With over 40 Years of Engineering Experience NUROL Makina is now in the Service of the Hungarian Armed Forces

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Armored vehicles became one of the indispensable requirements of not only Armed Forces but also of Security Forces due to terrorist attacks that showed an increase across the world after September 11th and other asymmetrical risks and threats. Today, procurement programs for armored vehicles are executed for both the Armed Forces and Security Forces in many countries. These programs vary depending on the defense and internal security policies of countries.

Changes in operational requirements have necessitated the use of dynamic mechanized units more in recent years. The core employment of these units is based on mobility, agility, armored protection, firepower and logistic support. Counterterrorism operations, peacebuilding and peacekeeping operations that were conducted in the last 20 years have proven that the Tactical Wheeled Armored Vehicle (TWAV) is the most convenient vehicle for such missions.

TWAVs with high maneuver capability and armored protection, with advanced firepower and flexibility in usage, are in demand by Armed Forces and Security Forces across the world. These vehicles are 40% to 50% more cost-efficient than tracked armored vehicles considering their initial purchase cost and lifecycle costs.

As user requirements for armored land vehicles increase, they also then become diversified and configuration options increase as well. Since the parameters directing the design are identified by these requirements, new generation, robust and reliable TWAV platforms are being designed presently. These platforms will fulfill the combat requirements of Armed Forces while meeting the demands of Security Forces in maintaining security with high performance.

NUROL Makina, one of the very first privately owned companies of the Turkish Defense Industry, commenced its activities in 1976 and started to focus on the Defense Industry in the 1990s. The company initially worked on the production of sub-systems then finally on product development and brought a new vision to the industry with the indigenously designed, new generation EJDER YALÇIN TWAV platform with high performance that meets the expectations of the Turkish Armed Forces (TAF) and Security Forces (Gendarmerie General Command [JGnK/GGC] and the Turkish National Police [EGM]) in particular, and the military and security units of friendly and allied countries.

Launched into the service of the Turkish National Police (EGM) in 2014, the EJDER YALÇIN TWAV immediately turned its performance in the field into a commercial success and achieved considerable exports to foreign countries as a result of agile and pragmatic business development and marketing activities.

Having had its first export success with a contract signed with Tunisia in 2017, the EJDER YALÇIN Block-III 4x4 TWAV has been serving in five countries; such as Turkey, Tunisia (75+150), Uzbekistan (24 deliveries + planned local production of 1,000 vehicles), Qatar (342 vehicles, nearly 200 vehicles have been delivered as of April 2020) and Senegal (25 vehicles). Extending over years, the number of ordered EJDER YALÇIN Block-III 4x4 TWAVs for export as of April 2020 exceeded 800 (500 of which are firm orders) and if the ongoing project and contract negotiations turn into firm orders an additional order of over 1,000 vehicles may be achieved.

Developed to meet the operational requirements of Armed Forces and Security Forces, under all types of regional and land conditions including urban and rural areas, and offering high protection and mobility capabilities, EJDER YALÇIN is an indigenously designed platform that has proven itself in the operation field. With a recently signed contract the Hungarian

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EJDER YALÇIN BLOCK-I

Defense Forces became the most recent customer of the platform. In this way, NUROL Makina has become the first Turkish Defense Industry company to achieve success in the export of an indigenous combatant TWAV product, at a platform level, to a European Union (EU) and NATO Member country. One of our country's companies Otokar realized the export of the COBRA Chemical, Biological, Radiological and Nuclear (CBRN) Reconnaissance Vehicle to the Slovenian Armed Forces (18the Battalion of Chemical, Biological, Radiological and Nuclear Defense) in 2008.

NUROL Makina's indigenous products quickly rose to fame worldwide. Successful global products such as the EJDER YALÇIN TWAV and YÖRÜK NMS make us proud and without doubt this level of success has not been easy to achieve. Critical infrastructural investments were made, and significant R&D activities were conducted in to transform the company that had launched its activities in the industry with the production of sub-systems. The company now fulfills the demands of both the TAF and Security Forces and the requirements of foreign customers through designing and manufacturing its indigenous platforms and technologies without a foreign partner or without obtaining design support or license from a foreign company.

Establishment and Entry into the Defense Industry

Founded in 1976 to operate in the Machine Manufacturing Industry, NUROL Makina is a company funded with 100% Turkish Capital. The Company decided to engage in the Defense Industry in 1992 and as a sub-contractor of its sister company FNSS, it focused on fields where FNSS had not been active, with the production of components in the first stage of operations. Activities began at the facilities in 1992 at Ankara's first Organized Industrial Zone in Sincan. The facilities used a 25mm Dragar one-person power-operated turret production for ACV-300 ACVs, Gunner's Cupolas for APCs (12.7mm Machine Gun Cupolas) and vehicle hatches. Over the years additional armor solutions and vehicle NBC systems were introduced, and in due course NUROL Makina became the source of all types of steel armor solutions for FNSS.

NUROL Makina gradually extended and deepened its range of activities in the Defense Industry, initially focusing on manufacturing components, then moved onto sub-system and main sub-system production and later engaged in the design and production of main systems. Directing its focus on the production of Tactical Wheeled Armored Vehicles (TWAV) to meet the developing needs of theTuAF, by cooperating with Ratmil Company (RomTechnica) located in Romania, NUROL Makina manufactured the TWAV solution in 6x6 configuration named RN-94 in 1994. In line with the contract signed with the MoND (Ministry of National Defense)/SSM (former Presidency of Defense Industries), five RN-94 TWAVs were ordered to be used for test purposes and the first vehicle was delivered in 1997 and the remaining four were delivered in 1998-1999 to the Undersecretariat for Defense Industries (SSM) of the time in order to be employed by the troops of the Land Forces Command (KKK). While no additional orders were placed for the RN-94, nevertheless it was NUROL Makina's first end-product experience. Though it signed a Production License Contract in 2003 for the Pandur-II TWAV Group of Steyr Company, NUROL Makina preferred to develop the 6x6 TWAV Group to be designed indigenously and manufactured locally. NUROL Makina also financed the development activities for the EJDER TWAV Group with an indigenous design and local production through its own resources.

NUROL Makina's EJDER YALÇIN TWAV Configurations

The Emergence of the EJDER TWAV Group and the EJDER YALÇIN 4x4

EJDER YALÇIN BLOCK-II

Defense industry technologies mostly require critical and high cost R&D activities with confidential content and the export/import activities of the industry are subject to control. Technology transfer and product sale in the defense industry are affected particularly by the political relations between the countries. In order to alleviate such restrictions to the maximum extent and in interest of the country's target of achieving an 'independent defense industry', NUROL Makina decided to work on indigenous, domestic development activities. Following this decision, based on the idea that the TuAF would be requiring mine resistant vehicles, it launched a development project for a new and indigenous mine resistant 6x6 TWAV in 2006 completely through its own resources. The first member of the EJDER TWAV Group, the EJDER 6x6 Armored Personnel Carrier (APC) was revealed after a short period of 2 years including challenging and intensive R&D activities and all the tests. During the design and integration processes of the EJDER 6x6 APC Vehicle, CAN Bus design and implementation were also realized in our country for the first time through domestic resources and thus new technology was acquired. On account of the CAN Bus system, major conveniences were achieved in the integration of different systems (engine, gearbox, brakes, gear shift, ABS, axle beams, lighting system, accelerator, doors, etc.) in terms of central command control. The EJDER 6x6 APC was launched on February 3, 2009 and the Ministry of Internal Affairs of Georgia became the first customer of the product by placing an order for 72 vehicles. With this export activity, NUROL Makina made its mark with Turkey's first export of the 6x6 TWAV as well.

As one of the Turkish Defense Industry's oldest private sector players, especially with the company's new management and new approach, NUROL Makina has completely focused activities on its own unique products and systems since 2012 – the year when the company decided on developing its own 4x4 platforms. Within this scope, the prototype activities of the EJDER TWAV in 4x4 configuration, today known as the EJDER YALÇIN, were launched in November 2012 and the first pre-prototype was unveiled during the IDEF'13 Fair. A series of improvement and development activities were conducted on the prototype vehicle upon received feedback and production under the name EJDER YALÇIN Block-I was launched in 2014. The serial production of the first group of 5 vehicles was completed (US$ 8 million contract covering the delivery of total 11 EJDER YALÇINs with SARP – the Stabilized Advanced Remote Weapon Platform) and they entered into the inventory of the Turkish National Police's Department of Special Operations.

The renewed and further improved vehicle was delivered to the end user in 2016 with the name EJDER YALÇIN Block-II. Aselsan's SARP-II RCWS (Remote-Controlled Weapon Station) was used in the EJDER YALÇIN Block-II platforms and NUROL Makina delivered 70 vehicles of Block-I and Block-II versions to the EGM in line with the previously signed contracts. In 2016, NUROL Makina developed the Block-III platform which is the third version of the EJDER YALÇIN TWAV and launched its serial production. Within the scope of the Armored Tactical Vehicle (ATV-I) Project conducted by the SSM, former Presidency of Defense Industries, the first delivery was made on November 9, 2016 to the EGM which had placed an order of 180 vehicles. The launch of the EJDER YALÇIN Block-III was made during the 3rd High-Tech Port Fair. All EJDER YALÇIN Block-III TWAVs for the EGM featured Aselsan's SARP-II RCWS (7.62mm weapon).

Power packs of 300hp and 350hp capacities were used in the earlier versions [Block-I and Block-II] where a power pack with a capacity of 375hp was used in Block-III. Moreover, the internal volume of the vehicle was slightly increased while its mobility features were improved further (road-holding capability was improved). Certain additional operational features were added in line with the demand of the Special Operations Department of the EGM. Within this

framework, for instance two cutters were placed on the vehicle roof for cutting of the steel sheets when the SARP RCWS over the vehicle is damaged or deactivated during operations in the residential areas. A fire extinguishing system was installed on the body of vehicle extinguish and prevent fires that may occur as a result of Molotov attacks (a similar solution is used in anti-riot vehicles as well). The previous versions of the vehicle contained fire extinguishing systems only for engines, wheels and cabins of the vehicle. The fire extinguishers in the personnel and engine compartments are automatically activated while the fire extinguishers in other compartments can be manually activated by the user.

The EJDER YALÇIN Block-III TWAV has the highest survivability capacity in its category (protection level of the vehicle was tested and certified by international independent bodies and by the TNO) and depending on its weight (the combat weight is 18 tonnes the vehicle offers extremely high mobility performance to its users. Thanks to the diesel power pack with high torque capability of 375hp capacity and fully independent suspension system, the vehicle offers superior performance in all types of fields conditions. Tested in 3 continents and 10 countries so far as part of the agile and pragmatic business development and marketing activities conducted by the Business Development Department of NUROL Makina, EJDER YALÇIN 4x4 Block-III TWAV passed quite challenging tests in countries such as Uzbekistan, Slovakia, Hungary, Qatar and Saudi Arabia and has proven its performance under difficult conditions and against competitors. Performing in various geographic conditions, fields and cities in Turkey since 2014, Ejder YALÇIN 4x4 TVAW accumulated millions of kilometers and displayed its capabilities in deserts, snow and ice, muddy fields, and moors with specially designed tracks in various geographies of the world from the Sahara Desert to the steppes and mountains of Central Asia. The EJDER YALÇIN 4x4 TWAV has not failed in any of the tests so far, on the contrary, the vehicle completed all tests successfully. By performing its duties in different conflict zones in certain countries that feature the vehicle in their inventory, the EJDER YALÇIN 4x4 TWAV has proven itself in the battle field while drawing the attention of potential foreign customers with its performance in mobility and resistance tests executed in the field, and it continuously attracts new opportunities for export activities.

Armored Ambulance Configuration of EJDER YALÇIN TWAV

During the development of the EJDER YALÇIN 4x4 TWAV, operational and ergonomic requirements of the user were taken into consideration in addition to the superior survivability capabilities and therefore an ideal platform was built for the safe and effective performance of personnel.

Depending on its ballistic protection features, the EJDER YALÇIN 4x4 TWAV has a payload capacity of up to 4 tons and the vehicle offers customized solutions to the various operational requirements of the user. It is able to perform as a Border Monitoring and Security Vehicle, Reconnaissance Vehicle, Tactical Missile Carrier/ Launcher, Command – Control Vehicle, Air Defense Vehicle, Combat Vehicle, Personnel Carrier Vehicle, CBRN Reconnaissance Vehicle, Mine/IED Detection – Destruction Vehicle or an Armored Ambulance. Due to its high payload capacity and unique vehicle control software, the vehicle can be configured in different versions and therefore it can be customized for various types of application.

NUROL Makina: Tips for Transforming from a Sub-System Manufacturer into a Company Capable of Designing and Producing its Indigenous Platforms and Technologies!

NUROL Makina presently carries out the production of 4x4 Tactical Wheeled Armored Vehicles at its modern facilities that span across an outdoor area of 65,000m2 and an indoor area of 25,000m2 in Ankara. NUROL Makina has been conducting successful design and development activities in the TWAV sector for 28 years. The projects accomplished in previous

years further increased their experience and know-how. The company accumulated system/sub-system-based design, integration and manufacturing capabilities during the execution of projects for sub-systems of vehicles and system solution projects that require custom design.

Beginning its activities in the sector with sub-system manufacturing, critical investments were made to transform NUROL Makina into a company that would be capable of fulfilling the demands of the Armed Forces and Security Forces, capable of designing and producing its own indigenous platforms and technologies without a foreign partner or the support or license of a foreign company. In this way NUROL Makina now owns a state-of-the-art technological infrastructure including 5-axis laser cutters, 7-axis robotic welding machines, hydraulic eccentric presses, heat treatment, laser scanning measurement system and painting units, and has a high production capacity. Despite the COVID-19 pandemic, NUROL Makina has been carrying out its production activities in two shifts to fulfill domestic and foreign orders. Furthermore, upon special permits activities are executed even during countrywide lockdown days. With the help of its indigenous designs, NUROL Makina creates a difference in the land platforms segment and at the same time the company owns a modern test zone. The company executes

performance tests on its indigenously designed and manufactured vehicles in trench crossing and obstacle climbing, side and steep slope climbing, crossing rough terrain and deep fording.

Offering high-quality products to the defense industry with its machines, tests, computer-aided design and production infrastructure and engineering know-how, NUROL Makina registered its R&D Center in 2015 and improved and enriched its engineering staff in accordance with the requirements of the sector. The company also places great importance on the qualification of the products it designs and develops in compliance with international quality and military standards. In addition to the activities conducted for the development of its existing product portfolio and its focus on quality improvement, the company carries out continuous development activities.

The after-sales support provided to customers throughout the lifecycle of the systems and the company's elaborative approach to client feedback has strengthened the ties between the users and NUROL Makina. The result is reflected in customer satisfaction and reliability, and this ultimately propelled the company into a brand in great demand in the defense industry.

The First EU and NATO Member Customer: Hungarian Defense Forces

NUROL Makina continued to increase its domestic sales particularly to the Turkish Armed Forces (TuAF) and to the Turkish National Police (EGM) as well as its foreign sales and the company signed a contract with Hungary in the second half of 2019. The company competed with TWAV products of leading European and US manufacturers and managed to become the successful supplier with its performance in the tests.

Hungary has been carrying out activities in order to increase the technological facilities of its Armed Forces and replace the older generation vehicles and equipment remaining from the Soviet Union era with Western systems and preferred to employ the EJDER YALÇIN TWAV as part of its requirement for a new generation TWAV in different configurations. With this order, Hungary became the 6th country in the world that has chosen

Hungarian Armed Forces EJDER YALÇIN BLOCK-III TWAV

Qatar Army's EJDER YALÇIN 4x4 are seen on National Army Day of Qatar, 2019

EJDER YALÇIN to fulfill the demands of its Army and Security Forces. Hungary was also the first EU Member customer of the vehicle. With the YÖRÜK TWAV order, also within the package, Hungary followed Qatar and became the 2nd international customer of this vehicle.

The agreement signed between NUROL Makina and Hungary's procurement authorities for a few hundred vehicles (EJDER YALÇIN and YÖRÜK) extends over years. The initial deliveries are expected to take place in 2020.

Within the scope of the Hungary project that will contain intensive engineering activities, various European manufacturers' (Aselsan may be on of them) equipment will be integrated in line with the specifications identified by the users for the vehicles to be delivered. Since the system engineering activities will be conducted over the EJDER YALÇIN and YÖRÜK TWAVs that will perform jointly with the various land platforms according to requirements in the inventory of Hungarian Defense Forces, the aforementioned vehicles will be in a different design and configuration from other versions that had been manufactured so far, in terms of the equipment to be installed over them. By exporting EJDER YALÇIN and YÖRÜK TWAV, NUROL Makina has in fact been creating new export opportunities also for other Turkish Defense Industry companies. To this end, for instance a new contract on the procurement of the SARP RCWS and SEDA Gunshot Identification System was signed between Aselsan and NUROL Makina in the beginning of April, probably to be used in the vehicles to be included in the inventory of Hungarian Defense Forces. Products of different companies will be available on some of the vehicles to be delivered to the Hungarian Defense Forces. Regarding the delivery of the equipment such as the SARP RCWS, KORNET-E ATGM Launcher System and the IGLA SAM Launcher System to be utilized in the EJDER YALÇIN Block-III and YÖRÜK/NMS TWAVs that will be delivered to Qatar, Aselsan previously signed a contract with NUROL Makina that amounted to approximately US$150 million.

Training programs will be organized as part of the Project both in Turkey and Hungary for the staff of the Hungarian Defense Forces who will be serving in these vehicles. A long-term solution that will allow the foundation of a permanent footstep in Hungary may be expected. Since the order consists of hundreds of vehicles, NUROL Makina's permanent existence in Hungary in respect to the repair and maintenance of these vehicles would not be surprising at all.

NUROL Makina participated to the field tests organized by Slovakia in Europe with its product EJDER YALÇIN Block-III 4x4 TWAV and demonstrated one of its most successful performances by competing with its competitors in the tests, in which 10 vehicles from different segments and various countries took part.

Conclusion

NUROL Makina continues its innovative activities in the defense industry by blending them with seasoned engineering experience of over 40 years. Presently, the company is further strengthening its position in the industry with its indigenous armored vehicle platform solutions such as the EJDER YALÇIN 4x4 TWAV, YÖRÜK/NMS 4x4 TWAV, EJDER TOMA 4x4 Riot Control Vehicle, EJDER KUNTER 4x4/6x4 and 6x6 Special Purpose Platform and the ILGAZ-I/II 4x4 Internal Security Vehicle.

In terms of its structure, technology and quality, NUROL Makina functions as a competitive company, advancing with firm and reliable steps towards a safe future. As a 'Solution Partner', within the scope of its target to become a more effective player in land platforms, it also aims to turn the EJDER, YÖRÜK/NMS and ILGAZ names into global brands as these products already have reached a certain maturity level and exports are increasing every year