Makina vehicles are semi-autonomous, in that the vehicles and their payloads can be remote controlled within a radius of five kilometres. Another Nurol Makina unmanned system project is the TEPEGÖZ, which involves the integration of a tethered rotary-wing UAV to Nurol Makina vehicles.

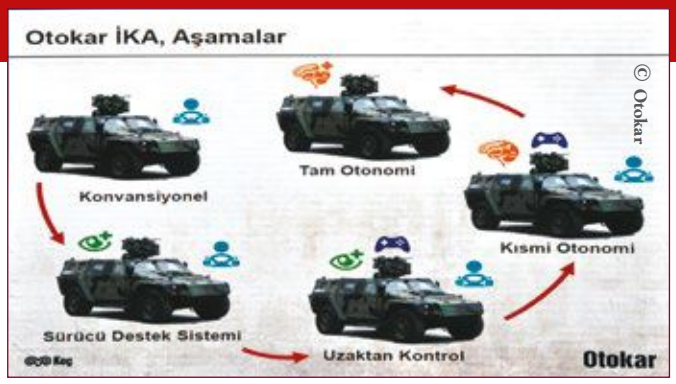
Nurol Makina has set grand targets for itself. At IDEF 2019, the company plans to unveil a fully autonomous vehicle that can make decisions, utilise all of its functions, and recognise the type of terrain (and react according) entirely of its own.

During IDEF 2017, ASELSAN showcased at its stand a Nurol Makina-made EJDER YALÇIN vehicle integrated with remote control capabilities

Otokar Moves Forward with Firm Steps

Otokar's plans include the development of vehicles capable of autonomous movement, with the company already having laid out its road map for achieving this objective, stage by stage. Korkut Kibaroğlu, Director of Armoured Vehicles System Engineering at Otokar, described this road map during the First Land Group Vision Sharing panel:

- Nowadays, manufacturers are integrating various driver support systems such as road tracking (or lane departure warning), adaptive cruise/speed control, hill start assist, blind-spot detection and collision avoidance systems into classical vehicles. These support systems have become indispensable as the basic components of autonomous vehicles.
- A vehicle equipped with driver support systems can be provided with capabilities for remote control. These support system will intervene in hazardous situations that a driver would normally notice, through his senses, if the vehicle was manned – such as in cases of skidding on a sharp turn. Such measures will help eliminate issues typically associated with remote control.
- The next step will be partial autonomy. These vehicles will support the driver by taking certain decisions in his place, such as when to decelerate and apply brakes; how to keep safe distances and avoid lane departure; and which driving mode to select.
- After semi-autonomous vehicles, the final goal will be transition to full autonomy.



Otokar has already identified the milestones along the road to a fully autonomous vehicle, and is conducting its works in this direction.

STM Readies Infrastructure

After unveiling its own unmanned aerial vehicles at IDEF 2017, STM continues to make preparations for unmanned naval systems. Hakan Altınköprü, Naval Projects R&D Manager at STM, briefed the audience about the company's activities in this area.

STM uses the following classification system for unmanned naval vehicles:

- **Small-Sized Unmanned Naval Vehicles, measuring between 0 and 7 m:** Used primarily for research purposes in oceanographic and university studies.
- **Medium-Sized Unmanned Naval Vehicles, measuring between 7 and 11 m:** Used in port protection and armed surveillance missions.
- Submersible Type Unmanned Naval Vehicles.
- **Long-Range Unmanned Naval Vehicles, measuring more than 11 m:** New examples of this type of vehicle are gradually emerging. The Sea Hunter, which is currently undergoing trials by DARPA, is the most recent example of these types of vehicles.

Altınköprü noted that UAVs and unmanned land vehicles have already seen service in combat zones, which has put them a step ahead when it comes to unmanned naval vehicles. Stating that, in the future, unmanned naval vehicles will become prevalent in swarm operations, autonomous search and rescue, infiltration operations (owning to submersibility) and electronic warfare missions, Altınköprü underlined that STM's works are also moving forward in this direction. The company is currently working on COMINT and surveillance applications.

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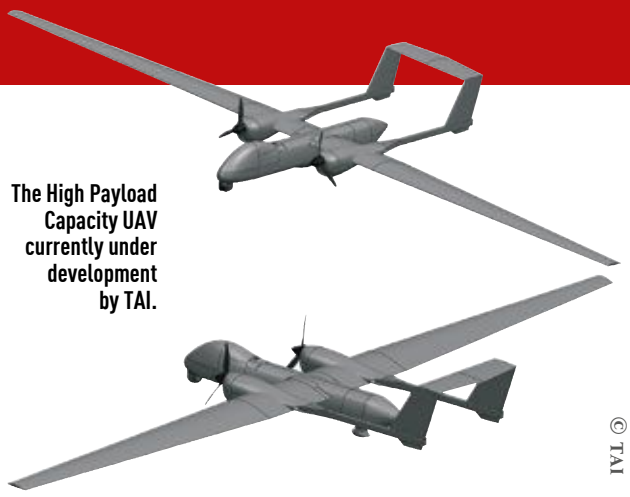
Nevzat Polat

TAI Moves Forward along the Path Paved by ANKA

During the Air Group Vision Sharing panel, Nevzat Polat, System Engineering Manager for UAV Systems at TAI, shared with the audience the latest situation with the company's UAV activities. Following the Block A version of the ANKA – which performed its maiden flight in 2010 and is capable of operating for 18 hours at an altitude of 23,000 feet – TAI also developed the following models of this UAV:

- Block C, or armed version of the ANKA, which performed its first flight and firing in May 2013.
- Block B, which performed its first flight in January 2015, and passed acceptance procedures in October 2016. In addition to its electro-optic payload, this version also carries a radar with SAR/ISAR/GMTI capabilities. It can operate for 24 hours at an altitude of 30,000 feet.
- Block S, which is currently in its qualification stage. This version is capable of being controlled by satellite, and can also carry payloads such as radio relay, PLS and a high-resolution electro-optic sensor. The Block S also features indigenous Identification Friend or Foe (IFF), encrypted communication, an indigenous flight control computer and a communication interface control unit. The software and hardware of the vehicle's avionics are DO-178B and DO-254 compatible.
- The Block SiB, whose first delivery has been completed, was derived from the Block B, and is used in electronic warfare missions.


The High Payload Capacity UAV currently under development by TAI.

© TAI

The integration of the L-UMTAS, CİRİT and MAM-L munitions to the ANKA have been completed, and firing has been performed with CİRİT and MAM-L. The ANKAs operating from the province of Elazığ, for instance, execute their missions using MAM-L munitions, and there are ongoing works to integrate the platform also with MAM-C and TEBER 81/82 munitions.

Meanwhile, TAI continues to work on a UAV system with high payload capacity, as well as a UAV that will have high-altitude long endurance (HALE) characteristics. The high payload capacity UAV is planned to make its maiden flight in 2019, and is set to transport 800 kg of payload while having an approximate take-off weight of 3.5 tons. The HALE UAV, on the other hand, will have a take-off weight of 5.5 tons and a payload capacity of 300 kg.

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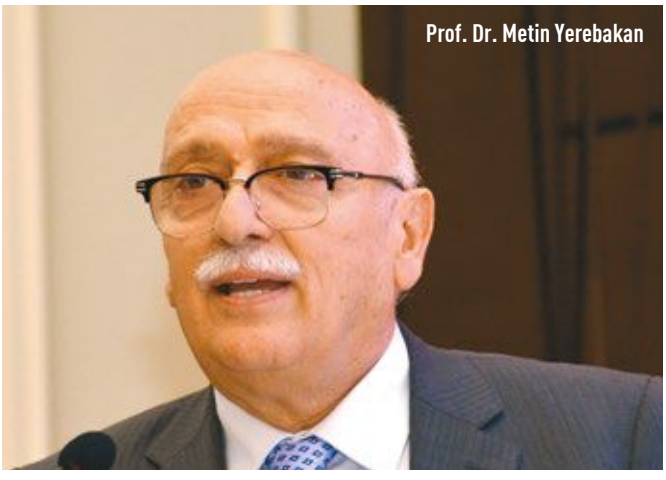
Prof. Dr. Metin Yerebakan


Dr. Celal Sami Tüfekçi

The Moment Dreams Come to Fruition

The conclusion of the workshop was followed by the award ceremony. Giving a brief speech before the announcement of the awards, Prof. Dr. Metin Yerebakan, the Head of the Jury Panel, said that while FNSS had organised similar competitions in this field in Turkey, ROBOİK represented a first for the SSM. Emphasising that the number of applications reflected Turkey's potential to do much more in this area, Prof. Dr. Yerebakan reiterated his belief that the number of application will continue to increase in the upcoming years.

The award winners were listed as follows:

- **First Place Award:** Uğraş Akpınar, for his design named Efe
- **Second Place Award:** Çağrı Demirbaş, for his design named Dost Autonomous Robot
- **Third Place Award:** Hakan C. Yıldız, for his design named OTASAR
- **Honourable Mention Award:** Utku Yücelmiş and Nurullah Taşkıran, for their design named YUNT
- **Honourable Mention Award:** Tolga Yaşar Yılmaz, for his design named Gergedan (meaning Rhinoceros),
- **Honourable Mention Award:** Volkan Gökalp, for his design named Atılgan-1
- **Honourable Mention Award:** Levent Tuna and Cengiz Akarsu, for their design named MERGEN
- **Jury Encouragement Award:** Barış Bumin, Sayit Alişan and Abdulkadir Uruç, for their design named Baykuş (meaning Owl)

Taking the floor after the presentation of the awards, Dr. Celal Sami Tüfekçi, Deputy Secretary for Defence Industries, said: "Here, we have engaged in a summit in which every participant provided his own added value as input... We will keep all of these designs in our archive, since they have all contributed in their own way. We keep learning new things from the designs our contestants put forward, and these will be examined in due time. There is a Technology Transfer Office within the SSM's Industrialisation Department, and all of this information will be kept in this office's archives. This means that among the designs that did not win awards in the event, some may, in the coming months and years, be declared eligible for production."

The ceremony ended following the taking of a group photograph. ◆


The Jury Encouragement Award was given by Prof. Dr. Yerebakan.


The Honourable Mention Award of the MERGEN team was given by Veysel Pekuz, Head of the SSM Department of Corporate Quality and Participations Management.


Volkan Gökalp received the Honourable Mention Award from Veysel Pekuz.

Veysel Pekuz presents an Honourable Mention Award to Tolga Yaşar Yılmaz, Lead Industrial Designer at FNSS. Speaking about their motivation in participating in this contest, Yılmaz said: "We set out with the purpose of finding what the TAF is looking for, what its needs are, and what solutions we can produce."

Veysel Pekuz hands an Honourable Mention Award to the YUNT team.

The second place award was given to Çağrı Demirbaş by Bilal Aktaş, Head of the SSM Department of Industrialisation.

Uğraş Akpınar, the first place winner of the contest, received his award from Dr. Celal Sami Tüfekçi. In his thank you speech, Akpınar said: "Everyone – including those have and haven't won – have all contributed to this event."

Regulatory Overhaul in Turkish Defence and Aerospace Industry Continues

Decree Law number 696, published in Official Gazette number 30280 dated December 24, 2017, brought a number of significant changes to the Turkish defence and aerospace industry. The decree listed the following changes:

- A new company, named Military Factory and Shipyard Operations Inc. (ASFAT A.Ş. in Turkish), has been established. Utilising the means and capabilities of the existing military factories and military shipyards, this company will – as a part of production planning efforts – receive and process purchase orders from state-owned enterprises and from real and legal entities, including foreign ones. It will also be in position to submit offers in response to the requirements of such enterprises and entities. Whenever required by the orders it receives or the offers it submits, the company will also engage in joint production, design, R&D and product development activities, as necessary. Furthermore, the company will ensure the modernisation of military factories and shipyards, construct facilities, and engage in any other commercial activities defined by its prime contract. ASFAT will commence its operations following the signing of its prime contract and the completion of the necessary official procedures. The company's initial capital of ₺50 million will belong entirely to the Undersecretariat of the Treasury, although the rights and authority this Undersecretariat has over the enterprise will be wielded by the Ministry of National Defence.
- In the Coast Guard Command Law, the sentence stating "The requirements of the Coast Guard Command will be directly notified and proposed by the Ministry of Interior to the Ministry of National Defence" has been amended, with the words "Ministry of National Defence" being changed to "Undersecretariat for Defence Industries."
- In the Law on the Organisation, Duties and Authority of the Gendarmerie, the sentence stating "The requirements of the General Command of the Gendarmerie will be directly notified and proposed by the Ministry of Interior to the Ministry of National Defence" has been amended, with the words "Ministry of National Defence" being changed to "Undersecretariat for Defence Industries."
- The Undersecretariat for Defence Industries (SSM) has been attached to the Presidency. The phrase "Ministry of National Defence" in Article 7 of Law number 3238 has been changed to "the President", as follows: "The Undersecretariat for Defence Industries has been established as a legal entity affiliated to the President." A provision stipulating that SSM personnel will be appointed with the President's approval has also been added to the regulation. Furthermore, changes in the regulation have also cleared the way for the employment of project-based or contracted personnel in tasks that require special knowledge and expertise, with their compensations covered from the Defence Industry Support Fund. The salaries to be received by these personnel will be determined by the Defence Industry Executive Committee.

The establishment of ASFAT is expected to accelerate the integration of military factories and shipyards – which showcased their products and solutions at a large stand in IDEF 2017 – into the Turkish defence and aerospace industry.

- Concerning the Defence Industry Executive Committee, the following clause has been added to the same law: "In projects conducted by the Undersecretariat for Defence Industries, the Committee shall decide with which company the project contract will be signed. In cases it deems necessary, the Committee may delegate this authority to specific members of the Committee or to the Undersecretary for Defence Industries, on the condition that it first defines the limits within which this authority shall be wielded."
- In the same law, the sentence "To fulfil the tasks given by the President" has been added to the list of the SSM's duties.
- In the same law, the following sentence has been added to the articles pertaining to the Defence Industry Support Fund: "Scholarship and educational support may be provided from the Fund, to support the development of human resources in the defence industry."
- The same law has also rescinded the articles concerning the Defence Industry Higher Coordination Council. The Defence Industry Executive Committee thus becomes the sole committee in the position to identify, single-handedly, the general strategies and principles for the development of the defence industry. The following sentence has been added to the committee's list of duties: "To take decisions pertaining to the production and procurement, both domestically and from abroad when necessary, of the modern weapons, tools and equipment required according to the Strategic Objectives Plan of the Turkish Armed Forces, and according to the security priorities set by the Ministry of Interior for the General Command of the Gendarmerie, Coast Guard Command and the Turkish National Police (TNP)."
- The change effectuated to Law number 3388 also makes the President the Chairman of the Board of Trustees of the Turkish Armed Forces Foundation. The Board now consists of the President, the Minister of National Defence, the Deputy Chief of the Turkish General Staff, the Undersecretary of the Ministry of National Defence and the Undersecretary for Defence Industries.
- A new article introduced to Law number 233 has cleared the way for the Mechanical and Chemical Industry Company (MKEK) to employ contracted personnel, while remaining exempt from the provisions of other laws regarding the employment of such personnel. ◆

S-400 Procurement Continues as Planned


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Launcher vehicle of the S-400 Triumf, in firing position.

On December 29, the Undersecretariat for Defence Industries (SSM) issued a press release concerning the S-400 systems to be procured from the Russian Federation as part of the Long-Range Air and Missile Defence System project. The statement reads as follows: "Negotiations with the Russian Federation have been concluded within the scope of the Long-Range Air and Missile Defence System project, initiated to meet the long-range air and missile defence system requirements of Air Force Command. Pursuant to these negotiations, a total of two S-400 Systems (Batteries) will be procured, one of which will be retained as an option. Control of the S-400 system, which is effective both against aerial vehicles and ballistic missiles, will be entirely under the Turkish Armed Forces, and the system is capable of operating independently without connection to external units or elements. Systems pertaining to the [S-400's] use, management, and friend or foe identification will be developed through indigenous means.

First delivery is planned for the first quarter of 2020, and the project contract also includes cooperation for the acquisition of technology, as well as a commitment for joint development.

Following the signing of the contract and the realisation of the advance payment, the project has started ahead of schedule. A credit agreement has also been signed concerning the portion [of the contract] that will be covered by a credit provided by the Russian Federation.

Moreover, work to ensure that long-range air defence needs can be met through indigenous capabilities are continuing with great determination, in line with the country's national interests, and various works and activities are being conducted with the relevant countries and companies to support this model.

Outside official statements, however, some news and comments that have appeared in the press do not fully reflect the truth of the matter. As is the case in all defence projects, the technical aspects and payments details related to the systems are not being disclosed, as per confidentiality clauses the parties have agreed upon."

December has also seen two other developments concerning SSM projects.

- On December 18, the SSM published a Request for Information Document for its Light Alloyed Support Bridge Project. Launched to meet a requirement of Land Forces Command, the project will involve the procurement of a complete system consisting of a Bridge Construction Vehicle, Bridge Transport Vehicle (or Vehicles), Bridge Materials, and, if necessary, Trailer Vehicle (or Vehicles), which together will be used to deploy a Logistic Support Bridge for the crossing of gaps, both dry and wet.
- On December 22, TÜMOSAN submitted its proposal for the National Powerpack Development Project. ◆

Berkin Engineering Expands Cooperative Activities Under the Emergency Intervention and Diving Training Boat Project with SMART Defence


© Berkin Engineering

Having signed a contract on November 29 with DESAN Shipyard, the prime contractor in the Emergency Intervention and Diving Training Boat (AMBED) project, concerning the integration of electronic systems onto the boats that will be produced as part of the said project, Berkin Engineering is continuing its activities at full pace. On December 13, the company signed a contract with SMART Defence to carry out electromagnetic interference and electromagnetic compatibility (EMI/EMC) analysis and testing on the electronic systems to be integrated onto these boats. The ceremony held for the contract covering the execution and reporting of these tests was attended by Yücel Atalay, Managing Director of Berkin Engineering, İbrahim Salçın, Chairman of the Board of SMART Defence and Assoc. Prof. Dr. Cemil Berin Erol, Deputy General Manager of SMART Defence. Commenting on the signing of the contract, Atalay said: "We had already matured our works long before the signing on November 29, which allowed us to make a rapid start on the project. We are moving with firm steps towards our goal of completing all tasks we have undertaken, in a timely manner and at the desired level of quality." Speaking on the level of experience at SMART Defence, Salçın said: "Although we were established only in 2014, our team's total experience in electronic warfare and system integration is in excess of 80 years. In the projects on which we have worked previously, we've completed our defined tasks in a timely and thorough manner. This new contract is evidence of the trust placed in SMART Defence's knowledge and experience. We are honoured to work with Berkin Engineering on a project of such importance for our country."

Under the AMDEB project – which is being conducted by the Undersecretariat for Defence Industries, with DESAN shipyard as its prime contractor – the Turkish Naval Forces Command will be supplied with two boats that can be used for initial response in accidents in coastal areas; for the applied training of diving personnel; and also for torpedo search missions, when necessary. ◆

ASELSAN's works in Malaysia aim at high levels of domestic contribution.

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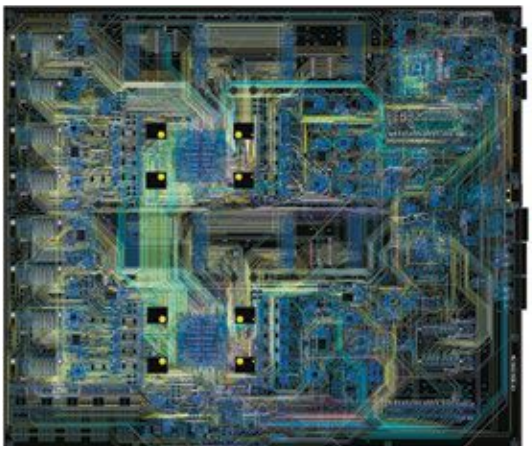
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ASELSAN's High Performance Multiprocessor Computer Card design.

ASELSAN Prepares for Second Public Offering

ASELSAN, one of the few publicly-traded companies in the Turkish defence and aerospace industry, is once again preparing to offer a portion of its shares to the public. In its December 26 meeting, the ASELSAN Board of Directors decided to initiate the second public offering of company shares, and to authorise the General Management to conduct the necessary activities to this end. At the time of writing, there have been no announcements concerning the intentions or goals of this public offering, or on how the resources to be acquired, in case this public offering goes forward, will be utilised.

In other news, ASELSAN also received an award. At the 2017 event of the PCB Technology Leadership Awards contest, held annually by Mentor Graphic to assess printed circuit board (PCB) technology designs, ASELSAN ranked second in the "Computers, Servers and Memory Systems" category for its High-Performance Multiprocessor Computer Card design. At this contest, which has been organised in 2017 for 27th time, ASELSAN had previously received awards in 2012 and 2016 as well.

The month of December has also seen the following developments in ASELSAN projects:

- According to a statement released on December 6, ASELSAN has successfully completed the installation, integration and testing of the SMASH weapon systems in boats belonging to the Malaysian Coast Guard. These works were conducted locally by Malaysian engineers with the support of ASELSAN, and also involved officials from the Malaysian Coast Guard and the Malaysian Naval Forces. ASELSAN MALAYSIA, which is ASELSAN's local company in the country, continues to pursue its activities towards the local production of remote-controlled weapon systems and their export to Southeastern Asia.
- In its statement to the stock exchange dated December 11, ASELSAN announced the signing of two separate contracts with the Ministry of National Defence with a total value of ₺262,999,600, covering the supply of Thermal Binoculars and Portable Thermal Cameras. Deliveries in this contract will take place between 2018 and 2019.
- On December 29, ASELSAN and the Undersecretariat for Defence Industries signed a contract for a short-range/low-altitude defence system with a total value of ₺122,422,715 and ₺1,011,395,262. Within the framework of this contract, deliveries will be performed between 2019 and 2022. ◆

Signatures in Place for IDEF 2019

In a statement released through its Twitter account on December 22, the Turkish Armed Forces Foundation announced that the necessary signatures are now in place for the IDEF 2019 event. IDEF 2019 will be held between April 30 and May 3, 2019, at the TÜYAP Fair Convention and Congress Centre in Istanbul.

IDEF 2017 had hosted a total of 820 companies and company representatives from 50 countries, 503 of them being foreign and 317 of them local. The exhibition was visited by 65,782 people in total, including 60,754 local and 5,028 foreign visitors, as well as 133 delegations (consisting of 637 delegation members) from 67 countries and two international organisations. Among the attendants of the exhibitions were the President of Sierra Leone Ernest Bai Koroma, 26 ministers, 6 chiefs


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of general staff, 17 vice ministers, 5 deputy chiefs of general staff, 10 force commanders, 14 undersecretaries, and numerous representatives of civilian and military procurement authorities. The exhibition also saw 2,240 scheduled meetings and stand visits, as well as 50 signing ceremonies. ◆

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© HAVELSAN
Fethi Azaklı


© HAVELSAN
Prof. Dr. Mustafa Alkan

Fethi Azaklı becomes New Chairman of the Board at HAVELSAN

At its December 8 meeting, the HAVELSAN Board of Directors took the decision to appoint Fethi Azaklı as its Chairman, and Prof. Dr. Mustafa Alkan as a Member of the Board. Following these appointments, HAVELSAN's new Board of Directors is now composed as follows:

- Fethi Azaklı, Chairman of the Board of Directors
- Taner Düvenci, Vice Chairman of the Board of Directors
- Ahmet Akyol, Member of the Board of Directors
- Gökhan Gökay, Member of the Board of Directors
- Prof. Dr. Mustafa Alkan, Member of the Board of Directors

Born in İkizdere, Rize Province, in 1959, Azaklı graduated from the Psychology Department of the Ankara University Faculty of Education in 1982, and from the Istanbul University Faculty of Law in 1995. After working as an education specialist and psychological counsellor, Azaklı began his career in law in 1996 as a lawyer registered with the Istanbul Bar Association. After starting to work at the Presidency of Telecommunications and Communication (TİB) in 2009, Azaklı became the Head of the Law Department of the TİB in 2014. Later serving as Counsellor to the President of the Information and Communication Technologies Authority, Azaklı was appointed as the Chairman of the Board of Directors of HAVELSAN on December 8, 2017.

Born in Develi, Kayseri Province, in 1962, Prof. Dr. Alkan graduated from the Electrical and Electronics Engineering Department of the Erciyes University Faculty of Engineering, after which he worked at the same university as a research assistant. He completed his postgraduate and doctorate studies in the Electrical and Electronics Engineering Department, and between 1988 and 1994, he worked at the Kayseri Regional Directorate of the Turkish Standards Institute. In 1998, he became an associate professor.

Holding office as the Vice President of the Information and Communication Technologies Authority between 2001 and 2012, Prof. Dr. Alkan was appointed in 2012 as a Professor to the Electrical and Electronic Engineering Department of the Gazi University Faculty of Technology, also serving as the Department's Head between 2012 and 2015. As the founder of the Turkey Informatics Council and the Information Security Association, Prof. Dr. Alkan has also held office as the President of the latter.

Having actively taken part in many e-transformation projects in Turkey, Prof. Dr. Alkan has over 100 national and international publications. On December 8, 2017, Prof. Dr. Alkan was appointed as a Member of the Board of Directors at HAVELSAN.

December also saw HAVELSAN signing a contract for the National and Indigenous Turkish Straits Vessel Traffic System, at a ceremony held in Ankara on December 15, and attended by Nurettin Canikli, Minister of National Defence, and Ahmet Arslan, Minister of Transport, Maritime Affairs and Communications. Activities are expected to be completed in the project within 16 months, and the system is planned to enter into service on April 15, 2019. The cost of project has been announced as ₺59 million. ◆


© SSI

SSI Board of Directors Holds Final Meeting of 2017

The Defence and Aerospace Industry Exporters' Association (SSI) Board of Directors held its final meeting of 2017 on December 27, at the facilities of Alp Aviation in Eskişehir. Closing an intense year during which it flew the flag of the Turkish defence industry at numerous events, including IWA Outdoor Classics 2017, Aircraft Interiors Expo 2017, LAAD 2017, IDEF 2017, IDET 2017, DSEI 2017, Milipol Paris and Defence & Security 2017, the SSI will continue its activities in 2018 in line with Turkey's targets for 2023.◆

Vestel Defence Receives R&D Centre Certificate

Vestel Defence received its R&D Centre Certificate from the Ministry of Science, Industry and Technology at the 6th Private Sector R&D and Design Centres Summit, held in Ankara between December 20 and 21. The certificate was presented to Öner Tekin, General Manager of Vestel Defence, by Dr. Faruk Özlü, Ministry of Science, Industry and Technology. With this development, Vestel Defence – a company which itself was first established within the scope of an R&D project – has become entitled to benefit from various R&D-related incentives. ◆


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Naval Forces Command Receives TCG AKIN (A-584)


© İstanbul Shipyard

Vice Admiral Adnan Özbal, Commander of the Turkish Naval Forces, speaking at the launch ceremony.

TCG AKIN (A-584), constructed by the Istanbul Shipyard as part of the Submarine Rescue and Salvage Ship (KURYED) project of the Undersecretariat for Defence Industries (SSM), was delivered to Turkish Naval Forces Command (TNFC) on December 29 at a ceremony held in Istanbul. The first ship in the project, TCG IŞIN (A-583), was delivered to the TNFC earlier in July 2017.

TCG IŞIN and TCG AKIN will carry out the following missions:

- Rescuing and salvaging vessels that have run aground, been damaged or suffered malfunction,
- Performing salvage in the open seas,
- Executing activities such as underwater repair and wreck salvage/removal by means of remote operated underwater vehicles (ROVs) and atmospheric diving suits (ADSs),
- Towing targets for surface firing exercises,
- Acting as target ships during torpedo firing exercises,
- Recovering torpedoes from the sea,
- For submarines that cannot reach the surface, providing life support to submarine personnel and assisting personal rescue activities down to a maximum depth of 600 metres.
- Firefighting on ships,
- Rescuing the personnel of all aircraft – particularly those of the Turkish Armed Forces (TAF), but also including civilian ones – that have landed or crashed at sea, and recovering the materials and wreckage of these aircraft,
- Preventing aircraft that have landed or crashed at sea from sinking, and salvaging these vehicles where necessary. ◆


© İstanbul Shipyard

TCG AKIN (left) and TCG IŞIN (right)

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Competition Development

Katmerciler showcased its unmanned vehicles at its stand at the 6th Private Sector R&D and Design Centres Summit.

Katmerciler Expands Product Family of Unmanned Land Vehicles

At the 6th Private Sector R&D and Design Centres Summit organised in Ankara between December 20 and 21, Katmerciler unveiled its Remote Controlled Fire Extinguisher (UKYS) vehicle. UKYS was showcased together with the Remote Controlled Weapon Platform (UKAP), which was first launched at IDEF 2017, thus signalling that the company is beginning to form its family of unmanned land vehicles.

UKYS was developed as a smaller-scale version of UKAP. Operating with a hose of adjustable length that connects the unmanned vehicle to a water or foam tank, the UKYS can remotely intervene against fires that are unapproachable by firefighters, allowing interventions against high-risk fires such as those caused by ammunition and fuel, without endangering human lives.

An electrically-operated vehicle, UKYS uses a battery or generator as power source. The vehicle's prototype has a speed of five kilometres per hour, and an unloaded weight of 700 kg. Its length, width and height are 1,400 mm, 650 mm and 1,100 mm, respectively. The vehicle can spray up to 2,000 litres of fluid per minute at seven bar pressure, and its remote control kit features a touchscreen display.

UKAP Now Features Satellite Control

Capable of being remotely controlled from a distance of up to three kilometres thanks to its remote control unit, the UKAP recently saw the addition of a satellite control system that has extended its range of control significantly. Satellite control also enables the simultaneous and coordinated control of more than one UKAP.

UKAP can be equipped with either an electric or hybrid drive system, and is a modular platform capable of being configured according to different needs, although the vehicle has initially been designed as a weapon platform.

Furthermore, the UKAP can be equipped with electro-optic systems to serve as a reconnaissance and surveillance vehicle; with other equipment to operate as a mine clearing vehicle; or with an armoured cabin to be configured as a wounded personnel rescue vehicle. Weighing approximately 1,100 kg, UKAP has an additional weight capacity of 2,000 kg for the carrying of military ammunition and equipment. ◆

UKYS can intervene in high-risk fires, without endangering human lives.

UKAP has now gained the ability to be controlled by satellite.

BAYRAKTAR TB2 Performs Landing with Meteksan Defence Automatic Landing and Take-Off System

Meteksan Defence Automatic Landing and Take-Off System (OKİS) has been successfully tested on Baykar Makina's BAYRAKTAR TB2 unmanned aerial vehicle (UAV). An announcement concerning the tests performed under the cooperation of the two companies was released on December 20.

OKİS, used to ensure the safe take-off and landing of UAVs, and to provide redundancy, has two main components:

- The OKİS Air Unit, composed of a transponder and antenna, integrated onto the UAV, and
- The OKİS Ground Unit, stationed on the ground near the runway, and composed of a single-pulse tracking radar.

During tests, the OKİS Air Unit integrated onto the BAYRAKTAR TB2 was able to communicate from a distance of 12 km with the OKİS Ground Unit, situated near the runway. Furthermore, in all ground and air tests, it was demonstrated that the positional information generated by the OKİS was highly sensitive, to the point of allowing the automatic take-off and landing of the UAV independently of any global positioning system (GPS). A statement released by Meteksan Defence emphasised that the OKİS Air Unit, which stands out with its small dimensions and low weight, can be used on nearly any class of UAV with minimal impact to the payload capacity. ◆

In his speech, Ahmet Taşkın addressed the members of OSSA.

MKEK Makes Largest MPT-76 Delivery to Date

The Mechanical and Chemical Industry Company (MKEK) carried out the delivery of 3,500 MPT-76 infantry rifles at a ceremony held on December 6 in Kırıkkale, bringing the number of MPT-76 rifles delivered by the MKEK to date to 7,000. This latest delivery also represents the largest delivery to date over the course of the project, and the delivery of the remaining 13,000 rifles is expected to be completed by April this year.

The ceremony held for the MPT-76 delivery was attended by Ahmet Taşkın, General Manager of MKEK; Derviş Mehmet Ocakcıoğlu, Weapon Factory Manager at MKEK; Zekai Tufan, Branch Manager at the Turkish Metal Trade Union; and MKEK Employees.

December also saw MKEK taking part in the cooperation conference with the OSTİM Defence and Aviation Cluster (OSSA). The event, which was held on December 1, was attended by Ahmet Taşkın, General Manager at MKEK; Orhan Aydın, Chairman of the Board at OSTİM; Sıtkı Öztuna, Vice Chairman of the Board at OSTİM; Mithat Ertuğ, Chairman of the Board at OSSA; purchasing officials from MKEK's 12 factories; and nearly 50 OSSA members. Nearly 200 one-to-one meetings took place at the event, where OSSA companies found the opportunity to describe their production capabilities to MKEK managers.

Speaking at the event, Taşkın gave important messages concerning the future. Noting that MKEK works with main suppliers in 30 to 40 percent of its manufacturing activities, Taşkın said: "We're planning to increase this ratio two-fold. In our 2018 budget plan, our turnover target for manufacturing works is ₺2 billion... We'll be successful if we manage to share and distribute this workload [between ourselves]. However, in the defence industry, quality and timely delivery are always important. I believe that the OSTİM and OSSA companies have an important competitive advantage with regards to price." ◆

Representatives of the organisations and companies that took part in the project.

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TÜBİTAK SAGE Begins Serial Construction of Newly-Developed Winged Guidance System

Serial production activities have begun for the Wing-Assisted Guidance Kit (KGK), developed by the TÜBİTAK Defence Industries Research and Development Institute (TÜBİTAK SAGE). In a statement released on December 5 concerning this development, TÜBİTAK announced that it has organised an Introduction Ceremony for the KGK Weapon System at the TÜBİTAK Feza Gürsey Conference Hall to mark the start of serial production of the system. Speaking at the ceremony, Mustafa Şeker, Deputy Undersecretary for Defence Industries, said: "It certainly makes us proud to see that we have finally resolved the issue [pertaining to the procurement] of this system, which we had tried to acquire externally for many years, and for which we had to conduct countless meetings – sometimes succeeding in obtaining the system from abroad, while, at other times having to wait for very long periods b efore being able to receive them."

The KGK was developed through the contributions of various Turkish defence and aerospace sector companies, acting under the leadership of TÜBİTAK SAGE.

Prof. Dr. Arif Ergin, President of TÜBİTAK, stated that the weapon system, developed through indigenous means, stands as an important example of the efforts being conducted to reduce the external dependence of the Turkish Armed Forces and the Turkish defence industry. Prof. Dr. Ergin went on to explain that prior to its introduction into the inventory, a number of firing tests have been carried out with the system, and that other tests had been completed on a small number of early production units, pointing out that they now have fully working munitions in the inventory. The KGK effectively transforms 250 and 500 kg general-purpose bombs into air-to-surface long-range smart munitions. With the KGK, the range of flight of the bombs can reach up to 110 km, with a level of precision of less than 6 metres, and usable under all weather conditions. The production and design of critical subsystems within the kit, such as the thermal battery and certain pyrotechnic components, were carried out by TÜBİTAK SAGE through indigenous capabilities.

The certification of the KGK for the F-4 2020 aircraft was completed in January 2017, while certification for the F-16 aircraft was completed in March the same year. As part of the final stage tof the KGK's design and development process, initial low-level production activities for the system began in June 2016, in line with the technology transfer and industrialisation activities of the Ministry of National Defence, Air Force Command and TÜBİTAK SAGE.

The serial production of the KGK will be carried out by Kale Aero, based on a cooperation protocol covering serial production works that had been signed between TÜBİTAK SAGE and Kale Aero on May 10 during IDEF 2017. ◆

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TAI will operate in Teknopark Istanbul from a 2,600-square metre office.

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TAI Continues Technology-Oriented Cooperative Activities with METU and Teknopark Istanbul

Taking its cooperative activities with universities a step further, TAI is now conducting studies for the development of Very Light Aircraft (VLA) with the academia. Following the first of such studies initiated with Istanbul Technical University, the Middle East Technical University (METU) is also joining these activities with the contract for an Independent VLA Research and Development (BARGE) project, signed on December 14 between Prof. Dr. Mustafa Verşan Kök, Rector of METU, and Assoc. Prof. Dr. Temel Kotil, President and CEO of TAI. Under the project, students of METU will develop the aircraft's design, while production, assembly, integration and testing activities will be assumed by TAI. Concerning the signed contract, Assoc. Prof. Dr. Kotil said: "We attach great importance to our university partners in meeting the engineer requirements of future projects. This project will allow [students] to gain their first experience in the subject, thus helping raise young people with expertise who can assume a role in Turkey's aviation studies." Another development in the same month was the opening of TAI's Teknopark Istanbul office on December 28. The opening ceremony of the office, which will operate on an area of 2,600 square metres in Teknopark Istanbul, was attended by Prof. Dr. Oğuz Borat, Chairman of the Board of TAI; Assoc. Prof. Dr. Temel Kotil, President and CEO of TAI; and Kemal Fidanboylu, Director of Teknopark Istanbul. With the opening of this office, TAI aims to increase its R&D and innovation-related activities with Teknopark engineers. ◆


© TAI

Assoc. Prof. Dr. Temel Kotil and Prof. Dr. Mustafa Verşan Kök

STM Becomes Authority in Railed Systems

STM is preparing to take its skills in aviation certification and certification consultancy to the field of railways. In a statement released on December 6, the company announced the signing of a protocol with the Directorate General of Railway Regulation (DDGM), in which it will assess the adequacy of rail vehicles according to national and international uniform technical prescriptions (UTPs), while also evaluating organisations responsible for the maintenance of vehicles in railway traffic. STM will, in this context, present its reports to the Ministry of Transport, Maritime Affairs and Communications. STM thus becomes one of the approval bodies under the Convention concerning International Carriage by Rail (COTIF). ◆

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SAHA Istanbul Companies Seek to Take Part in F-35 Maintenance


© SAHA Istanbul

A delegation from the Joint Programme Office (JPO), the administrative office of the F-35 project, met with officials from the Istanbul Defence and Aerospace Cluster Association (SAHA Istanbul) on December 1 at THY Technic's facilities. During the meeting, which was also attended by representatives from the Undersecretariat for Defence Industries, discussions were held concerning the potential contributions of SAHA Istanbul companies to the maintenance and overhaul of various F-35 components and subsystems throughout the aircraft's life cycle.

Commenting on the meeting, İlhami Keleş, Secretary General of SAHA Istanbul, said that companies in the cluster were willing to carry out, under the coordination of the SSM, the necessary activities to join the project. Highlighting that the member companies needed to speed up their works on standardisation in order to take part in the project, Keleş said:

"Our members need to raise their qualifications to the levels [expected] by global suppliers. This requirement constitutes an important threshold for our involvement in international projects. With the support of the state, we are conducting projects to remedy any shortcomings our companies may have in this regard."

Keleş stressed that SAHA Istanbul companies would be able to achieve a certain level of progress with regards to standardisation by the second half of 2018, and that they will likely complete such preparations by the time they participate in the SAHA EXPO Defence and Aerospace Industry Exhibition, which SAHA Istanbul will hold between September 13 and 15, 2018, in Istanbul. ◆


Prof. Dr. Mahmut Faruk Akşit


Mustafa Şeker


Özden Apaydın

TEI Begins to Shape Ecosystem for Turboshaft Engine Production

As the prime contractor in the Turboshaft Engine Development (TED) project of the Undersecretariat for Defence Industries (SSM), TEI held a Turboshaft Engine Subsystems Workshop in Eskişehir between December 18 and 19, bringing together current and potential suppliers. During the event, which was attended by 550 participants from 250 companies, information was shared on the current status of the TS1400, Turkey's first indigenous turboshaft engine.

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The TED project was launched with the goal of developing an engine for the Helicopter Development Program being conducted by the SSM. The contract for the prime contractor role was signed between the SSM and TEI on March 8, 2017, and the project is expected to last for a period of eight years, including the certification processes and procedures. The first stage of the project envisaged the development of what is defined as the core engine within a period of two years – a task that TEI completed in less than a year.

Paving the Way for Other Turbine Engines

The project output will be a 1,400 shaft horsepower (shp) engine. Capable of revolving it's main shaft at velocities up to 23,000 rotations per minute, the engine will be able to operate at a maximum altitude of 20,000 ft. Other highlighted technical characteristics of the engine are listed as follows:

- Two-layer radial compressor, manufactured from forged titanium,
- Thermal barrier coated (TBC) reverse-flow combustion chambers,
- Compressor turbine with single crystal cast blades,
- Two-layer axial power turbine with uncooled blades.

The TED project also aims to achieve the following:

- To establish testing infrastructure for use in development projects for gas turbines of up to 2,000 horsepower,
- To create a material database for engines,
- To strengthen the domestic subsidiary industry,
- To develop design and testing software, and
- To acquire engine certification experience.

The engine to be designed – as well as the variants to be developed later on and the new engines that will utilise its main components or technology – will be used in such platforms as the T129 ATAK, HÜRJET, TF-X and various unmanned aerial vehicles (UAVs).

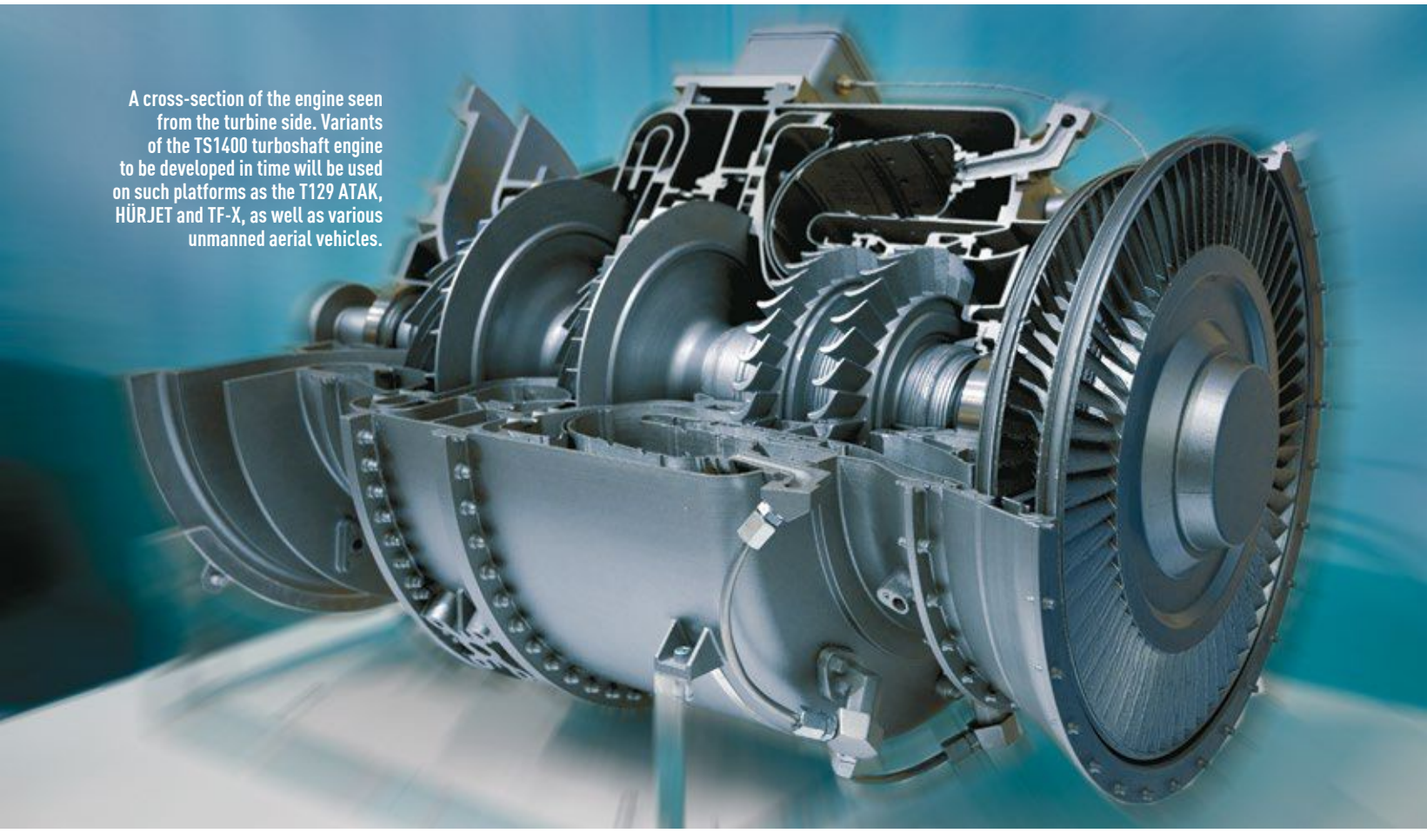
A Gathering of Skills

Held with a view to discussing the domestic procurement of the necessary subsystems for the TED project, the workshop was organised under the SSM's auspices with the support of Erciyes Teknopark, Teknopark Istanbul, the Eskişehir Chamber of Commerce and the Eskişehir Chamber of Industry. On the first day of the workshop, a number of presentations were made by officials of TEI and the SSM.

The second day of the event was cleared for comprehensive communication and networking activities by companies interested in the project, with TEI holding a total of 170 meetings with attending companies. Nearly 200 companies also held one-to-one meetings with each other. The main topics of the meetings were engine subsystems, digital control systems, testing, technology acquisition, manufacturing and special processes.

TEI Wants to Raise Subcontractors to the Next Level

Delivering the opening speech of the workshop, Dr. Mahmut Faruk Akşit, President and CEO of TEI, summarised the workshop's goal as follows: "We need everyone in Turkey who can



A cross-section of the engine seen from the turbine side. Variants of the TS1400 turboshaft engine to be developed in time will be used on such platforms as the T129 ATAK, HÜRJET and TF-X, as well as various unmanned aerial vehicles.

give us a hand and their support in this task, otherwise we'll have to make [the necessary subsystems] on our own or purchase them from abroad. The purpose of this workshop is to ensure that every subsystem to be used on the engine is made using Turkey's own capabilities – with Turkey's intellectual potential and the sweat and efforts of our industrialists."

Speaking on TEI's industrialisation policies, Prof. Dr. Akşit repeated a point that he has often mentioned in similar events: "It's true that we're the prime contractor of this engine. Developing the engine's core technologies is our responsibility, and that's precisely what we're doing. However, there are also plenty of subsystems we need to have on the engine... I have said on previous occasions that we want to take our subsidiary industry to the next level, from a position in which they are just carrying out machining works or hourly works, to a position where they can produce, design and develop technology and subsystems. Today is that day; the day that I fulfil this promise. A tremendous amount of work is waiting to be done for the engine, on parts such as its cables, connectors, turbines, pipes, start switch system, starter, alternator, pumps and small gearboxes. I especially want to involve in these works, to the maximum extent possible, the industrialists who are present here today with us in this hall."

TEI's Incentives

Prof. Dr. Akşit went on to note that TEI will be providing various forms of support and incentives to companies willing to take part in the project: "If you work [on this project] and launch activities to have these systems built in Turkey, there will be a share of responsibility that you will have to shoulder. But we'll be supporting you along the way. Firstly, we'll be the ones covering the payments for the project. Secondly, I personally promise we'll give you the support [you need]. Once you reach a sufficient level of maturity, we'll be giving all forms of support to make sure you can receive certificates, and even provide training. There is something that I can mention with a sense of pride, which is that, as of October 2017, TEI is the company with the most NADCAP approved and certified special processing capabilities in the world. We're number one in the world in this regard, and you have helped us to achieve this. Working together, we can make our country number one in the world."

TEI Makes Offer for TF-X

Prof. Dr. Akşit also announced a new development that is likely to further motivate the subcontractors who are willing to take part in the project: "Right after this project, we've an even larger one in the pipeline. Last Friday, we've made our offer for the engine of the national combat aircraft (TF-X)... The bidding process is of course ongoing, but if we win this tender, the companies that have worked with us to develop the turboshaft engine will, as their next assignment, have the chance to work immediately on an even larger project."

Gas Turbine Ecosystem Takes Shape

The next speaker at the event was Mustafa Murat Şeker, Deputy Undersecretary for Defence Industries, who underlined that there are various problem areas with regards to engine development in many different defence and aerospace projects. Highlighting that there are various clusters in Turkey that revolve around certain prime contractors, Şeker signalled the possibility of a new cluster taking shape around TEI: "We want to form an ecosystem, or a similar system, that is centred around TEI, and to then grow together with this ecosystem. As is the case with all platforms, the goal here when making engines isn't to obtain every part from outside and combine them. Our main goal when making this engine is to build everything here – from the exhaust system inside to the fuel and oiling systems, and from the digital control system to the gearbox – such that we own the engine 100 percent."

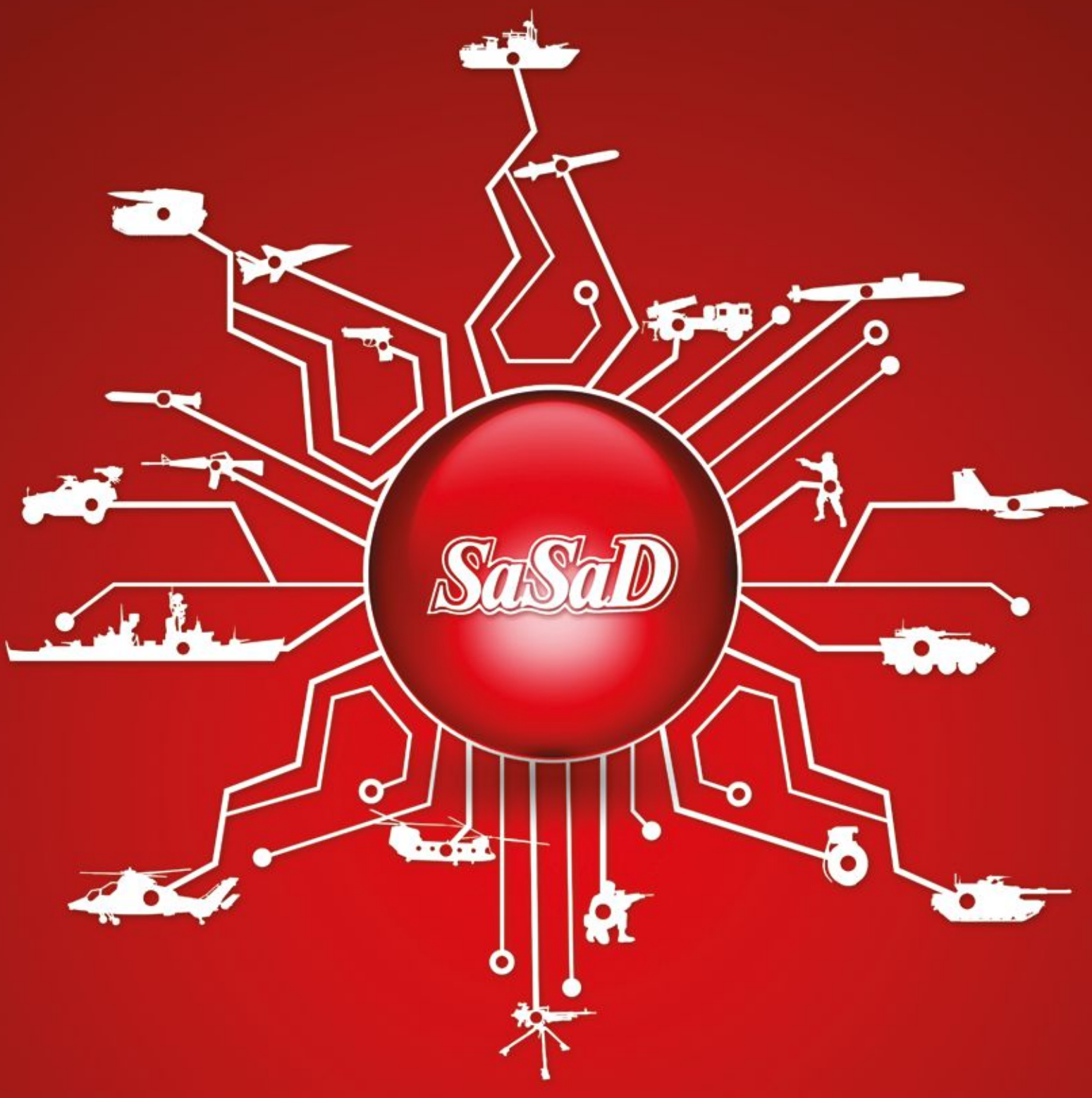
Şeker also emphasised the workshop's contributions to the ecosystem: "In our country, we generally have difficulty in bringing the right people together. The specific skills [you may need] are available, somewhere; but when you're working on a task, you're generally not aware of them. That's why these types of environments create an opportunity for everyone. Here, TEI will describe and lay out what they expect, while the participants here will explain what they're capable of."

A Four-Stage Project

Özden Apaydın, Director of Electronic Subsystems at the SSM, shared information about the different stages of the projects: "The project consists of four main stages, with each stage resulting in a separate [type of] engine. The resulting engines will undergo constant improvement, and the by the fifth year, we'll have a final engine. After the fifth year, we'll start working on certification activities. Our project can actually be thought of as a spiralling cycle – it's constantly turning, producing numerous engines at each stage and turn."

Apaydın went on to describe how the SSM is supporting the TED project: "Components such as the digital control system, accessories and gearbox, and issues such as technology acquisition, are areas in which we plan to prioritise investments and development efforts. But aside from these, will there be other special areas [that we might focus on]? Yes; and as the SSM, we'll support them as well."

Following the opening session, the proceedings continued behind closed doors. ◆



DEFENSE AND AEROSPACE INDUSTRY MANUFACTURERS ASSOCIATION

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SSM's Industrialisation Efforts to Continue Full Speed in 2018

At the 35th meeting of the TOBB Turkish Defence Industry Assembly, Prof. Dr. İsmail Demir, Undersecretary for Defence Industries, Dr. Celal Sami Tüfekçi, Deputy Undersecretary for Defence Industries, and Bilal Aktaş, Head of the SSM Industrialisation Department, informed the industry about the activities SSM will perform in 2018 with regards to industrialisation. In line with its strategic targets, the SSM is preparing to implement a set of policies to form a defence and aerospace industry that can develop indigenous solutions down to the level of sub-components and materials.

Working to establish a competent and sustainable defence and aerospace industry, the Undersecretariat for Defence Industries (SSM) will pursue its current policies with determination in 2018, while also launching a new set of policies. Messages given during the 35th meeting of the Turkish Defence Industry Assembly, of the Union of Chambers and Commodity Exchanges of Turkey (TOBB), held important clues regarding this subject.

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The Current Situation

The industrialisation policy instruments the SSM is currently implementing, or which it has nearly completed preparing and will soon begin to implement, are listed as follows:

- Industrial participation and offset (IP/O)
- The Industrial Competency Evaluation and Support Programme (EYDEP)
- The SSM's incorporation/company-forming models
- Credits and supports
- Export supports
- R&D road map
- Technology management
- Researcher Training Programme for the Defence Industry (SAYP)

In EYDEP, which is one of these instruments, the training of the auditor team has been completed in December. The training programme that continued for six and a half months involved 110 auditors, and an average of 31 training days per participant. This team of auditors will be starting their activities following EYDEP's launch planned in early 2018. From EYDEP's standpoint, 2018 and 2019 will be more a period when the programme takes a general picture of the industry. A source of nearly ₺40 million have already been earmarked for the support to be provided under EYDEP.

On the IP/O front, current figures are as follows:

- Total IP/O obligations stand at $23.1 billion ($10 billion on local contractors)
- Of these obligations, $12.8 billion have already been realised (obligations realised by local contractors stand at $3 billion)
- The balance of IP/O obligations stands at $10.3 billion ($7 billion on local contractors)

New Sectoral Strategy Documents in the Works

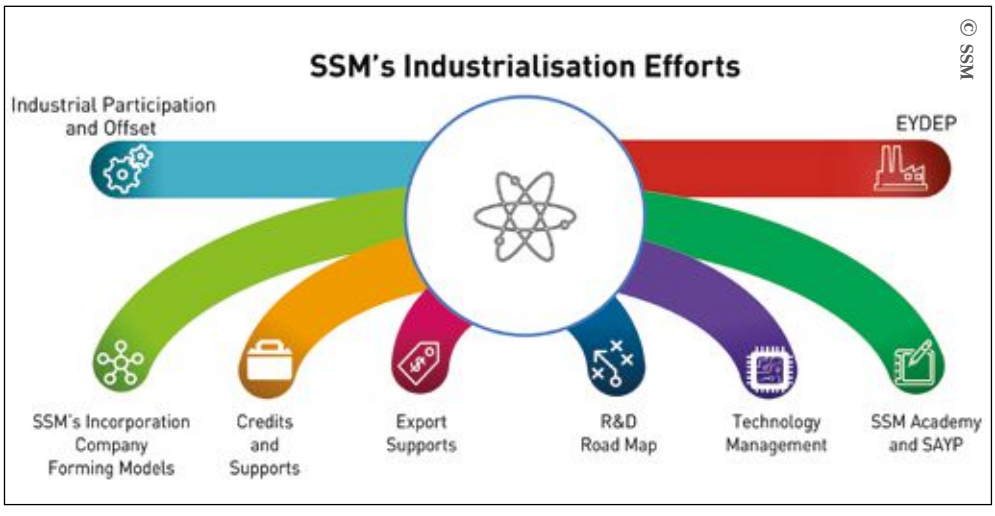
The 2018-2022 Defence Industry Sectoral Strategy Documents is expected to be published in early 2018. The main headings of this document will include:

1. Land Vehicles Sector Strategy
2. Naval Vehicles Sector Strategy
3. Air Vehicles Sector Strategy
   a. Aircraft Projects
   b. Helicopter Projects
4. Weapon Systems Sector Strategy
5. Air Defence and Space Sector Strategy
   a. Air Defence Projects
   b. Satellite and Space Projects
6. Unmanned and Smart Systems Sector Strategy
7. Electronic Systems Sector Strategy
   a. Communication, Electronics and Information Systems
   b. Cyber Security and Electronic Warfare Systems

The document will focus on two main topics:

- Defining the technology and subsystems to be acquired in the coming period, to ensure technology and subsystem ownership for a sustainable defence industry.
- Laying out future forecasts concerning the industry and determining the strategic targets for each subindustry, as well as the activities required to achieve them.

To achieve the strategic target of ensuring "technology and subsystem ownership for a sustainable defence industry,"



the following items will be included into the agenda, independently of the different sectors:

- First of all, the implementation of a domestic development model,
- Bringing to the industry the technologies which the country lacks and the subsystems that cannot be designed or produced domestically,
- The utilisation of domestically-acquired capabilities in ensuing projects, and
- Ensuring the involvement of domestic industry companies in new projects to be initiated.

The document will also cover sector-specific activities.

As part of a practice that will become more prominent in the coming period, each prime contractor will, in coordination with the SSM, be asked to select three subsystems, and then work to indigenise them together with a subcontractor. It will be ensured that each of these three subsystems is developed indigenously by a medium- or small-sized company. The intention is to thereby accelerate the pace at which industry companies become product owners.

Another novel practice will be regarding the IP/O Directive. The difference between Small and Medium-Sized Enterprises (SMEs) and the subsidiary industry will be removed from the document, thus paving the way for the allocation of a greater amount of works to SMEs, and for raising the share of design-related activities in the works they receive.

SSM Support to Incorporation in Critical Areas

In recent times, the SSM has taken a number of steps to promote the establishment of new companies focusing on specialised tasks:

- Through the SSTEK Defence Industry Technologies Inc., a company owned directly by the SSM, the Undersecretariat is joining partnerships for the development of high technology systems. These partnerships – some of which have already been established, while others are in the process of becoming established – include TRD Micro-Electronics Inc. (for photodetector production), Delta V Inc. (for development of hybrid fuel rocket technologies), TR Engine Power Systems Inc. (for development of design skills in engine technologies) and ULAK Communication Inc. (for production and marketing of the National base station).
- YİTAL Inc. was established for the critical production processes of semi-conductor technologies.
- Plans are also being made to have TRTEST Testing and Assessment Inc. work on the development of testing capabilities.

Exhibitions Candidate for Participation at National Level

The SSM announced the list of 2018 exhibitions to which participation is planned at a national level:

- **DIMDEX 2018** – *Doha – March 12 to 14*
- **DSA 2018** – *Kuala Lumpur – April 16 to 19*
- **KADEX 2018** – *Astana – May 23 to 26*
- **EUROSATORY 2018** – *Paris – June 11 to 15*
- **ADEX 2018** – *Baku – September 25 to 27*
- **Indo Defence 2018** – *Jakarta – November 7 to 10*
- **IDEAS 2018** – *Karachi – November 27 to 30*

Another area where the SSM is currently brainstorming is company mergers and acquisitions. There are discussions highlighting that, for companies willing to make an entry into the industry, there are various benefits associated with doing so by acquiring or merging with companies already operating in the industry. These benefits include the transfer of industry-related experience to the newly-formed company; the preservation of already-acquired capabilities; and eliminating the need to conduct activities for developing pre-existing capabilities once again.

Growing Diversity of R&D and Technology Management Activities

The SSM's R&D and technology management works are continuing on three main fronts:

- There is cooperation with universities through the SAYP. Number of universities and companies with which the SAYP protocol has been signed has reached 24 and 35, respectively. A total of 44 projects are being conducted.
- With the Technology Development Liability (TDL), various activities are being conducted within the scope of existing projects for the acquisition of new technologies.
- The SSM Wide Area R&D Programme (SAGA) paves the way for R&D studies, independently of the projects' agenda.

The transfer of all Ministry of National Defence (MND) R&D Projects to the SSM has been completed, which now enables the management of projects from a single centre. To initiate new R&D projects, the SSM makes use of the R&D panels it was handed over from MND. These panels are listed as follows:

1. Materials
2. Weapons and platforms
3. Sensor, electronic warfare and communication
4. Informatics
5. Human performance and soldier health
6. System analysis and research
7. Modelling and simulation
8. Systems, concepts and integration
9. Technology management

To date, the panels have gathered three times under the SSM's coordination, and taken the decision for the launch of 32 new projects. Presently, the SSM is conducting 123 R&D projects with a total budget in the region of $450 million. The Undersecretariat manages an annual R&D budget of □300 million.

The SSM is also working internally on the laying out of a technology taxonomy and inventory. Another study that is being carried out is an endeavour to bring together, under a single roof, all the academies that have been established by various companies of the industry.

For the coming period, the SSM plants to focus on the following technology areas as part of its R&D studies:

1. Autonomy and control
2. Advanced materials
3. Innovative platform and system concepts
4. Energy and propulsion
5. Sensors
6. Signal and image processing
7. Chemical, Biological, Radioactive and Nuclear (CBRN)
8. Electronic warfare
9. Explosive technologies
10. Communication
11. Informatics and cyber security ◆

Türksat is looking for Teknokent companies it can cooperate with not only in the field of information and communication technologies, but also in the field of satellite technologies.

Türksat Meets with Teknokent Companies

The first of the TEKNO B2B events organised by ICT Media, under the auspices of the Information and Communication Technologies Authority (ICTA) and with the support of the Ankara Chamber of Commerce, was held together with Türksat in Ankara on December 19. Having recently started to work on promoting the satellite industry' development through R&D and cooperative activities, in addition to its longstanding identity as one of the world's leading satellite operators, Türksat held important meetings with Teknokent companies during the event.

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As part of the first TEKNO B2B, Türksat shared its technology investment agenda with the Teknokent companies, which also found the opportunity to describe to Türksat officials their products and solutions that fall within the scope of this agenda. Türksat's agenda included the following projects:

- The National and Indigenous LIDAR and Panoramic Imaging Platform Project
- The National and Indigenous Geographic Information System Software Development Project
- Project for Determining Vehicle Tracking System Standards
- Satellite Software Modules Development Project
- Satellite Communication Terminal Subsystems Hardware Development Project
- Satellite Positioning Systems User Receiver Terminals Development Project
- Turnkey Enterprise Software Projects
- Information Technologies Technical Consultancy Services Project
- Software Development Project
- Product Development Project
- Project on After-Sales Product Procedures

Türksat Aims to Grow Together with Ecosystem

The first speech of the event's opening session was delivered by Cenk Şen, General Manager of TÜRKSAT, who described the importance they attach to cooperation: "We can keep up with the future only to the extent that we're able to equip ourselves, our company and our society with information and technology skills. That's why it is of critical importance for today's business leaders to review their business models, products and services, and to develop their innovative skills by building more effective relations with stakeholders in the ecosystem.

At Türksat, our work focuses on promoting innovation and entrepreneurship, in a manner that will contribute to increasing indigenousness within our areas of activity. This meeting is, in itself, an important indication of the

importance we place on this subject. I want to emphasise that we consider it very important to create such a platform, and to come up with an event that includes all stakeholders."

Continuing his speech, Şen summarised the range of solutions and services provided by Türksat, and said that their priority target for the coming three-year period is to increase their number of services with added value.

Indigenisation Move by BTK

Taking the stage after Şen, Dr. Ömer Fatih Sayan, President of the ICTA, highlighted the importance of the event: "Our goal is to take the products and applications developed by [Turkish] companies that see indigenous technology as the ultimate goal, and bring them together with licensed companies we call operators within the framework of a high-quality cooperation environment. We believe that we will thereby take an important step for increasing the ratio of indigenousness in information technologies."

In his speech, Dr. Sayan conveyed various information about the information and communication industry and Türksat's works. Dr. Sayan also touched on the Fourth Generation (4G/LTE) Communication Technologies (ULAK) Project conducted by the Undersecretariat for Defence Industries, with the ASELSAN, ARGELA and NETAŞ consortium as its contractor: "With the ULAK project, we gain an important bridgehead in terms of technology development and domestic production, while also asserting ourselves in the future of the mobile communication industry." To sustain this pace of development, the BTK has also brought indigenisation requirements in 4.5G authorisations. As such, companies will be required to perform a certain share of their network-related software and hardware investments on products certified as indigenous, at the ratios defined below based on the year of investment:

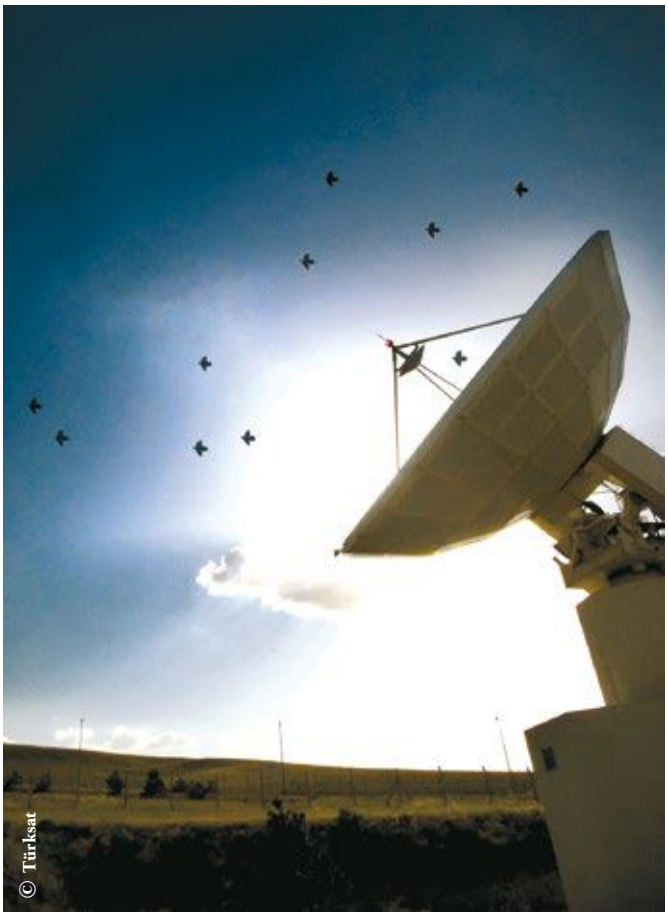
- At least 30 percent during the first year of the investment.
- At least 40 percent during the second year of the investment.
- At least 45 percent during the third and following years of the investment.

At least 10 percent of these investments will be covered with products produced by Small and Medium-Sized Enterprises (SMEs) in Turkey. The BTK also continues to work with universities and companies on creating an ecosystem for 5G technologies.

Dr. Gönül Speaks about Offset

The last speaker of the opening session was Dr. Vecdi Gönül, Chairman of the Board at Türksat. In his presentation entitled "Offset in the Development of the Turkish Industry – A Case Study: The Defence Industry", Dr. Gönül gave examples of offset practices in the world, and also shared with his audience examples illustrating the progress the Turkish defence industry has made with regards to these practices. Stating in the conclusion part of his presentation that "In parallel with practices around the world, offset should become mandatory in public procurements in all industries, so as to promote the development of the Turkish industry," Dr. Gönül emphasised that offset could become one of the driving forces for Turkey's industrialisation initiative.

Following the opening speeches, the event continued with meetings. During this part of the event, Türksat officials held one-to-one meetings with a total of 37 companies on 10 different areas. ◆



ASPİLSAN Energy's battery product family

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ASPİLSAN Energy Sheds Light to the Future of Cell and Battery Systems

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F20/40H1C type nickel-cadmium batteries produced by ASPİLSAN Energy, are compatible with UH-1H helicopters and C-160 aircraft.

At the very centre of Turkey's ecosystem for military grade batteries, ASPİLSAN Energy has further reiterated this position with the 2nd Workshop for Cell Technologies and Battery Systems used in Aviation, held in Kayseri between December 21 and 22. During the workshop, the company demonstrated once again its determination to become Turkey's preeminent authority in battery technologies for weapon systems, military platforms, aviation and robotics.

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The workshop brought together members of the ecosystem, including public institutions, universities and companies working on cell technologies, supercapacitors, energy storage systems, fuel cells, and aviation battery systems, to discuss the latest developments in these areas.

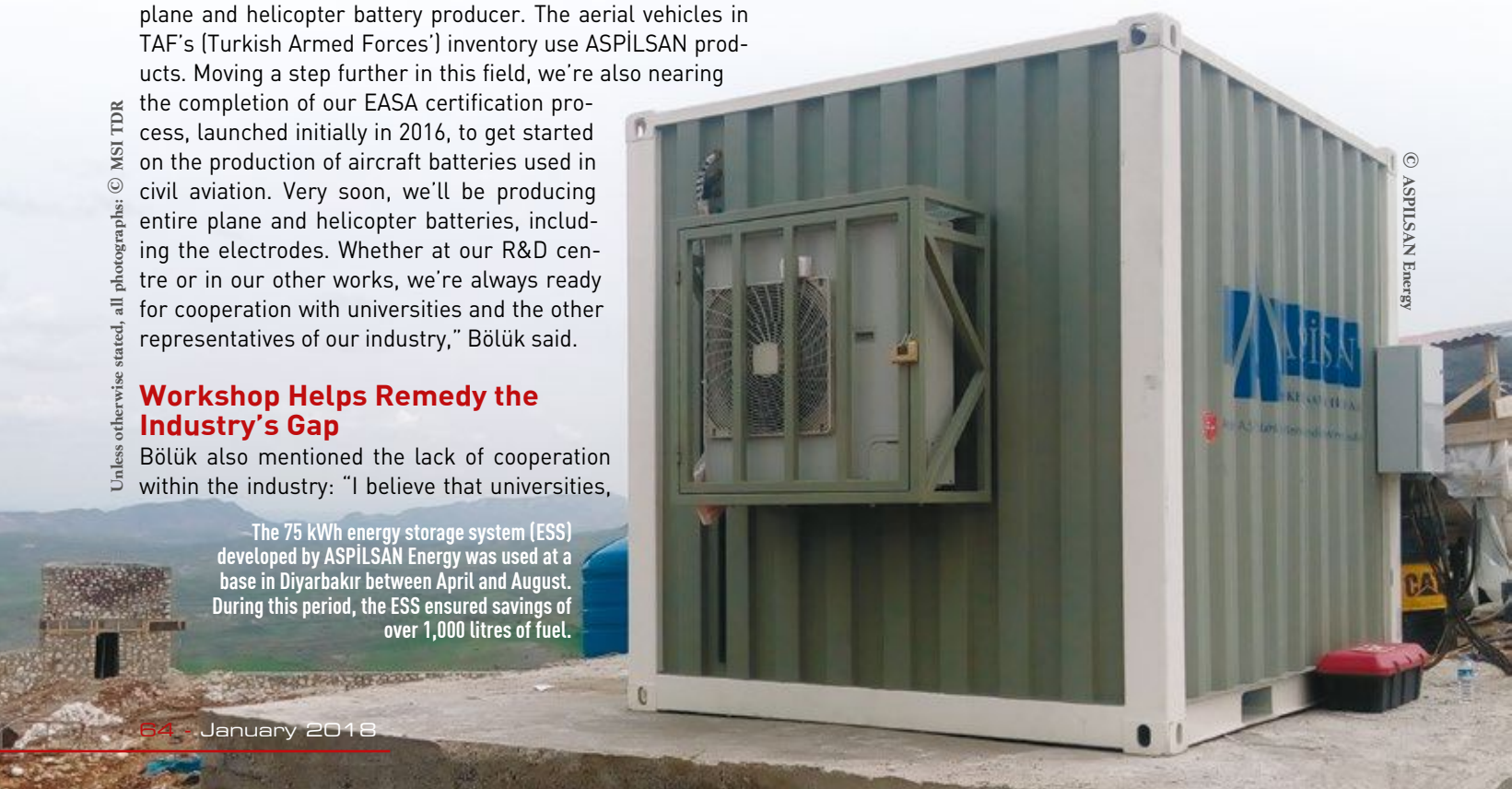
The workshop's opening speech was given by İlhan Bölük, Chairman of the Board at ASPİLSAN Energy, who stressed upon the gradually growing importance of energy storage systems: "Owing to the considerable incentives and supports provided by the state, there have been significant investments in wind and solar energy, and the decision has also been taken to initiate the production of a domestic vehicle. This vehicle will most likely be electrically-powered. In both areas, the subject of portable energy technologies is highly important. The most important part of an electric vehicle is its source of energy, namely its batteries. Moreover, the need for modern battery technologies in the defence industry is increasing with each passing day."

ASPİLSAN Energy: Turkey's Only Aircraft Battery Producer

Reminding to his audience of ASPİLSAN Energy's position within the industry, Bölük also mentioned their cooperative activities. "As you already know, ASPİLSAN Energy is Turkey's sole plane and helicopter battery producer. The aerial vehicles in TAF's (Turkish Armed Forces') inventory use ASPİLSAN products. Moving a step further in this field, we're also nearing the completion of our EASA certification process, launched initially in 2016, to get started on the production of aircraft batteries used in civil aviation. Very soon, we'll be producing entire plane and helicopter batteries, including the electrodes. Whether at our R&D centre or in our other works, we're always ready for cooperation with universities and the other representatives of our industry," Bölük said.

Workshop Helps Remedy the Industry's Gap

Bölük also mentioned the lack of cooperation within the industry: "I believe that universities, the business community and industry suffer from coordination issues, which results in a loss of work, effort and time for Turkey. In brief, I think that we're unable to create synergy. This is why I consider that this information-sharing platform, formed here with your contributions, will be of great benefit in terms of understanding the current technologies and trends in this field, and in shedding light on the works our country's researchers and industrialists may conduct in the future."



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The 75 kWh energy storage system (ESS) developed by ASPİLSAN Energy was used at a base in Diyarbakır between April and August. During this period, the ESS ensured savings of over 1,000 litres of fuel.


İlhan Bölük

Trends in Cell Technologies

The workshop began after Bölük's speech, lasting for two days and featuring 24 presentations. The most discussed topics during the workshop were as follows:

- Features such as silent operation, the reduction of thermal signatures and ease of concealment in the battlefield will keep electrically-driven systems in the spotlight for military platforms.
- Owing to their low-weight and high energy density, the use of lithium ion cells is also becoming increasingly prevalent in aviation.
- For lithium ion batteries, there is a broad choice of alternative materials that can be chosen for the anodes and cathodes. It is important to select the optimum materials for the platform in question, taking into account parameters such as energy density, safety, reliability, lifespan, and sensitivity to environmental conditions.
- Reliability is a key factor in batteries for military purposes, just as safety is a key factor in batteries for aviation.
- Electric and hybrid vehicles are also becoming more widespread, and the effective use of these vehicles is directly related and proportional to the development in cell and battery technologies.

ASPİLSAN Energy Shares Its Experiences

During the workshop, presentations were given by ASPİLSAN Energy employees, including Ahmet Altınay, R&D Manager; Şule Hüsrevoğlu, Quality and Certification Manager; and Taner Çarkıt and Mehmet Erciyes, R&D Engineers. In these presentations, they shared their knowledge and experiences in new cell technologies, energy storage systems, battery design parameters and the certification processes of batteries used in aviation. Furthermore, they also briefed their audience about the company's recent activities in these areas.

ASPİLSAN Energy's On-the-Field Energy Storage Systems

Energy storage systems (ESS), which are also part of ASPİLSAN Energy's product family, generally refer, as their name implies, to large-scale batteries that enable the storage of energy - or electricity, given that this is what was meant by the word energy throughout the workshop. The importance of ESS is becoming clearer as the use of renewable energy sources becomes more prevalent. Meteorological events, such the position of the sun in the sky, can cause fluctuations in electricity generation levels from these sources during the day. EES, however, will store energy during times of higher electric production, and provide this electricity to the user during times of lower production. Similarly, it also enables storage of electricity during hours when grid electricity costs less, for use at later times, thus ensuring cost-savings.

ASPİLSAN Energy has developed various energy storage solutions, ranging from 3.5 kilowatt-hours (kWh) to 1 megawatt-hours (mWh). The dimensions of these systems varies between 135 cm and 40 feet, while their weight range from 110 kg to 29,700 kg. The company's 10, 20 and 40-foot large solutions are produced in accordance with international container standards. Some of these systems have been tested at a base in Diyarbakır between April and August in 2017; and, since there was no need to use the generators during this period, these systems ensured savings of somewhere between 1,000 to 1,200 litres of fuel. A similar system is in use at a base in Şırnak.

ASPİLSAN Energy Grows by Investing in Ankara

ASPİLSAN Energy is making significant R&D investments. Company's R&D Centre in Kayseri, which became operational in early 2017. The company has also taken the decision to open a design centre in Ankara. The centre, which is expected to commence operations in March 2018, will conduct laboratory, prototype and testing studies on cell, battery and energy technologies; these studies will range between level one and seven in terms of technological maturity. The company is also working on the following R&D projects:

- Design Work for Smart Battery Cabin Capable of Charging and Maintenance under Military Field Conditions (KANGURU),


Ahmet Altınay


Şule Hüsrevoğlu


Mehmet Erciyes


Taner Çarkıt


Prof. Dr. Şaban Patat


Assoc. Prof. Dr. Rezan Demir Çakan


Ahmet Göçmez


Prof. Dr. Hasan Göçmez

- Electrode Production for Nickel-Cadmium Batteries used in Aircraft Batteries,
- Development of Battery and Energy Management Systems Responsive to Performance Parameters, for Electric and Hybrid Vehicles,
- Fibre Electrode Development for Nickel-Cadmium Batteries,
- Development of PEM Fuel Cell that Operates with Alcohol, for Use in Military Applications,
- Sodium-Ion Power Cell Development.

TÜBİTAK is providing support for the first two of these projects, while for the others, applications for TÜBİTAK support are in the process of being submitted.

ASPİLSAN Energy Ready to Receive EASA Certification

ASPİLSAN Energy's experience in the certification processes for aviation batteries were shared with the workshop's participants. ASPİLSAN Energy's EASA certification process began with their application on January 2016, and the company is expecting to be granted Design Organisations Approval (DOA) and Production Organisations Approval (POA) in April 2018, and to pass the European Technical Standard Orders (ETSO) tests for some of its products. Şule Hüsrevoğlu, Quality and Certification Manager at ASPİLSAN Energy, summarised the company's knowledge in this area, as well as their motivation behind sharing this knowledge with the rest of the industry: "ASPİLSAN Energy is ready to share its knowledge in this area with the aviation industry, and, with its determination to rank among trailblazing organisations, our company aims to open new horizons for Turkey in the 21st century. We are ready to provide the necessary support to any company in the aviation industry that is entering into certification processes."

The Rise of Sodium Ion Cells

During the workshop, which continued for two days without losing pace, the other speakers and the subjects they covered were as follows:

- **Prof. Dr. Şaban Patat, Faculty Member at Erciyes University**, spoke about the advantages sodium ion cells offer over lithium ion cells. These advantages can be listed as follows:
  - Compared to lithium, sodium is far more readily available on earth, and purchasing costs are correspondingly much lower.
  - Production procedures for sodium ion cells are similar to those for lithium ion cells, meaning that the former can be produced using the same infrastructure.
  - Sodium ion cells have similar characteristics to lithium ion cells in terms of energy density, power density and shelf-life.
  - Sodium ion cells have higher thermal stability and are safer to transport.


Prof. Dr. Halime Ömür Paksoy


Prof. Dr. Özgül Keleş


Prof. Dr. Kadri Aydınol


Prof. Dr. Hatem Akbulut


Prof. Dr. Tayfur Öztürk


Dr. Türev Sarıkurt


Assoc. Prof. Dr. Muhsin Mazman


Prof. Dr. Raşit Turan

- **Assoc. Prof. Dr. Rezan Demir Çakan, Faculty Member at Gebze Technical University**, listed the advantages of lithium sulphur batteries as high theoretical capacity, high energy density, low cost and ability to operate at room temperatures. She continued by describing the problems encountered in the use of these types of batteries.
- **Ahmet Göçmez, Deputy Director at the TÜBİTAK Defence Industries Research and Development Institute (SAGE)**, spoke about thermal battery technologies and their military use. These batteries, which TÜBİTAK SAGE can produce, are subject to various regulatory restrictions and high costs when purchased from abroad. These non-rechargeable batteries are characterised by long shelf-lives, high power density, high reliability and resistance to harsh environmental conditions, which is why they are preferred for systems that are used one-time-only, such as in munitions and ejection seats.
- **Prof. Dr. Hasan Göçmez, Faculty Member at Dumlupınar University**, gave a presentation on reserve cell technologies and lithium oxyhalide cells.
- **Prof. Dr. Halime Ömür Paksoy, Faculty Member at Çukurova University**, said that the excess heat generated by batteries could be disposed of using phase-change materials (PCMs), and then shared details regarding the design of these materials.
- **Prof. Dr. Özgül Keleş, Faculty Member at Istanbul Technical University (İTÜ)**, said that the thin film technology used in lithium ion cells will become more important in the future, and described İTÜ's studies in this area.
- **Prof. Dr. Kadri Aydınol, Faculty Member at the Middle East Technical University (METU)**, explained that while silver-oxide-zinc batteries have high energy and power density, their costs are also high, which is why they are used mainly as training batteries for torpedoes.
- **Prof. Dr. Hatem Akbulut, Faculty Member at Sakarya University**, spoke about energy storage techniques, and described his university's studies into electro-chemical energy storage. He also drew comparisons between the different methods used in this field.
- **Prof. Dr. Tayfur Öztürk, Faculty Member at METU**, described the low-cost solutions used in the storage of grid energy, as well as the current trends in this area.
- **Dr. Türev Sarıkurt, Lead Senior Researcher at the TÜBİTAK Marmara Research Centre (MAM)**, gave a presentation on battery management systems (BMS), and spoke about the methods used to balance cell potentials in batteries. He also mentioned how differences in cell potentials can have negative effects, such as reductions in battery life and capacity.
- **Assoc. Prof. Dr. Muhsin Mazman, R&D Centre, New Technologies and Laboratories Manager at Mutlu Akü**, discussed battery technologies in electric vehicles, and emphasised that for Turkey, producing electric vehicles has become an obligation rather than just an option.
- **Prof. Dr. Raşit Turan, Director of the METU Centre for Solar Energy Research and Applications (GÜNAM)**, described the rising and advancing technologies for electricity production from solar energy, as well as GÜNAM's works in this area.
- **Mustafa Can Altungüneş, Senior Design Leader at ASELSAN**, described ASELSAN's current studies into the energy storage systems required in the field of transportation.
- **Murat Başaran, Expert Engineer at ASELSAN**, emphasised that batteries are also important and necessary in situations where large temporary loads are placed on the electric generation systems of a vehicle, such as turret movements in armoured vehicles.


Mustafa Can Altungüneş


Murat Başaran


Assoc. Prof. Dr. Seden Beyhan


Levent Yıldırım


Serkan Kobak


Assoc. Prof. Dr. Hüsnü Emrah Ünalan


Assoc. Prof. Dr. Davut Uzun


Porf. Dr. Gülfeza Kardaş

- **Assoc. Prof. Dr. Seden Beyhan, Faculty Member at İTÜ**, listed the advantages of proton exchange membrane (PEM)-type fuel cells as high efficiency, silent operation, modularity, resistance, safety, and ability to recycle waste heat. She stated that these systems can be used in many military areas.
- **Levent Yıldırım, Design Engineer at TAI**, described the battery requirements that arise in aircraft design, and reminded that the F-22, F-35, A380 and Boeing 787 aircraft all use lithium ion batteries.
- **Serkan Kobak, Director of Maintenance and Operations at Turkish Technic**, listed the types of batteries used in the aircraft in THY's inventory, which include nickel-cadmium, fibre-nickel-cadmium, lead-acid and lithium ion batteries. He went on to describe the maintenance processes that Turkish Technic applies for these batteries.
- **Assoc. Prof. Dr. Hüsnü Emrah Ünalan, Faculty Member at METU**, explained that supercapacitors have high specific power, which enables them to rapidly discharge the energy they store; however, he also noted that they have low specific energy, which limits their storage capacities. He went on to highlight that supercapacitors can ensure significant savings when used in systems that require very large amounts of energy for very short times, such as cranes.
- **Assoc. Prof. Dr. Davut Uzun, Expert Researcher at TÜBİTAK MAM**, noted that batteries used in commercial airlines designed during the 1980s had between 200 to 300 kVA power, while the same type of aircraft developed in the 2010s now use batteries with nearly 1,000 kVA power. He spoke also about the safety tests applied to lithium ion batteries.
- **Prof. Dr. Gülfeza Kardaş, Faculty Member at Çukurova University**, gave a presentation on the use of nickel-cadmium batteries in aviation, and mentioned the factors that need to be considered when designing these types of batteries.

Through lengthy question and answer sessions, the workshop promoted interaction between the participants and the speakers. Taking part for the entire two-day event, Ferhat Özsoy, General Manager of ASPİLSAN Energy, brought different perspectives to the subjects being discussed through the questions he asked.

The workshop ended following the presentations, and a questionnaire was passed to the participants, the feedback and responses to which ASPİLSAN Energy will consider when designing its next workshop. Planned to be held for the third time in the upcoming period, it is said that concurrent sessions in parallel halls may be organised at the event depending on the level of demand. ◆

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Ferhat ÖZSOY, General Manager of ASPİLSAN Energy: "We'll become a company that not only engages in production through the use of current technologies, but also one that guides the industry with its knowledge and experience."

During the workshop, we had the opportunity to hold a brief interview with Ferhat Özsoy, General Manager of ASPİLSAN Energy, and discussed with him both the event and the company's vision, which sheds much light on the future.

MSI TDR: How did the idea of organising such an event come about?

Ferhat ÖZSOY: With this workshop, which we are organising this year for the second time, our aim was to bring together all stakeholders of the ecosystem – namely the universities, institutes and scientific organisations working on battery and power cells, as well as the companies and the Turkish Armed Forces. Our idea was to create a platform on which we could discuss developments in this field on a national level, and motivate the people who will conduct R&D studies with a view to meeting Turkey's requirements. The event is being attended by many academics and companies, and from the presentations being given by our esteemed academics, we see that they are all working on important studies that we believe should be shared with industry. ASPİLSAN Energy is the only company capable, at corporate level, to create such synergy, and I can say that it was only natural for us to assume this task. I hope that in the coming period, we'll be able to see from these workshops how much ground our country has covered in the studies pertaining to this field.

MSI TDR: As far as we've seen, we have the main players in the industry taking part in the workshop, even those who aren't cell or battery producers. Some of them are even giving presentations. How should we interpret this picture?

Ferhat ÖZSOY: Yes, as you've said, we have the prime contractors present here, such as ASELSAN, TAI, ROKETSAN, HAVELSAN and İŞBİR. We also have many representatives from SMEs (Small- and Medium-Sized Enterprises). So in a way, at this event, we're including every level of the industrial pyramid. What we wanted at this event was not only to discuss developments and novelties in the industry from an academic perspective, but also for companies to express themselves and their requests. Our goal was to bring companies and academics under the same roof by creating a platform that breaks down walls and is conducive to strong communication.

In this way, companies will become aware of the studies being conducted in universities, while our academics will learn about the requirements of companies. This is an environment in which new collaborations can be formed, and I even believe that this workshop could result in four or five new TÜBİTAK projects. In this way, we are acting as a bridge between basic sciences and industry.

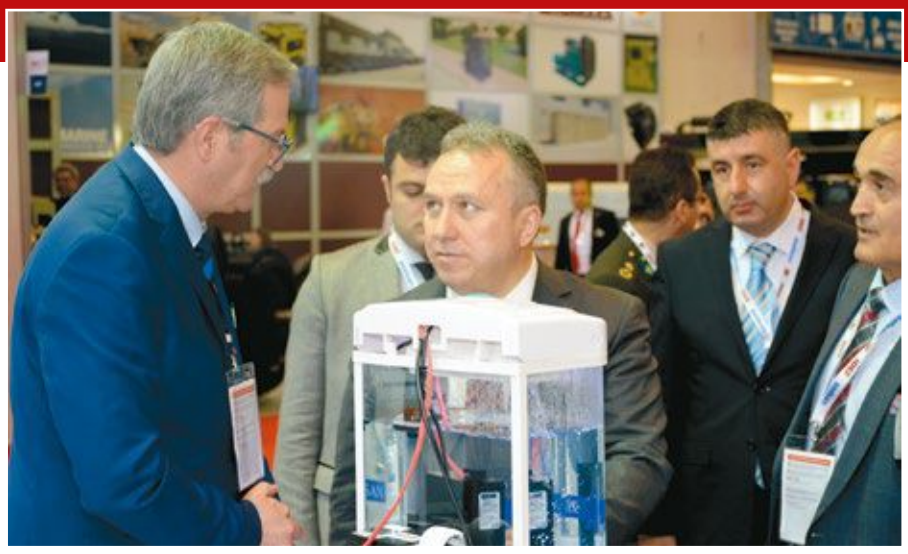
MSI TDR: The time given to the speakers, as well as the question and answer sessions in the workshop, were quite satisfactory. This is something we don't always see in similar events. Is this something you specifically aimed for?

Ferhat ÖZSOY: As a matter of fact, we did. One of our aims here was to increase the exchange of ideas; in other words, the level of interaction [the audience could engage] with the speakers through their questions. When we looked at the profile of the participants and their motivation to share their knowledge, we realised that, even though our workshop lasts for two days, not everybody would have the opportunity to speak. This is in part why the question and answer sessions were kept fairly long, as we wanted participants from every level of industry to share their views, knowledge and experiences. The industry is actually very large; and at this event, we're going over [every area of the industry] rather generally. We then organise smaller studies in which we try to develop specific projects. We're organising separate meetings for them.

MSI TDR: You pointed out that you'll also be working on basic sciences. Can you elaborate on this a little further?

Ferhat ÖZSOY: We're going to do our own R&D in this area, and use the information we acquire to come up with ready-to-use products for the end user. There is one vital link in the chain that is still missing in Turkey, and that is cell production. We'll work to remedy this gap, as right now, we have to obtain cells from abroad to make batteries [in Turkey]. We do have domestic products in this area, but our ultimate goal is to produce cells indigenously.

MSI TDR: Could you tell us about the ongoing activities at your R&D centre in Kayseri?



During IDEF'17, Ferhat Özsoy briefed Ali Fidan, Undersecretary of the Ministry of National Defence, about the BB-2590 type battery, displayed immersed in an aquarium full of water to illustrate that it is not affected by environmental conditions.

Ferhat ÖZSOY: This centre works on electro-chemistry, specifically on nickel. The main focus there is batteries. We've designed new ones this year. We've also caught a significant potential with these new products – a potential which we'll be increasing in the future. One of these products is our BB-2590 battery, which is actually a standard battery that is in use all around the world. However, we've managed to develop it domestically and indigenously, adding certain additional features on it. Right now, we're seeing very high demand for this battery, which I can say is the best of its kind in the world. We are even making a tremendous effort to meet the market's demand, and engage in substantial levels of production. This is a battery used in robotic systems, jammers and various UAVs. What makes it stand out is its energy density, and the fact that it is unaffected by environmental conditions. During IDEF 2017, we showcased this product immersed in an aquarium full of water. It was the year's most important product.

MSI TDR: What other activities are you engaged in at product level?

Ferhat ÖZSOY: We have a new product that is currently undergoing testing, and we will be making an announcement regarding this in the upcoming period before launching it to the world with a name of our choosing. This will be an important step for us in terms of becoming a brand. We've also designed and provided batteries for companies manufacturing special household appliances. If we get good responses on that side, we'll be continuing in that market as well. In the meantime, we're also making various ventures into the medical market.

MSI TDR: There is news that you're establishing a design centre in Ankara. How will you shape this centre's activities?

Ferhat ÖZSOY: Our centre in Ankara will work primarily in the areas of electro-chemistry and materials, which will allow us to develop our indigenous cell. It will serve as a centre where all knowledge and know-how are all brought together under a single roof in coordination. One of the reasons we've chosen Ankara as a location is that it is the heart of the ecosystem, in terms of both the companies and universities. This will enable us to coordinate and engage in dialogue more rapidly with the people in the industry, and it will also allow us to identify needs and requirements in shorter periods of time. As you may also appreciate, with regards to the defence industry, the academia is a little more active in Ankara.

MSI TDR: Aside from these investments you've mentioned, you're also organising workshops such as the one today. Where do you expect this journey to take you?

Ferhat ÖZSOY: In Turkey, you have various organisations and companies, such as TÜBİTAK and ASELSAN, working on the area of batteries, to extent that meets their own requirements. However, we're the ones bringing together and merging all the knowledge and experience in this area in a single melting pot, and giving them shape. That's why we're ultimately aiming to become a centre of excellence in this field in Turkey. We'll become a company that not only engages in production through the use of current technologies, but also one that guides the industry with its knowledge and experience. That's how we have set our corporate vision, and have, to this end, placed growing emphasis on our works in the export and civilian side.

MSI TDR: Is there anything you would like to add?

Ferhat ÖZSOY: Today, Turkey's biggest issue is engines, which is something that everyone is talking about. This will change in time, however, as in technology, everything is going electric. That's why in every area from automobiles to space systems, we're seeing an extensive use of cells and batteries. We're also discussing robotic systems. From electric aircraft to renewable energy and the storage of solar energy, all of them ultimately revolve around the topic of the battery. That's why this subject is a top priority in our country. This is a requirement that will become relevant tomorrow; but to meet it, we'll have to start working today. There is a notable gap in this area that ASPİLSAN Energy is doing its best to fill.

On behalf of our readers, we would like to thank Ferhat Özsoy, General Manager of ASPİLSAN Energy, for taking the time to answer our questions and for providing us with valuable information.

© ASELSAN

The BB-2590 type lithium ion rechargeable battery is used on various different platforms, including ASELSAN's KAPLAN bomb disposal robot.

© ASPİLSAN Energy

ASPİLSAN Energy has added various indigenous and national components to the BB-2590 type battery.

Meteksan Defence Makes Ambitious Entry into Radar Altimeter Market

Having started development of a radar altimeter design in 2011, following a series of studies to meet domestic needs, and introducing the system after the successful completion of its qualification tests, Meteksan Defence has turned the design into a product family. The product family has seen considerable export success, and is now ready to meet the radar altimeter needs of various platforms of Turkish and international customers with challenging requirements.

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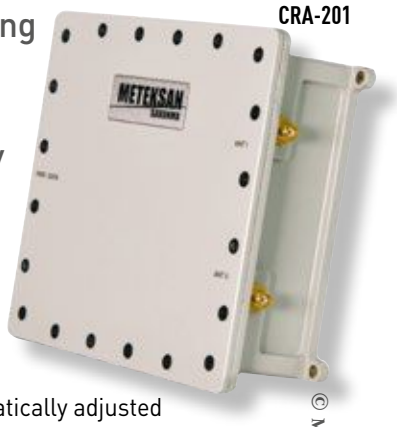
CRA-201



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From Initial Use to a Product Family

In 2011, Meteksan Defence was assigned the task of developing a radar altimeter. Using the technological know-how it had acquired in other projects, an interdisciplinary 10-person team first developed a product for unmanned platforms that passed both Meteksan Defence's development tests and the customer's qualification tests with great success. The radar altimeter effectively entered into use after the platform onto which it has been integrated made it into the inventory. Meteksan Defence thus joined the ranks of the select group of companies that develop and produce radar altimeters, including Honeywell, Rockwell Collins, Roke Manor and Smartmicro.

The company has also launched strategic and technology-based works to spread this success into other areas. Examining the radar altimeter market as well as future forecasts, Meteksan Defence determined that the said market is expected to grow worldwide in excess of 10 percent by 2019. Taking into account international trends as well as the requests of Turkish users, the company began shaping its product family, and made its launch in 2016.

KRA-201

© Meteksan Defence

Two Bands, Two Maximum Altitudes

Meteksan Defence's radar altimeter product family consists of the CRA and KRA series. The CRA series products operate in the C-band of the radio frequency spectrum, and are further subdivided among themselves depending on the maximum altitude in which they can carry out precise measurements. For the CRA-201 and CRA-501, these maximum altitude values are 2,500 ft and 5,000 ft, respectively.

KRA series products, on the other hand, operate in the K- band. The advantage offered by this band is that, owing to the physical features of the associated antenna, it can be integrated to the main unit of the radar altimeter, thus allowing the entire system to be packaged in a single Line Replaceable Unit (LRU).

The technical specifications of the entire product family are shown below, while the different features are listed in Table 1:

- Comprehensive Built-In-Test (BIT) capabilities
- Low Probability of Intercept (LPI)
- Broad Frequency Band
- Low Output Power
- Power control mechanism automatically adjusted according to altitude
- Resistance to ambient conditions, compatible with MIL-STD-810F
- EMI/EMC compatible with MIL-STD-461E

Currently, Meteksan Defence is offering and marketing this product family for use in unmanned platforms, such as unmanned aerial vehicles (UAVs) and missiles. If they are to be integrated into manned platforms, these products will have an additional certification process. Since the products contain no software, this certification process will be principally for its hardware. Although Meteksan Defence has completed all of its certification-related preparations, it is still waiting for the start of new projects in which this process has been included in the budget before going ahead with the certification process.

A Competitive Solution

For unmanned platforms, subunit characteristics such as size, weight, power and cost (SWaP-C) are of critical importance. The general preference is for subunits of the smallest volume, lowest weight and lowest power consumption, which enables platform designs capable of carrying maximum payload. Meteksan Defence has designed its radar altimeter family by taking these SWaP requirements into consideration, and as this design has been developed at a more recent time than its competitors, it also contains newer technologies.

Radar altimeters provide altitude data during critical stages of flight, such as landing and cruising at low altitudes, which is why sensitivity and reliability are both crucial. Meteksan Defence's solutions have been tested by both the company and its clients in different areas on land, including forests and urban areas, and also at sea. In all tests, the systems proved themselves capable of meeting and exceeding performance expectations.

The product family also stands out with its cost-effectiveness. Meteksan Defence emphasises that its altimeter solutions offer a significant cost advantage over its competitors around the world. It is also possible to further reduce the prices by increasing the number of units produced.

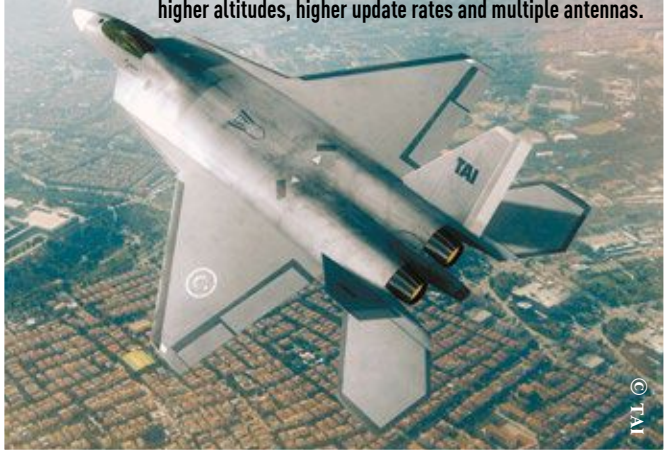
Meteksan Defence does not consider its business to be limited to the sale of radar altimeters, in that it also continues to provide support during the integration phase of the system onto the platform. The company has platform integration experience both on the radar altimeter and its other solutions, particularly the MİLDAR. Owing to the standard interface and a design that is compatible with the SWaP requirements of target plat-

forms, Meteksan Defence's product family requires effortless and straightforward integration work, almost as simple as plug and play systems. The numerous integration work Meteksan Defence has carried out with its customers is also evidence of these systems' ease of integration.

© Meteksan Defence

Laser altimeter prototype developed by Meteksan Defence.

Meteksan Defence's goals include providing radar altimeters to the National Combat Aircraft (TF-X), for which company officials have highlighted their readiness to devise a new altimeter with features such as data generation at higher altitudes, higher update rates and multiple antennas.



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Meteksan Defence: Looking to the Future

Meteksan Defence's radar altimeter product family has various members that have completed their qualification process and are serving commendably in the inventory. These products have, to date, been selected both by Turkish and foreign customers. With an already active radar altimeter production line, Meteksan Defence is able to make these products available at any time and to deliver at short notice.

In the area of radar altimeters, Meteksan Defence is also planning for the future, by considering the following activities for the further diversification and technical development of its product family:

- For different platforms that may enter the agenda, there is work being done on altimeters that are capable of operating at higher speeds. The technological infrastructure of the current design is suitable for this.
- Similarly, for different platforms, solutions with lower volumes and weights may also be developed.

Meteksan Defence has laid out the following road map in the field of radar altimeters:

- The Turkish Armed Forces' needs continue to remain the first and foremost priority. The goal is to make sure Meteksan Defence's radar altimeters are used on all new unmanned platforms to be developed and produced in Turkey. Meteksan Defence is also ready to do what is needed in case of any modernisation or indigenisation requirements for existing platforms.
- Another target on the road map is the certification for use on manned systems. Meteksan Defence's goals include providing radar altimeters for the National Combat Aircraft (TF-X). In this regard, company officials have highlighted their readiness to devise a new altimeter with features such as data generation at higher altitude, higher update rate and multiple antennas.
- Once it completes its works on civilian certification, Meteksan Defence will find new opportunities in the field of civil aviation.
- Meanwhile, Meteksan Defence continues to promote its solutions in the international markets. The company is meeting with unmanned aerial vehicle and missile producers where discussions of new cooperation opportunities are high on the agenda. ◆

The Laser Altimeter Waiting Its Turn

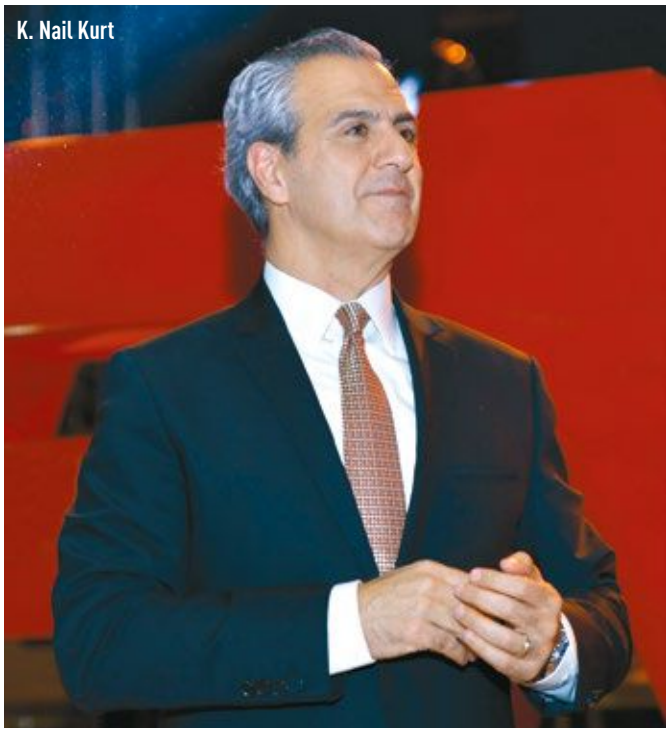
Laser altimeters are capable of more sensitive measurements than radar altimeters; however, they are affected by weather conditions such as fog and rain, and the maximum altitude at which they can make measurements is much lower. They are nevertheless used in various platforms in which sensitive measurements are important. Within the scope of its projects conducted in different areas, Meteksan Defence collaborates intensively with universities in the development of laser technologies. The company has carried the skills developed under these projects to the field of altimeters, and developed a laser altimeter prototype that has performed well in testing. The laser altimeter has not yet been turned into a product; but in the event of actual demand, Meteksan Defence is ready to rapidly convert this prototype into a product. As laser and radar altimeter technologies are very different, there is currently no company in the world that is producing both. Meteksan Defence is well suited to becoming such a company.

Table 1. Technical Specifications of Meteksan Defence's Radar Altimeter Product Family

	CRA-201	CRA-501	KRA-201
Operating frequency	4.3 GHz	4.3 GHz	24 GHz
Altitude	2,500 ft	5,000 ft	1,500 ft
Measurement Sensitivity	2 ft, or 2 percent	2 ft, or 2 percent	2 ft, or 2 percent
Update Rate (Maximum)	66 Hz	50 Hz	66 Hz
Antenna Beamwidth (nominal)	40° x 40°	40° x 40°	35° x 45°
Power Consumption (nominal)	11 W	16 W	12 W
Data Interface	RS422 or RS485	RS422 or RS485	RS422 or RS485
Antenna Interface	SMA(F)	SMA(F)	Integrated Antenna
Input Voltage	22 V – 32 V	22 V – 32 V	22 V – 32 V
Dimensions	171 x 111 x 20 mm	171 x 111 x 20 mm	150 x 125 x 53 mm
Weight	500 g (excluding antenna)	500 g (excluding antenna)	830 g

A Quarter Century at FNSS

FNSS held an event on December 23 in which it gave 66 of its employees a Seniority Award. At the event, awards were received by 15 employees who have completed 20 years of service at FNSS, as well as 51 employees who have been working for 25 years or more at the company. K. Nail Kurt, General Manager and CEO of FNSS, who has been with the company since its inception, was among those who received awards.



K. Nail Kurt

All photographs: © MSI TDR

Alper ÇALIK / a.calik@milscint.com
Vehbi TUNCA / v.tunca@milscint.com

The employees were presented with their awards by Kurt and Brent Butcher, Assistant General Manager of Defence Systems at FNSS, while Kurt's award was presented by Mehmet Sarıkaya, Head of the Welding Unit, who is one of FNSS' most senior employees.

Addressing the company's employees with a speech before the award ceremony, Kurt first gave an assessment of FNSS' performance in 2017: "We've have had a very successful year in the projects we undertook. I would like to thank each and every one of you for this," he said.

FNSS: Growing with Its Employees

Kurt continued: "Our [company] growth continued in 2017 as well, and we expect the same for 2018. Ahead of us, we face years that will be harder and more challenging, but at the same time more exciting than those we've left behind. Our colleagues who've recently joined us are adding to our strength."

After conveying to FNSS employees the thanks and appreciation of high-ranking Nurol Holding and BAE Systems officials, Kurt said: "We once again have a challenging year ahead, but I'm certain we'll overcome it, as we have in the past. I am confident that our high performance in 2017 and before will continue in the upcoming years, starting from 2018, and that you'll put maximum effort into ensuring this."

Kurt concluded his speech with a reminder of how FNSS had reached its current position: "In the time that has passed [since we first started], we've learned a lot. By the end of the 1980s, FNSS had become an essential part of the Turkish defence industry. We successfully completed the Armoured Combat Vehicle contract, which accounted for many ground-breaking firsts for the Undersecretariat for Defence Industries (SSM) and the industry as a whole. We delivered over 2,000 vehicles to our armed forces, and have, in the time since, continued to grow together."

FNSS Showcases Its R&D and Design Capabilities

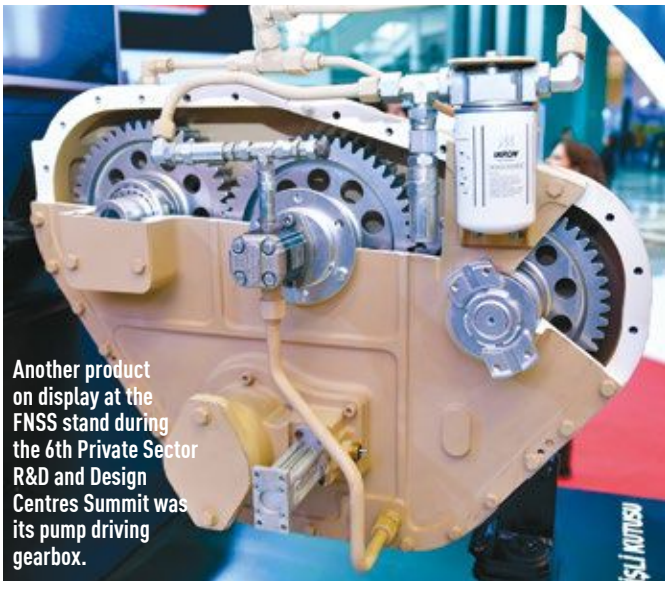
Another important event for FNSS in December was its participation in the 6th Private Sector R&D and Design Centres Summit, held in Ankara between December

At the event organised by FNSS, awards were received by 15 employees who had completed 20 years of service at FNSS, as well as 51 employees who have been working for 25 years or more at the company.

K. Nail Kurt receives his plaque from Mehmet Sarıkaya, one of FNSS' most senior employees.

20 and 21. Organised by the Ministry of Science, Industry and Technology, the company showcased at the event the transfer box and pump driving gearbox it has developed, and also introduced the various tracked and wheeled vehicles of its own design. ◆

At the 6th Private Sector R&D and Design Centres Summit, FNSS showcased its transfer box.



Another product on display at the FNSS stand during the 6th Private Sector R&D and Design Centres Summit was its pump driving gearbox.

Prepared by: Birol TEKİNCE / btekince@milscint.com

National Day of Romania

▶ The 99th Anniversary of Romania's National Day was celebrated at a reception held in Ankara on December 5. Accompanied by their spouses, His Excellency Gabriel Sopanda, the Ambassador of Romania to Turkey; Carmen Zamfirache, Minister Counsellor; and Lieutenant Colonel Iulian-Alin Done, Defence Attaché, greeted the guests as they arrived. The reception was attended by Ahmet Demircan, Minister of Health, and also by members of the Turkish Armed Forces, foreign diplomats serving in Turkey, and many other guests. In his speech, Ambassador Sopanda thanked the sponsors of the reception, which included Nurol Makina.

▲ H.E. Gabriel Sopanda, the Ambassador of Romania to Turkey; and Ahmet Demircan, Minister of Health cut the traditional cake.

Left to right: Ersoy Aksoy, Director, America and Europe Region of International Cooperation Department at SSM; Dr. Celal Sami Tüfekçi, Deputy Undersecretary for Defence Industries; Lieutenant Colonel Iulian-Alin Done, Defence Attaché of Romania

Lieutenant Colonel Iulian-Alin Done, Defence Attaché of Romania together with the AMAC and FALO members.

Bosnia and Herzegovina's Armed Forces Day

◄ The 12th Anniversary of the Bosnia and Herzegovina Armed Forces Day was celebrated in Ankara with a reception held on December 5. His Excellency Bakir Sadović, the Ambassador of Bosnia and Herzegovina to Turkey; and Colonel Dzemal Masinovic, the Military Attaché of Bosnia and Herzegovina, greeted the guests as they arrived. The reception was attended by General Hulusi Akar, Commander of the Turkish Armed Forces; Deputy Prime Minister Recep Akdağ; General Ümit Dündar, Deputy Chief of the Turkish General Staff; members of the Turkish Armed Forces; diplomats and foreign attachés serving in Ankara; students from Bosnia and Herzegovina studying at the Turkish Military Academy; and many other guests.

▲ H.E. Bakir Sadović, the Ambassador of Bosnia and Herzegovina to Turkey; Colonel Dzemal Masinovic, the Military Attaché; General Hulusi Akar, Commander of the Turkish Armed Forces; and Deputy Prime Minister Recep Akdağ cut the traditional cake.

▲ H.E. Bakir Sadović, the Ambassador of Bosnia and Herzegovina to Turkey; and Colonel Dzemal Masinovic, the Military Attaché, together with General Hulusi Akar, Commander of the Turkish Armed Forces; General Ümit Dündar, Deputy Chief of the Turkish General Staff; AMAC and FALO members.

National Day of the Republic of Kazakhstan

◄ The 26th Anniversary of the Republic of Kazakhstan and the 25th Anniversary of the relations between Turkey and Kazakhstan were celebrated with a reception held in Ankara on December 5. Accompanied by their spouses, His Excellency Abzal Saparbekuly, the Ambassador of the Republic of Kazakhstan to Turkey, and Colonel Almazbek Jetybayev, Military Attaché of Kazakhstan, greeted the guests as they arrived. The reception was attended by Deputy Prime Minister Hakan Çavuşoğlu; members of the Turkish Armed Forces; diplomats and foreign attachés serving in Ankara; and many other guests.


Deputy Prime Minister Hakan Çavuşoğlu

▼Colonel Almazbek Jetybayev, Military Attaché of Kazakhstan and Major Nurgali Sadyk, Deputy Military Attaché of the Republic of Kazakhstan together with the representatives of the Turkish Armed Forces; AMAC and FALO members as well as the Kazakh cadets studying in Turkey.

▼Left to right: Hakan Kabalar, Marketing Leader in Asia and Far East at ROKETSAN; Col. Almazbek Jetybayev, Military Attaché of Kazakhstan; Barbaros İzgün, Marketing Manager in Asia and Far East at ROKETSAN

▲ Left to right: Mustafa Kaval, Vice President of Defence Systems Technologies at ASELSAN; H.E. Abzal Saparbekuly, the Ambassador of the Republic of Kazakhstan to Turkey; Abdullah Erol Aydın, Head of Department of Logistics at SSM

Left to right: İsmail Bıkmaz, Vice President at SİMSOFT; Mrs. Yasemin Kaval; Mustafa Kaval, Vice President of Defence Systems Technologies at ASELSAN; Colonel Almazbek Jetybayev, Military Attaché of Kazakhstan; Abdullah Erol Aydın, Head of Department of Logistics at SSM; Özgür Özdemir, Naval and Simulator Logistics Project Manager at SSM; Kadir Temiz, Vice president at SİMSOFT

Finland's Independence Day

▲ The Centennial of Finland's Independence was celebrated in Ankara with a reception held on December 6. Accompanied by their spouses, Her Excellency Paivi Kairamo, the Ambassador of Finland to Turkey; Jussi Soini, Deputy Head of Mission; and Navy Captain Jyrki Litmanen, Defence Attaché, greeted the guests as they arrived. The reception was attended by İsmet Yılmaz, Minister of National Education, as well as by Turkish Armed Forces personnel, foreign diplomats and military attachés serving in Ankara, representatives of the Turkish defence industry, and members of the press.

◄ Left to right: İsmet Yılmaz, Minister of National Education; H.E. Paivi Kairamo, the Ambassador of Finland to Turkey

▲ Navy Captain Jyrki Litmanen, Defence Attaché and Lieutenant (Sr.Gr) Kari Juhani Keranen, Assistant Defence Attaché from Finland, together with the AMAC and FALO members.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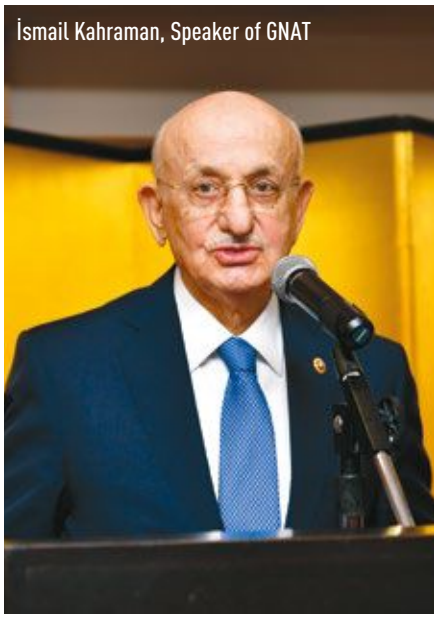
Ukraine Armed Forces Day

▶ Ukraine's Armed Forces Day was celebrated in Ankara with a reception held on December 14. Accompanied by their spouses, His Excellency Andrii Sybiha, the Ambassador of Ukraine to Turkey; and Colonel Viacheslav Latysh, the Defence and Air Attaché of Ukraine, greeted the guests as they arrived. The reception was attended by Refat Çubarov, the Chairman of the Mejlis of the Crimean Tatar People, members of the Turkish Armed Forces, diplomats and foreign attachés serving in Ankara, and many other guests. Ambassador Sybiha said that Ukraine is continuing to make extensive reforms to improve its Armed Forces, and that they are aiming to achieve the NATO standards by 2020.

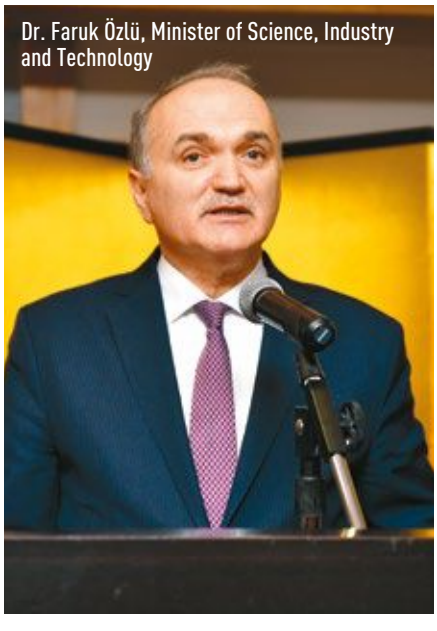
▼ Colonel Viacheslav Latysh, the Defence and Air Attaché of Ukraine; Lieutenant Colonel Yurii Kaliaiev, Army Attaché; and CDR Denys Shevchenko, Naval Attaché; together with AMAC and FALO members.

Colonel Viacheslav Latysh, the Defence and Air Attaché of Ukraine together with İbrahim Pamuk, Deputy General Manager at Vestel Defence and the staff of Vestel Defence and AYESAŞ.

İsmail Kahraman, Speaker of GNAT



Dr. Faruk Özlü, Minister of Science, Industry and Technology



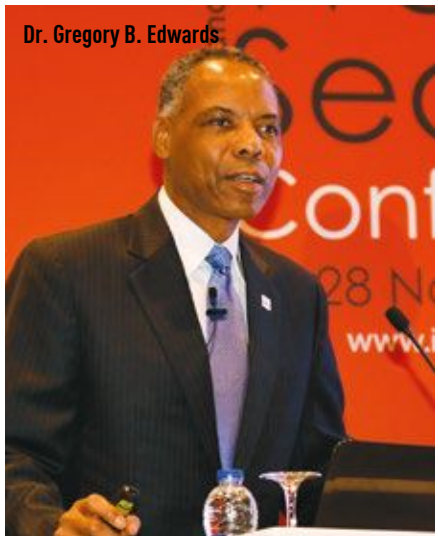
Japanese Emperor's Birthday

▲ Japanese Emperor Akihito's birthday was celebrated with a reception held at the Residence of the Embassy of Japan in Ankara on November 29. Accompanied by their spouses, His Excellency Akio Miyajima, the Ambassador of Japan to Turkey; Koichiro Nakamura, Minister Counselor at the Embassy of Japan; and Navy Captain Hiroyoshi Nakatsu, Defence Attaché of Japan, greeted the guests as they arrived. İsmail Kahraman, Speaker of GNAT; Dr. Faruk Özlü, Minister of Science, Industry and Technology; Şuay Alpay, Deputy Minister of National Defence, members of the Turkish Armed Forces, diplomats and foreign attachés serving in Ankara, and many other guests attended the reception.

▲ Navy Captain Hiroyoshi Nakatsu, Defence Attaché of Japan, and members of the Turkish Armed Forces together with AMAC and FALO members.


Dr. Ahmet Kılıç


Mustafa Şeker


Dr. Gregory B. Edwards

3rd International Cyber Warfare & Security Conference Heralds New Cyber Security Cluster

Defence Turkey Magazine was the organiser of the event, held under the auspices of the Undersecretariat for Defence Industries (SSM) and in coordination with TÜBİTAK BİLGEM. Also supporting the event were the Prime Ministry, the Ministry of Science, Industry and Technology, the Ministry of Development, the Ministry of Transport, Maritime Affairs and Communications, the Information and Communication Technologies Authority, and the Defence and Aerospace Industry Manufacturers Association (SaSaD).

The event's sponsors were as follows:

- **Gold Sponsors:** HAVELSAN and STM,
- **Silver Sponsor:** sayTEC,
- **Basic Sponsors:** ASELSAN, AYESAŞ, BAE Systems, BARİKAT, BİZNET Bilişim, CRYPTTECH, LEONARDO, NETAŞ, THALES, and VESTEL Defence. In addition to some of the sponsor companies, organisations such as ATAR, BİTES, CANOVATE, DIFOSE, GAIS, ISR, ICTERRA, Krontech, Logsign, Netsparker, Roksit, TRAPMINE, UITSEC, ULAK A.Ş. and ZEMANA also opened stands at the event.

The International Cyber Warfare & Security Conference (ICWC) was held in Ankara on November 27-28. This is the third year it has been organized. ***The conference was also the setting for a signing ceremony and an important announcement concerning the industry. This year's conference revolved around the theme of Strengthening the Cyber Security Ecosystem and Cyber Security Clustering, with international cooperation and indigenous solutions being the two most mentioned and repeated concepts throughout the event.***

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Alper ÇALIK / a.calik@milscint.com

The first panel, moderated by Mustafa Şeker, Deputy Undersecretary for Defence Industries, involved a discussion of national cyber security policies. A common topic addressed during this session was supporting international cooperation with national solutions.

Importance of International Cooperation

Dr. Ahmet Kılıç, Vice President of the Information and Communication Technologies Authority (BTK), delivered the event's opening speech. Noting that in recent times, Internet of Things (IoT) devices are being used as means to carry out cyber attacks, Dr. Kılıç highlighted the importance of international cooperation in cyber security: "As we work to fight off both internal and external threats, we must join forces and cooperate with stakeholders in Turkey and abroad. All the other stakeholders, such as governments, security forces, armed forces and law enforcement agencies, have critical roles as well. With regards to the infrastructure of the internet, international stakeholders also have important functions to perform. Despite this, international efforts have remained limited in the world of the internet. Nevertheless, the cyber world doesn't recognise borders, and it is precisely at this point that international cooperation, as well as a unity in approach and perspective, becomes essential."

A Cluster of 150 Companies

Next to take the stage was Mustafa Şeker, Deputy Undersecretary for Defence Industries, who explained that various types of support, including financial, infrastructure and mentor support, will be provided to entrepreneurs in the field of cyber security. Şeker also said the following regarding the cyber security cluster: "Another issue is that of bringing all the products under a single roof and making them marketable at an international level. Individually, there are many small companies that operate [in the industry]; but we want to bring them together. When I speak about 'bringing them together', I am not talking about gathering and joining them together, physically. In a setting where it's the internet and the notion of 'staying connected' that we're discussing, what we're actually talking about is a digital cluster. Within the framework of such a cluster, we intend to bring all the existing skills together. In the end, what we want to do is create a cluster that not only focuses on technology and innovation, but also aims at exports. What we're hoping for by the 2020s, and the centennial of the Republic of Turkey, is a cluster consisting of 150 companies, with a turnover reaching $1 billion."

NATO and National Solutions

Keynote speaker of the conference was Dr. Gregory B. Edwards, Director of Infrastructure Services at the NATO Communications and Information Services Agency (NCIA). Dr. Edwards began his speech by noting that Turkey has already a certain level of awareness in the field of cyber security. Stating that success in cyber security requires collaboration between universities, the industry and the nation, Dr. Edwards emphasised the importance of international cooperation and national solutions, as follows: "NATO comprises 29 nations. We want this collective strength, as well as national capabilities, to be used for NATO. [At NATO], we do not want to create our own solutions. We have engineers who can come up with good ideas and good solutions; but what we want instead are national solutions blessed by the academia, and supported by the industry."

Not Possible to Prevent All Cyber Attacks

A total of five panels were held during the conference. Listed in the order in which they were held, the panels were called:

Ömer Korkut, Deputy General Manager for Technology at STM, spoke about the European Organisation for Security (EOS), which was established in Europe in 2007 and focuses on a range of areas that includes cyber security. Noting that STM is the only Turkish company within this cluster, Korkut said that his company is also a member of the cluster's board of directors. Korkut went on to describe STM's cyber security-related contributions to the Cyber Security Protection Alliance (CYSPA) project, which the EOS conducted between 2012 and 2015: "Becoming part of the CYSPA was an important experience for STM... Thanks to this involvement, we were able to choose the right strategies from the onset."

Salih Talay, Cyber Security Group Manager at HAVELSAN, shared information about their own business ecosystem: "As a company operating in the defence industry, you cannot complete every project on your own. You have to take advantage of collaborations... [To this end] we have, until now, worked to develop our own ecosystem." Talay also described HAVELSAN's potential contributions to the cluster: "We've done a lot of work prior to the cluster being formed. We've learned about the stakeholders of the ecosystem, such as SMEs, universities and technology centres. And we've come up with a methodology to evaluate the SMEs taking part in our ecosystem. We can also share this with the cluster."

Alper Botan, Security Solutions Director at Thales Turkey, spoke about what needs to be done in Turkey to ensure the emergence of global brands in cyber security: "As a country, what we first need to do is to hold these [kinds of] conferences more frequently, and to concentrate on more specific topics... Secondly, regarding the cyber security cluster, I believe that we definitely need to attract the experience, work and knowledge of international companies in this field to our country, and benefit from them." Botan concluded his speech with the following words: "At the end of the day, we, the Thales family, see cyber security as a global issue, and place great importance on our collaboration and business partnerships in this field."

- Cyber Security and Defence Policies of Nations
- Cyber Security Clusters: Collaborations to Strengthen the Cyber Security Ecosystem,
- Emerging Technologies for Cyber Security,
- Government, Academia and Industry Cooperation on Cyber Security, and
- Strengthening the Cyber Security Ecosystem with a New Turkish Cyber Security Cluster

The following points and were frequently emphasised during the panels:

- While the resources allocated to cyber security is limited, the range of cyber attacks is very diverse. It is not possible to prevent all attacks, which is why it is necessary to focus on the right areas.
- The large majority of attacks can be prevented by following best practices.
- Individual countries are not able to tackle cyber security threats on their own. Through collaboration, countries can manage to develop cyber security capabilities, something that they would not be able to do if they were alone.
- Collaboration is also important for preventing the same work from being done twice (preventing duplication/repetition).
- Problems in cyber security are too broad and large to be handled by a single company. That is why companies should come together to form clusters.

Establishing a Cyber Security Cluster

After the panels ended, Mustafa Şeker, Deputy Undersecretary for Defence Industries, announced during the closing

The title of the second panel -also held on the first day of the event- was Collaborations to Strengthen the Cyber Security Ecosystem.

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Speaking at the panel on cyber security clusters and collaborations for strengthening the ecosystem, İlhami Keleş, Secretary General of SAHA Istanbul (far right), described the ways clusters can contribute to SMEs.

Left to Right: Prof. Dr. Nazife Baykal, Prof. Dr. Mehmet T. Zeyrek, Mustafa Şeker and Prof. Dr. Alper Ünal

panel at the end of the event that a new cyber security cluster would be established, and shared information with his audience concerning this development.

One of the tangible steps taken for the foundation of a cyber security cluster in Turkey was the protocol signed – with this goal in mind – between SSM and TÜBİTAK BİLGEM, during IDEF'17 held in May 2017. Following this, during the weeks coming up to November, the SSM performed a number of workshops and meetings on the subject. These events saw participation by representatives from the stakeholders of the cyber security ecosystem, which includes universities, the private sector and public institutions. Finally, at the concluding workshop held in early November, the decision was taken to establish a cyber security cluster in Turkey.

With a view to forming this cluster, a board of directors will be created that includes the relevant stakeholders. The board of directors will then establish an association, to which any company operating and providing services in the field of cyber security, and developing products through indigenous means, will be included as a member, on the condition that they meet certain criteria.

Priority Topic on the Cluster's Agenda: Human Resources

The short- and long-term objectives of the cluster have already been laid out. Briefly, these objectives can be summarised as follows:

- Creating an information portal,
- Identifying the priority technologies and product road maps to be included into the cluster,
- Organising events and training activities to generate awareness of topics such as indigenousness and national production, in which all stakeholder will participate, and
- Establishing a system similar to the SSM's EYDEP to ensure standardisation within the cluster.

Finally, Şeker also commented on the need for a qualified workforce in this field: "One important issue in cyber security is training human resources. There are different numbers being floated around, but current estimates highlight the need for at least 15,000 people working in this field. That's why we have to start focusing on raising human resources as soon as possible. This is one of the primary activities we'll work on under the umbrella of this cluster... But of course, [the need for] human resources is a bit more urgent. That's why we didn't want to wait for all the processes and procedures to be completed [before starting to address this need]."

A signing ceremony was then organised for the good-will agreement between SSM, METU and İTÜ, covering the raising of the human resources required in the field of cyber security. The agreement was signed by Mustafa Şeker, Deputy Undersecretary for Defence Industries; Prof. Dr. Alper Ünal, Vice Rector of İTÜ; Prof. Dr. Mehmet T. Zeyrek, Vice Rector of METU; and Prof. Dr. Nazife Baykal, Rector of METU's Northern Cyprus Campus. ◆

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