



# Middle East Technical University & ODTÜ TEKNOKENT

## Turkey's Pioneer in University-Industry Cooperation

METU has proudly completed hundreds of projects within the scope of cooperation with defense industry companies. In this exclusive interview with Prof. Mustafa Verşan KÖK - METU Rector & Chairman of ODTÜ TEKNOKENT discusses the impressive and innovative projects that have been launched, and the success of the establishment of the Defense Industry

Research and Technology Development Sub-Region (SATGEB) at ODTÜ TEKNOKENT in 2006. R&D departments of major contractors of the industry such as Aselsan, Havelsan and Turkish Aerospace are located at ODTÜ TEKNOKENT where new entrepreneurs, scientists, researchers cultivate collaboration, building upon Turkey's strengths and future vision.

**Defence Turkey: Presently, nearly 5000 METU graduates are working as engineers, researchers and executives at defense industry companies such as Aselsan, Roketsan, Turkish Aerospace, FNSS and Havelsan. Could you by briefly inform our readers on METU's cooperation as a university with the defense industry?**

**Mustafa Versan KÖK:** Middle East Technical University has always been a prominent pioneer not only in terms of education but also with respect to industrial cooperation. Various engineering departments and branches in our university enabled us considerably in contributing to various industrial collaborations, and in particular to the defense industry.

METU's academic past with the defense industry goes back to the 1970s. The departments focused mostly on increasing their academic richness until that date and then they started to build industrial cooperation with the establishment of companies such as Aselsan, Havelsan and Turkish Aerospace. These companies attach great importance to R&D

studies, thus enabling our academicians to take part in projects as consultants or researchers.

After the establishment of Defense Industry Research and Technology Development Sub-Region (SATGEB) at ODTÜ TEKNOKENT in 2006 as a result of the emerging needs that arose due to the momentum reached in R&D studies and

fuelled by the increase in collaborations, R&D departments of major main contractors of the industry such as Aselsan, Havelsan and Turkish Aerospace started to establish locations at ODTÜ TEKNOKENT.

As of 2010, companies active in the defense industry started to gather under the Teknokent Defense Industry Cluster (TSSK). TSSK has been providing various R&D and engineering services related to areas such as manned and unmanned air vehicles, advanced material, man-machine interactions, cryptography, coding and encryption, electronic intelligence systems, simulation systems, sensors and electronic systems and datalink technologies. Presently about 3 thousand defense industry R&D personnel are employed at ODTÜ TEKNOKENT.

Meanwhile in 2011, in order to maintain the cooperation between university and the defense industry, the Researcher Training Program for the Defense Industry (SAYP) was launched by the Presidency of Defense Industries (SSB) and METU, Aselsan, Roketsan, Turkish Aerospace, FNSS, Milsoft and Havelsan for the employees in the defense industry, for postgraduate students and prospective postgraduate students of Middle East Technical University.

Over 1000 R&D projects related to the defense industry have either been conducted or are being executed at our university.



**Defence Turkey: What would you like to say on the operations conducted in 2019 under the cooperation built with the Turkish Defense Industry companies within the scope of the University-Industry cooperation model? Presently, with how many defense industry companies does METU collaborate? Could you please mention a few of the projects that stand out in the defense industry field?**

**Mustafa Versan KÖK:** METU has been carrying out intensive cooperation with Turkish Defense Industry companies for many years. These activities increasingly continued in 2019 as well. In 2019, R&D projects were launched as part of state-funded projects or projects funded through their own resources with over 50 defense industry companies.

A prominent example of a project that was launched in 2019, I would like to draw attention to the Development of Unique Sensor Networks and Identification System against Nuclear Radiation Threats (RADAT) Project. This project is funded by

the Presidency of Defense Industries (SSB) and will be conducted with METU and the Nanomagnetic Instruments Company at ODTÜ TEKNOKENT. This project aims to develop a detection system capable of identifying the isotope that is a source of radiation and that could measure radioactivity to detect microGray level dose values. On account of this project, the CdZnTe (cadmium zinc tellurium) crystal capable of detecting beta, gamma and x ray emissions will be developed for the first time in Turkey. The CdZnTe crystal and detector that is the main component of the radiation detection systems could not be produced in our country. The number of countries with this product in the world is extremely limited. Therefore, we decided to support the RADAT project as part of the R&D program launched by the Presidency of Defense Industries.

Another project that I would like to highlight is the Project on the Development of an Infrared Detector Set (NAR) that focuses on the unique development and production of infrared detector sets that are

the most critical sub-component of infrared camera systems. The main contractor of the project launched by SSB, is Aselsan and the related support will be received from METU Quantum Devices Nano Devices Laboratory and Crystal Growth Laboratory. The first product manufactured within the scope of the project will be delivered in 2 years and delivery of all products will be completed within 6 years. Accordingly, METU intensely continues its efforts in the development of unique products and technologies integrated with defense industry institutions.

Finally, I would also like to mention one of the critical projects. The “Innovative Software Competition (Y3)” project funded by SSB and conducted by METU Center for Image Analysis (METU OGAM) aims to conduct precise measurement of capabilities and know-how existing in our country in automatic target acquisition and identification through images. To this end, the main target of the project is to build the hardware and software infrastructure capable of



Very-Light Aircraft (VLA) Concept Design

© Turkish Aerospace

measuring the automatic identification performance of the different algorithms for visual data types and varying target types. A total of 147 individual applications have been submitted by university students, institutions, SMEs and university employees to the competition held as part of this project and the winners of the competition were awarded by the SSB with a TL100,000 prize.

A contract was signed for the execution of the 2nd phase of the project in 2020.

**Defence Turkey: On December 14, 2017, a contract was signed at Turkish Aerospace facilities within the scope of the “Development of an Independent Research and Development Project for the Development of Very-Light Aircraft (VLA)”. According to the project, METU students will be designing the aircraft and Turkish Aerospace will be in-charge of production, integration and test activities. What kind of activities have been accomplished so far as part of the project? Could you please enlighten our readers on the latest status of the project?**

**Mustafa Versan KÖK:** Together with Turkish Aerospace, Turkey’s technology center in the development, modernization, production, system integration and life cycle support processes regarding aerospace systems, activities are being carried out uninterrupted. This cooperation aims to contribute to the development of Very-Light Aircraft while enabling METU students studying in various disciplines to experience the complete air vehicle design process with an interdisciplinary approach under the guidance of experienced Turkish Aerospace staff and thus become more experienced when they graduate from the university as the project renders the participant students to have more know-how and experience than their rivals across the world.

11 METU academicians from Aerospace Engineering, Mechanical Engineering, Electrical and Electronics Engineering Departments and 83 students from Aerospace Engineering, Mechanical Engineering, Electrical and Electronics Engineering, Industrial

Engineering and Industrial Design Departments of METU are taking part in the aforementioned project that was launched on March 1, 2018. By the end of 2018, the pre-design phase of the activities identified for the design of the prototype aircraft in the VLE category was completed. The second phase of the project started in 2019 and production, assembly and test activities were conducted through Turkish Aerospace resources. The SRR, PDR and preliminary CDR phases were accomplished. Design activities on the end product aircraft continue as the design is aimed to be completed by the end of February 2020.

With this project, METU was deemed worthy of the University - Cooperation Award as part of the Excellence Award granted in 2019 by the Council of Higher Education.

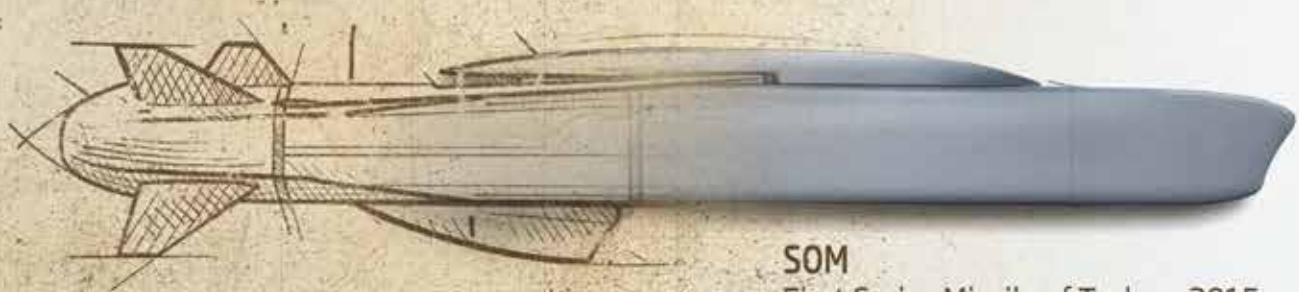
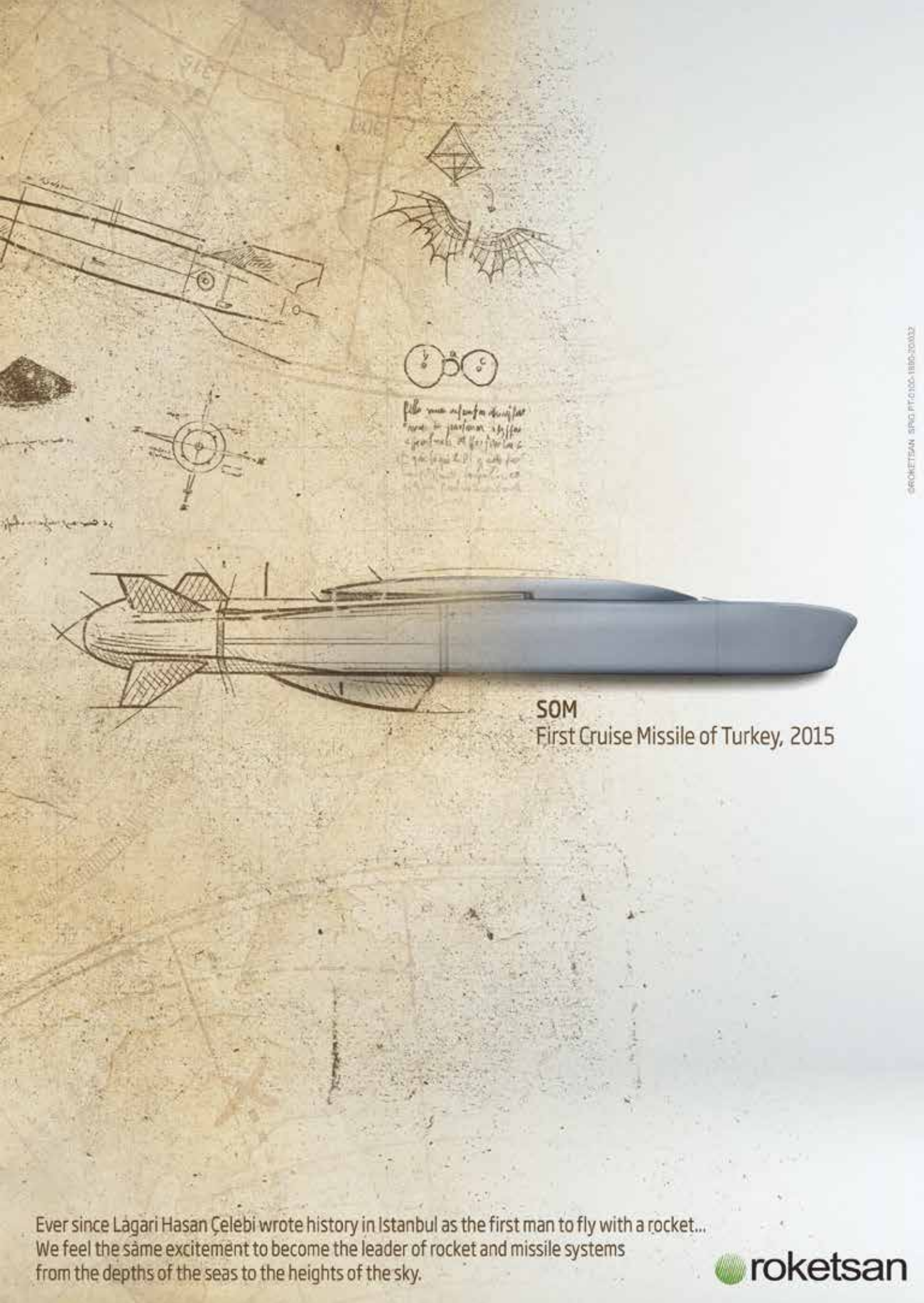
**Defence Turkey: There are many projects conducted in the departments of aerospace engineering, mechanical engineering, computer, electrical and electronics engineering, metallurgical and materials engineering, chemistry and physics**

**engineering departments and research centers of METU. These projects contribute greatly to the Turkish Defense Industry through Faculty of Engineering, Institute of Science and Technopark. Could you please inform us on the total number and financial size of the ongoing projects in the defense industry?**

**Mustafa Versan KÖK:** Our research and application centers are the critical research infrastructures in our university. Presently, one third of our 29 centers are conducting activities in the field of defense. At this point, I would especially like to mention the Research and Application Center for Space and Accelerator Technologies (iVME-R) which was established with the financial support of the SSB. The Center became an application and research center in 2019 and is presently under assessment to be granted a legal entity within the scope of Law No. 6550. Additionally, the Robotic Technologies Research and Development Training Center that the call for proposal has been issued by SSB two year ago, is included in the scope of support program. With this project, critical infrastructure will be established in our campus within 2020 in the area of robotics. This infrastructure will contribute significantly to the defense field in our country will be transformed into a research center before long.

Moreover, to date, hundreds of projects either have been conducted or are being executed





**SOM**  
First Cruise Missile of Turkey, 2015

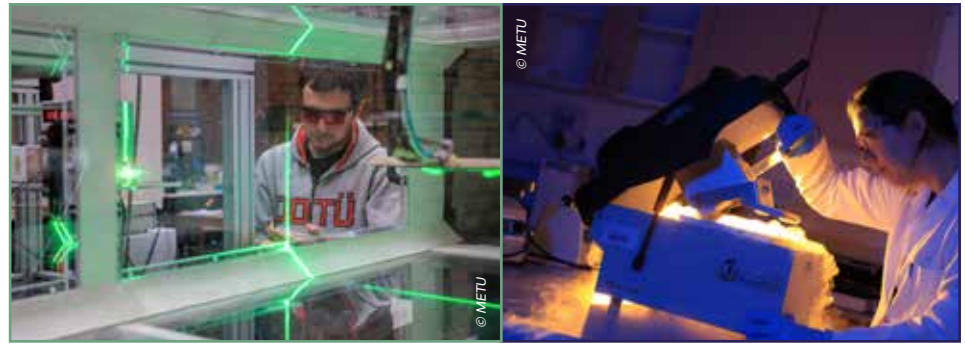
Ever since Lagari Hasan Çelebi wrote history in Istanbul as the first man to fly with a rocket...  
We feel the same excitement to become the leader of rocket and missile systems  
from the depths of the seas to the heights of the sky.

within the scope of the cooperation between METU and defense industry companies. 86 projects have been launched in this area in just 2019 alone with a project budget of TL 25 million.

**Defence Turkey: Teknokent Defense Industry Cluster (TSSK) companies have major contributions in many projects launched in the Turkish Defense Industry in recent years. How many companies are there under the auspices of ODTÜ TEKNOKENT that are actively involved in R&D studies and how many of them are working in the defense industry field?**

**Mustafa Versan KÖK:** The Teknokent Defense Industry Cluster launched its activities in 2010 with the participation of ODTÜ TEKNOKENT companies. Today, this Cluster conducts its activities not merely with the companies of ODTÜ TEKNOKENT but also with the participation of defense industry companies active in other technoparks. TSSK companies made their mark on successful projects in the defense and security projects of our country with their superior know-how and capabilities. Currently, over 400 technology companies are active under the auspices of ODTÜ TEKNOKENT and nearly one third of these companies are working in defense and security fields.

**Defence Turkey: ODTÜ TEKNOKENT gathers companies with vertical competence and develops new products and services in defense, aerospace and security fields. Additionally, many**



**research centers and laboratories within METU joined together these companies active in the defense industry under the Teknokent Defense Industry Cluster (TSSK) in 2010. Could you inform us on the number of R&D personnel working at ODTÜ TEKNOKENT, the number of staff employed by projects related to the defense industry, the number of executed R&D projects in the defense industry and the export volume conducted until the end of the of 2019?**

**Mustafa Versan KÖK:** ODTÜ TEKNOKENT, with its three campuses, one at METU, the METU MET campus on the Eskişehir Highway and the Ostim Center, hosts a considerable sized workforce. Over 8,500 research personnel are employed by over 400 technology companies and 90% of this staff have either graduate or post-graduate degrees. Nearly 3,000 of the aforementioned staff are employed by our companies that are active in the defense industry. It is hard to mention an exact figure as the project cycles of ODTÜ TEKNOKENT companies with dynamic structures advance quite rapidly, yet it is possible to note that over 600 R&D projects in the defense industry are being conducted actively.

Though it is quite hard to take part in the global market, particularly in the areas of defense and security with its severe competitors in exports, our companies accomplished a prominent achievement by reaching an export figure of nearly US\$ 120 million.

**Defence Turkey: What are your thoughts on the project incentives METU received from TÜBİTAK on the Scientific and Technological Research Projects Funding Program (1001), Career Development Program (3501) and National New Ideas and Products Funding Program (1005) and how do you evaluate the rate of success in these projects?**

**Mustafa Versan KÖK:** Encouraging the studies of our scientists, increasing the competitiveness of our country, developing projects towards applied and/or experimental research and generating new competence have always been our priority. Within this scope, our university plays a key role in the research ecosystem of our country. For instance, considering the latest results of March 2019 regarding the TÜBİTAK ARDEB Scientific and Technological Research Projects Funding Program (1001), our university has

been the one that received the greatest project support. Moreover, our average success rate in 2014-2018 in concern with the TÜBİTAK ARDEB 1001 program is 32%. Within the scope of the “National New Ideas and Products Funding Program (1005)” and “Career Development Program (3501)”, the average success rate of our university reached 50%. Regarding the total calls for proposal supported by ARDEB during the same period (2014-2018), our university became the one with the highest number of supported projects with 377 projects and a total budget of TL 181.7 million. Moreover, the overall success rate of our university during aforementioned years reached 29.8%, above the overall support rate of ARDEB which is 14.5%.

Our university also made its mark on many achievements in the new programs in recent years in addition to TÜBİTAK's fundamental programs. For instance, our university's “Center for Solar Energy Research and Applications (G U N A M )” and “Microelectromechanical Systems Research and Application Center (MEMS)” have applied to the TÜBİTAK ARDEB's Center of Excellence Support Program



(1004), where research universities and research infrastructures are qualified by Law No.6550 and they entered the list of 17 projects supported across the country.

As part of another new program of the TÜBİTAK, SAYEM - Industrial Innovation Network Mechanism, our university was entitled to receive support for two out of the three applications. These two applications were under the partnership of the companies ARÇELİK and BİYOMOD.

Similarly, 11 out of our university's 12 applications to the call for BİDEB 2244 - Industrial Doctorate Program made for the first time by TÜBİTAK were accepted. Thus, 47 of 517 PhD students to be trained by the industrial partnership of our country will be trained at our university under the partnership of 8 industrial enterprises.

Our university used effective methods for creating awareness for the BİDEB programs. Accordingly, 20 applications were made on behalf of our university for "BİDEB 2232 - International Fellowship for Outstanding Researchers Program" and 14 of them were entitled to receive support. Arriving in our country within the scope of this program, 2 researchers decided to conduct their research at our university, and a total of 16 outstanding researchers, 5 of which are foreigners will be launching their studies at our university as of 2020. With the help of these effective promotions, 12 applications made for

the BİDEB 2236 - Co-Funded Brain Circulation Program in 2018 reached 25 in 2019.

**Defence Turkey: The Researcher Training Program for the Defense Industry (SAYP) was launched with the cooperation protocols signed with METU and the SSB, Aselsan, Roketsan and Turkish Aerospace in October 2011 and started to be implemented in 2012. Could you please inform us on the activities conducted within the scope of SAYP in the past 7 years? How many researchers graduated from METU under the program and how many of them are still involved in the program?**

**Mustafa Versan KÖK:** As you also mentioned, SAYP is a program launched with the initiative of METU and it was then extended to all our universities by the SSB. The country-wide popularity of the programs we launched is our source of pride.

To date, 37 projects have been conducted as part of SAYP. 20 out of these projects were accomplished successfully and 20 students graduated. I would like to mention with pleasure that one of our projects that is about to be completed bears a patented product.

**Defence Turkey: We would like to hear more about the test infrastructure and capabilities owned by METU? Within this frame, what would you like to say about the METU RÜZGEM Large Scale Wind Tunnel Construction that was completed in the beginning of last June? At this location aerodynamic, isolation and wind tests of all vehicles capable of gearing up to the speed of 360km/h can be conducted. Can you also touch on the Open Field Acoustic Test Field at the METU Yalıncağ Pond?**

**Mustafa Versan KÖK:** METU-RÜZGEM Large Scale Wind Tunnel is presently Turkey's largest

wind tunnel and it is also the highest speed wind tunnel in its category, and it is among the few wind tunnels in Europe in terms of size and areas of application. Installed with the research infrastructure support of the Presidential Strategy and Budget Office, it is planned to be fully activated in spring 2020.

On account of its modular structure capable of moving over air cushions, this tunnel will be capable to provide services both for civil sector requirements such as wind power, construction and automotive sectors and will also host tests required as part of the defense industry, specifically for the aerospace industry, for instance UAV scaled model tests, certain tests of various ongoing aircraft projects (HürJet, National Combat Aircraft, etc.) and some tests related to helicopter projects. Mostly local resources were utilized during the construction of the tunnel, the construction was realized by a local company and all the technical monitoring and controls during the construction were conducted by the relevant departments of our university.

Considering that the steel honeycomb units regulating the flow in the wind tunnel were manufactured in Turkey, that the engines of the tunnel were procured from domestic companies, the tunnel fans were designed at RÜZGEM and manufactured by domestic companies, the tunnel's automation and control system was developed by RÜZGEM, the fact that the model support system to



*The Steel Honeycomb, Engine of Tunnel and Tunnel fans were produced by local companies*

be utilized in aerodynamic tests were designed by domestic companies, and that the studies over the external balance system to be used when measuring the power was conducted at METU, the Large Scale Wind Tunnel project plays a crucial role both in terms of the utilization of national resources and the indigenization of know-how and capability in this area.

**Defence Turkey: Could you please inform our readers on the METU Design Factory where academicians and students specializing in various areas gather and design projects addressing many different issues presented by major industrialists such as the automotive industry, defense industry, white goods, aviation, aerospace industry, energy companies, SMEs, non-governmental organizations, hospitals or any other stakeholder wishing to create a difference in its line of business and also on the Factory's activities in 2019?**

**Mustafa Versan KÖK:** Ever since its establishment, the METU Design Research and Innovation Center has become a brand-new interface for our university, aiming to become a 4th generation university, where university and non-university stakeholders are gathered, in addition to the multi-disciplinary collaboration of various disciplines.

Within this context, with the help of the interdisciplinary studio launched every semester, the METU Design Factory has continued to conduct projects gathering students, academicians



and non-METU stakeholders, training on "Design Oriented Thinking" and research projects in 2019 as well. In addition to research and training activities, the factory supported the establishment of similar centers by hosting representatives from many regional development agencies, governmental and industrial organizations at various scales and educational institutions.

Collaborations in different areas were realized during the last year. For instance, within the scope of a project executed in our university, measurement and modelling activities have been accomplished for the identification of problems that emerged around the head of cancer patients, before and after their treatment. Test samples were designed for a research project being conducted at a different university. A cooperation protocol was signed as part of the project on unmanned air vehicles developed under the partnership of BAE and Nurol. The Mine Marking Project, which is among the projects conducted with the UNDP, was deemed worthy of an entrepreneurship award. The smart toy and smart playground

project focused on the rapidly ageing population with Autodesk, the inner campus smart transport project with Willdan Group, the inner campus activity optimization software project with UTARIT group were accomplished during the past year. Similarly, the factory worked jointly with Turkish Airlines on the development of an automated cargo packaging and tracking system. In the same period, four projects were realized with the energy sector, either directly or indirectly. Reinforcement of aging wooden utility poles with Enerjisa, optimization of wind turbines and improvement of their life cycles and a project on an alternative wind power solution system with GAMA Enerji were realized, while a project on achieving energy savings in refrigerators was conducted with Anadolu Holding.

Research projects in various sectors are currently being conducted, while the number of collaborations and the projects to which the Design Factory provides consultancy increase day by day.

**Defence Turkey: Could you make an assessment on the defense industry activities that METU plans to conduct in 2020 and on your targets and**

**expectations regarding the future?**

**Mustafa Versan KÖK:** Middle East Technical University aims to increase our collaboration with the major companies of our country in the defense field through maintaining our cooperation in the defense industry in 2020 as well. Development of joint R&D projects and enabling our students to take part in defense industry projects will continue to be our priorities, while we continue to support the activities conducted under the auspices of our engineering departments, research institutes, ODTÜ TEKNOKENT and the TSSK with full effort.

**Defence Turkey: Dear Rector, would you like to convey any message to our readers?**

**Mustafa Versan KÖK:** First of all, I would like to thank you for this interview. As METU and ODTÜ TEKNOKENT, the defense industry is amongst our priorities.

In addition to its achievements in education, METU has always been a pioneer in our country in terms of cooperation with the defense industry and being aware of this we will continue our endeavors in the future ■





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