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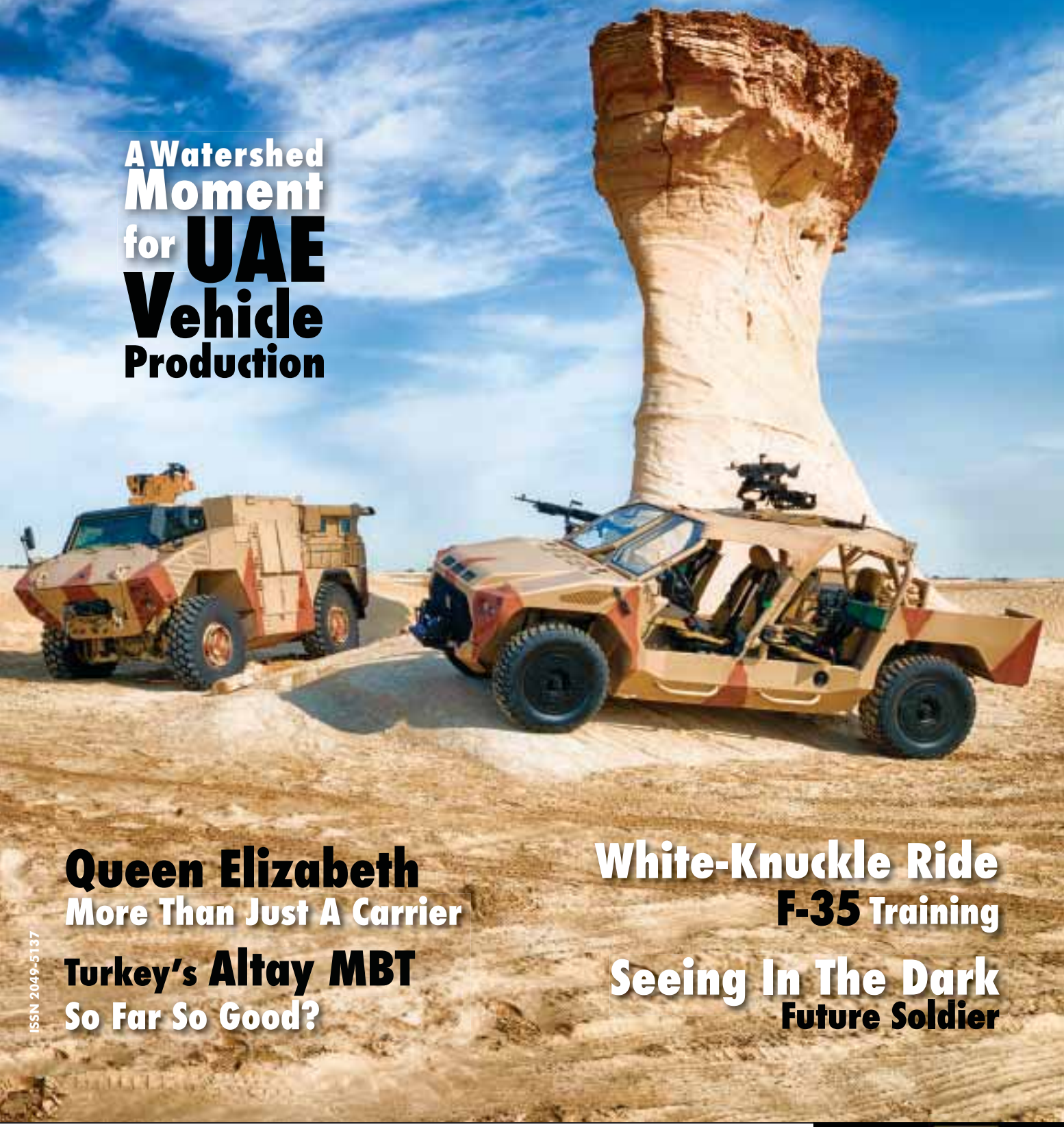

A Watershed Moment for UAE Vehicle Production

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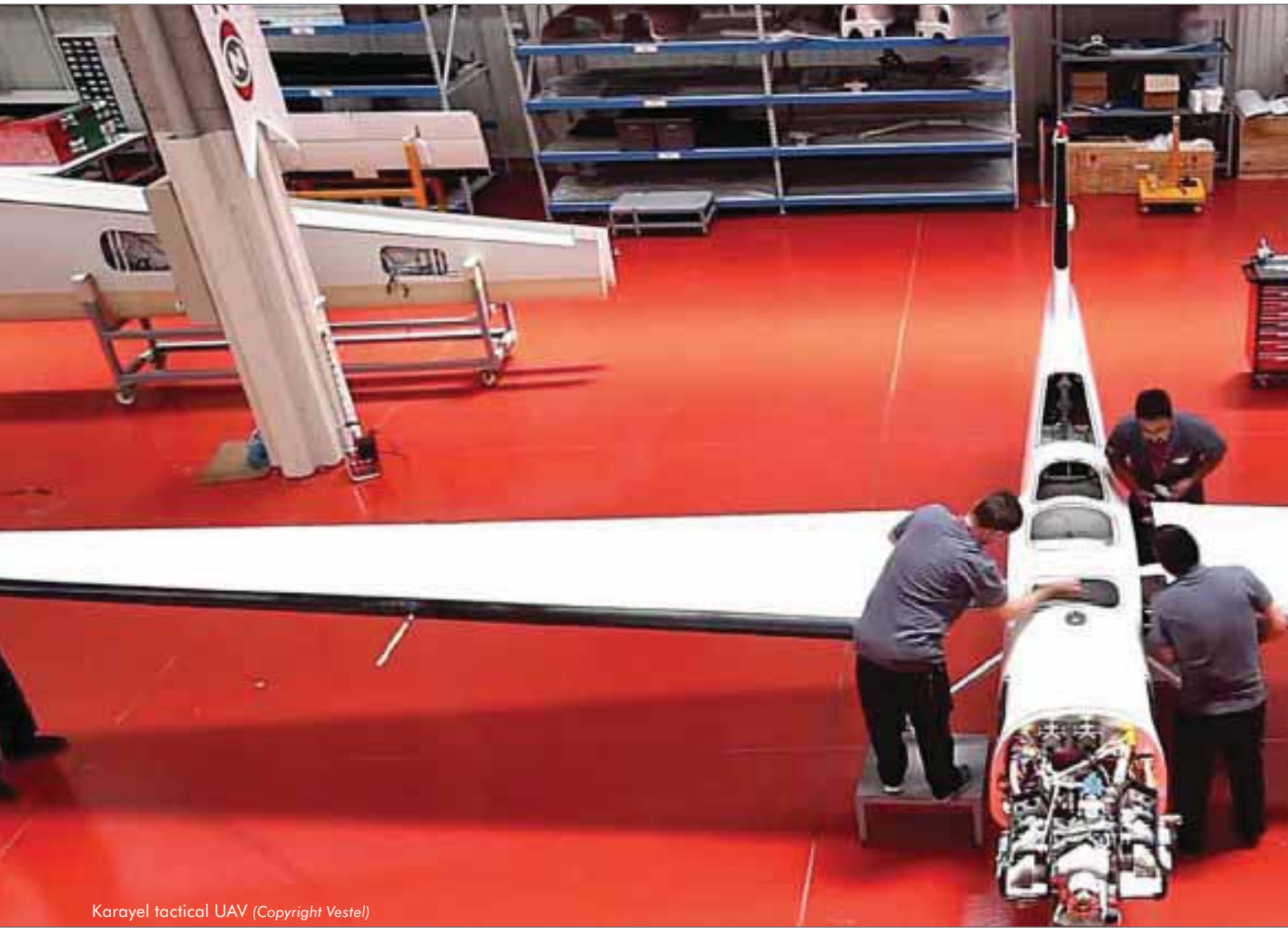
Turkish UAVs Join Exclusive Club

After a decade of research and development, Turkey recently joined a group of elite Unmanned Combat Aerial Vehicle (UCAV) producers (China, Israel, Iran, Pakistan, and the United States). A growing number of domestically-produced UCAVs are becoming operational, including the armed Baykar Makina Bayraktar TB2-S.

By Giulia Tilenni

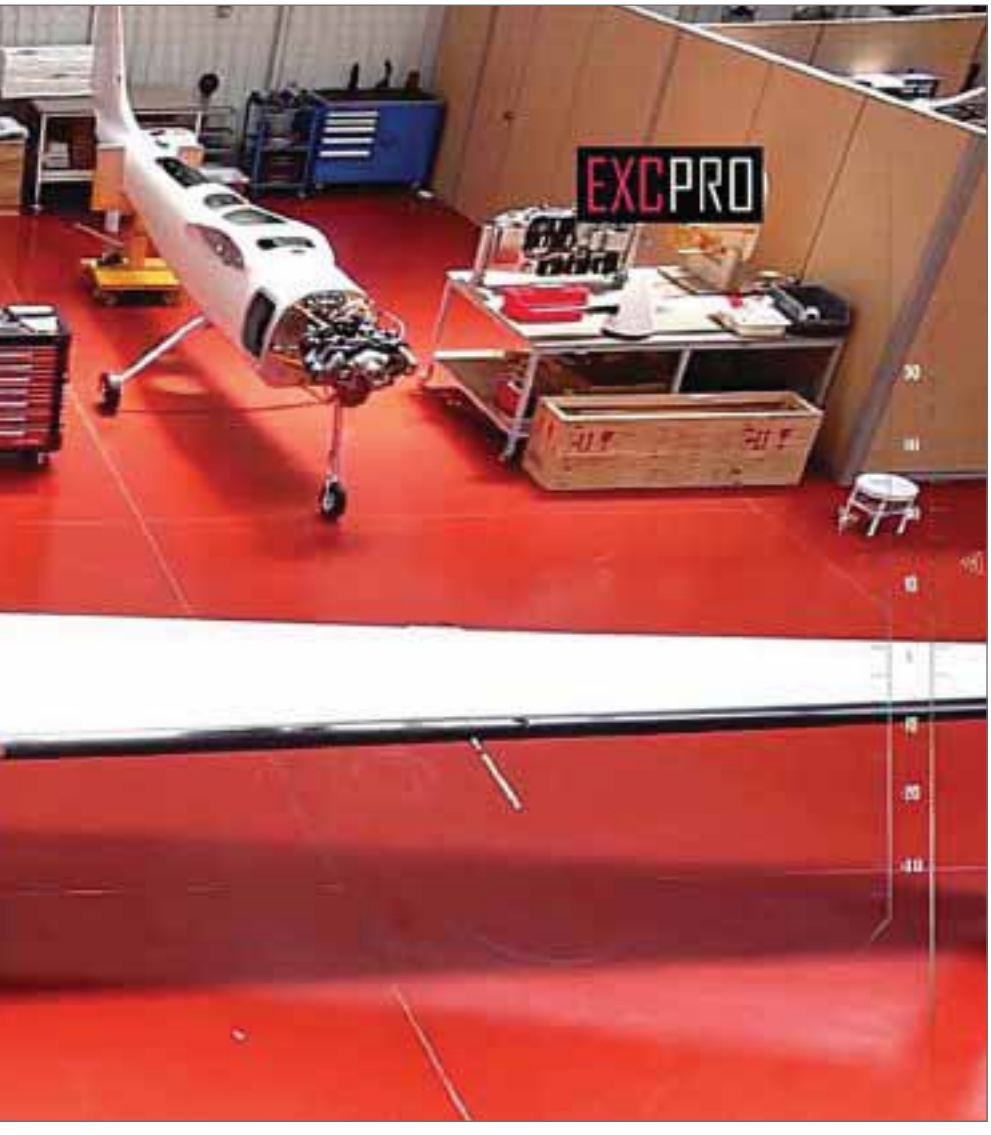


Karayel tactical UAV *(Copyright Vestel)*

Turkey has had an interest in unmanned aerial vehicles (UAVs) since the onset of the millennium. But like most NATO member countries, it has relied on imports of foreign designed and manufactured UAVs to sate its appetite for MALE (Medium-Altitude, Long Endurance) unmanned assets.

Turkish Armed Forces have operated the Israel Aerospace Industries' Heron UAV, but a cooling off in diplomatic relations between Turkey and Israel negatively impacted the operability of the fleet. Ankara also expressed an interest in acquiring General Atomics MQ-1 Predator and MQ-9 Reaper from the US, but the purchase was not concluded.

Convinced of the importance of having a UAV fleet, in 2009 the Turkish Undersecretariat for the Defense Industry launched a two-stage Tactical Unmanned Aerial Vehicle System Development programme. This resulted in the creation of the first Turkish-produced tactical UAV—the Baykar Makina Bayraktar Block 1—which marked a significant step towards Turkey's development of indigenous unmanned systems.



Since then, Ankara has worked on becoming strategically independent from foreign UAV suppliers through domestic UAV production. Turkey's acquisition of the Heron MALE UAV from Israel demonstrated that relying on foreign technologies could negatively impact the political-military possibility of pursuing related goals.

Attacked by terrorist organisations and surrounded by political instability, Turkey has become more proactive in terms of indigenous defence equipment production and UAVs have supported this posture by monitoring domestic and external threats.

BAYRAKTAR TB2-S

The Baykar Makina Bayraktar TB2-S tactical UCAV is based on the Bayraktar TB2 tactical UAV, which is already deployed by the Turkish Land Forces Command (TLFC) and the Aviation Department of the Turkish National Police. The Bayraktar TB2-S has been operational since December 2015 and was used for domestic security operations up until August 2016 when the Bayraktar TB2-S was deployed for counter-terrorism operations on the Turkish border (against Kurdish forces and ISIS militants). The two Bayraktar TB2-S deployed by the TLFC have reportedly killed approximately 300 terrorists in the first months of operation.

The Bayraktar TB2-S is entirely domestically-produced, including critical systems (power, inertial systems, fight controls and assignment computers, and the BSI-101 Signal Intelligence Device).

Its main strengths are target acquisition and fight capability, which make this UCAV particularly efficient for counter-terrorism operations, especially when carried out in urban environments.

The UCAV mounts the Roketsan laser-guided smart micro munition MAM-L. The length and weight of this munition is built around this specific class of

UCAV. A new TBS-2 version, able to mount up to four Roketsan MAM-C smart micro-munitions is currently under development, and should be available later this year. The TLFC will be provided with an additional four Bayrakatr TB2-S systems (16 aircraft) by June 2018.

Although already operational, the Bayraktar TB2-S may still be under technical evaluation. This could explain why, to date, technical features are still undisclosed. As the Bayraktar TB2-S derives from the Bayraktar TB2, it is likely that the two models share similar characteristics. According to Baykar Makina, the Bayraktar TB2 has a 150+ km range, and a 70 knots maximum speed. It can fly for 20 hours and perform semi-autonomous or fully autonomous missions at a maximum altitude of 24,000 ft.

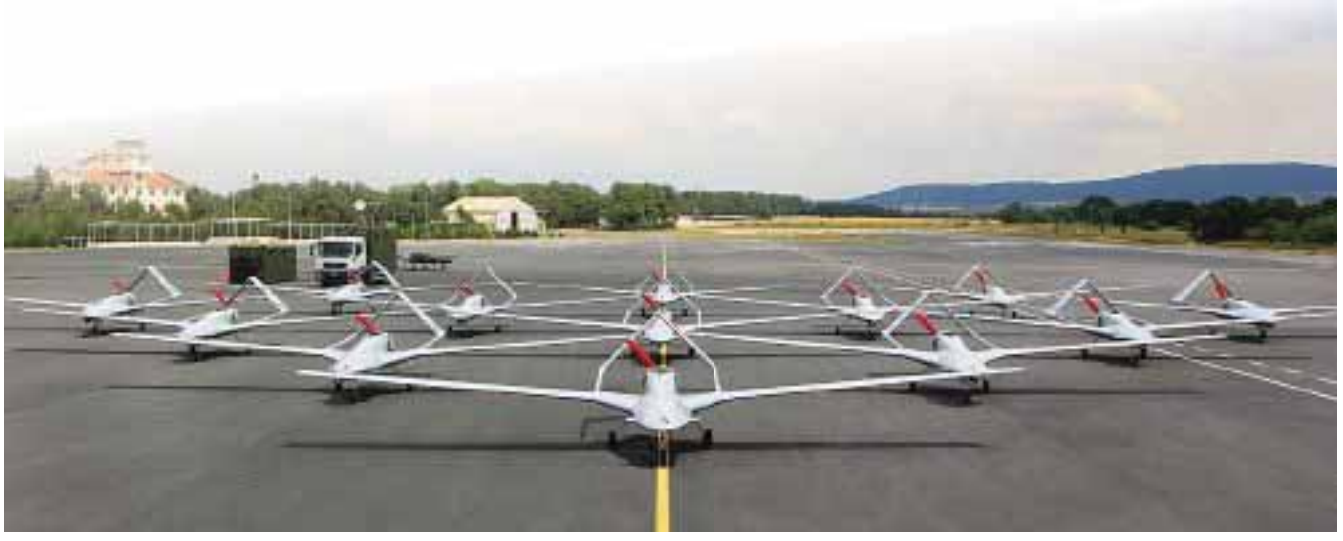
The maximum payload it can carry is 55 kg, compared to General Atomics MQ-9 Reaper's 1,700 kg maximum payload. As each Roketsan MAM-L smart ammunition weighs 23 kg, the Bayraktar TB2's airframe could have been modified so the TB2-S could carry two ammunitions and the Electro-Optical Infrared Laser Designator Laser Range Finder standard payload. Alternatively, key figures could have remained the same, and the overload would have been balanced by reducing the fuel load (300 litres maximum), yet downgrading overall capabilities. This second hypothesis is the most likely, as in 2015, Roketsan performed an air-to-surface anti-tank test mission in a similar configuration.

KARAYEL TACTICAL UAV

An armed version of the Vestel Savunma Sanayi Karayel tactical UAV was presented at the third High-Tech Port 2016 exhibition in Istanbul. Karayel is thought to be the first tactical UAV designed, developed and produced in Turkey. It was displayed for the first time in 2013, but its development dates to 2003.

The Karayel UCAV can fly 20-hour missions at a maximum altitude of 22,500 ft and a maximum speed of 80 knots. It has an operational range of 150 km. The payload bay has different configurations related to either military or civilian applications. With its 70 kg maximum payload, Karayel can mount two Rocketsan MAM-L munitions. Other payload packages include the L3 WESCAM MX15D EO/IR camera for target detection and different laser designator (laser distance metre, laser target guidance and laser target marker).

> **"Although Bayraktar TB2-S is proving effective in counter-terrorism campaigns, this UCAV is far from reaching US or Israeli standards in terms of lethality of payload or endurance."**



Bayraktar TB2 UAVs (Copyright Baykar)

TAI's ANKA-S at the 2017 Paris Air Show *(Photo: Giulia Tilenni)*

The current payload is the result of an upgrade of the base version of the Karayel, which had a payload of 51 kg.

The Karayel UCAV was designed to meet NATO airworthiness standards (NATO STANAG 4671), which will eventually facilitate its future integration into non-segregated air space. It can perform both manual and autonomous take-off and landing and can fly in all weather conditions, including ice—a pneumatic de-icing subsystem can be mounted.

The Turkish Armed Forces placed an initial order for three ground control stations with two Karayel UAVs each, however, the number of deployable UCAVs is currently unknown. In 2016, the company declared that Karayel was being used along Turkey's eastern border. So far, official data on ongoing deployments is not available.

UCAV TO BE – ANKA-S?

Turkish Aerospace Industries' (TAI) first deliveries of the armed ANKA-S MALE UAV are expected this year. Six out of 10 UAVs will enter into service this year, and the remaining four will follow by 2018. ANKA-S is a multi-role ISTAR system, deployable for all weather conditions, day and night missions, including SIGINT. The programme commenced in October 2013 when TAI and the Undersecretariat for Defence Industries established its development framework.

This MALE UAV can fly 24-hour long missions at a 30,000 ft service ceiling with a speed greater than 74 knots. ANKA-S has a 200 km data-link range and 200 kg payload capacity. Its technical features have been tested in harsh conditions, including winds (up to 45 knots), rain and ice.

ANKA-S provides real-time, night and day image intelligence on fixed and mobile targets. TAI can provide the UAV with two payloads: EO/IR/LD/LRF (for example, Aselsan CATS – Common Aperture Targeting System) and SAR/ISAR/GMTI (Synthetic Aperture Radar/Inverse Synthetic Aperture Radar/Ground Moving Target Indication).

ANKA-S will mount SATCOM TÜRKSAT 4B for satellite communications/control. The Operation, Simulator and Training Centre (OSEM) will allow beyond-line-of-sight satellite control on different UAVs at the same time. ANKA-S has

redundant command and control systems and can conduct fully autonomous take-off and landing operations. In addition, it can be transported by C-130. TAI is reported to have successfully concluded trials of a weaponised version of ANKA-S, carrying Rocketsan MAM-L munitions. The Turkish Defence Industry Undersecretariat stated that the UAV will soon become operational in the armed configuration.

CONCLUSIONS

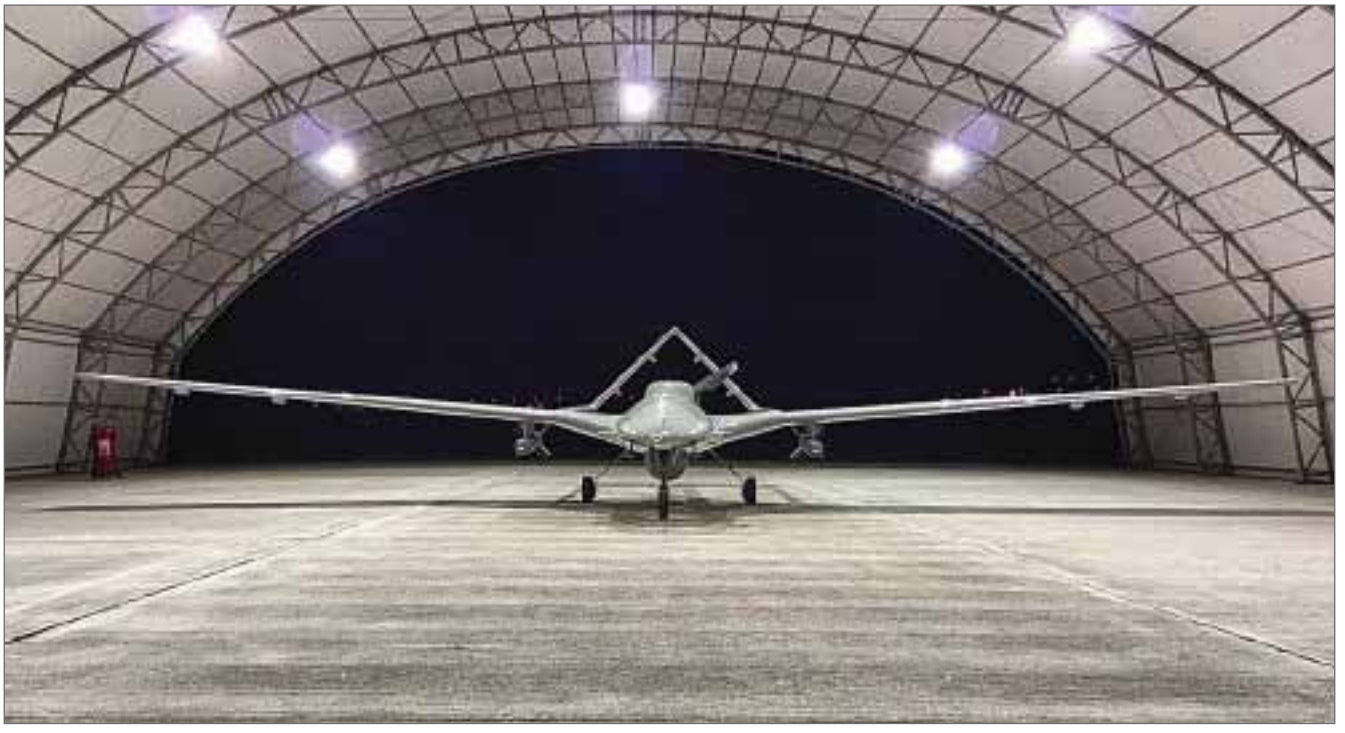
The Bayraktar TB2-S is fast becoming Turkey's 'silver bullet' for counter-terrorism and border protection operations, proving particularly effective against the PPK thanks to its target acquisition and strike capabilities. This operational experience has had a two-fold effect on Turkey's approach to UAVs. Firstly, Turkey will continue to deploy these assets to achieve its military objectives at home and abroad.

A Joint Coordination Centre for UAVs and Surveillance Monitoring Systems will be established in Ankara to better co-ordinate UAV deployments in counter-terrorism operations, which are expected to increase in future. Furthermore, Turkey plans to expand its unmanned fleet and national companies are working on nano-drones and multi-copter strike drones.

Secondly, Turkish UAVs demonstrate domestic companies' relative proficiency at developing/producing cutting-edge technologies, allowing Ankara to enter the international UAV suppliers' market. The Turkish Bayraktar-B mini UAVs were sold to Qatar in 2012, marking the first Turkish international sale of unmanned technologies. More recently, the launch of domestically-produced UCAVs has provided an international showcase for aerospace companies. For example, last February. Boeing expressed an interest in collaborating with four to five Turkish companies. Yet, it is difficult to assess whether Turkey will become a staple in the UCAV market. To date, a small number of UCAVs have been delivered, and it is unclear if other domestically-produced UAVs (such as ANKA-S) will be effectively armed. Although Bayraktar TB2-S is proving effective in counter-terrorism campaigns, this UCAV is far from reaching US or Israeli standards in terms of lethality of payload or endurance. Arming ANKA-S could represent a basic solution to this problem, but to date Turkey's overall UCAV capability is still embryonic. ■

ABOUT THE AUTHOR

Giulia Tilenni is a junior analyst in defence and security affairs and editorial co-ordinator of the European affairs desk at *Il Caffè Geopolitico*, an online journal of international politics. She provides analysis on UAVs, military intelligence and EU defence issues.



Armed Bayraktar TB2 (Copyright Baykar)