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The Language of Power for a More Geopolitical EU

Photo: author



It is not only in view of the Israeli-Palestinian conflict that Europeans are trying to orient and mobilise themselves. Commission President Ursula von der Leyen proclaimed a more geopolitical stance for the EU when she took office. The EU intends to play a greater role in global crisis management. According to a survey, this is what the citizens want as well. Last year, 77 per cent of Europeans supported efforts to develop a common EU security and defence policy (source: High Representative Josep Borrell, citing Eurobarometer). Josep Borrell never gets tired of calling for more commitment. At the 6 May meeting of EU defence ministers, he concluded, "We must prepare for the next crises and respond quickly." That involves "making the EU's operational engagement more effective."

The deliberations at the 6 May meeting focused on one of the four main issues at hand: crisis management. A "number of ideas" were "put on the table," the EU High Representative reports. According to rumours, a total of 22 non-papers, describing different perspectives on how to prepare for the next crises and approaches to respond quickly. All more or less focused on the operational aspect of the common security and defence policy: How can CSDP operations and missions be made more robust, agile and efficient? Where should the European Union act as a priority? And how?

Now a new unit is supposed to do the job – although the EU Battle Group has not yet proven its usefulness. Will 'the new entity' help to hide the fact that for the time being a truly global ambition seems to be unattainable?

Fourteen member states, including France and Germany, have endorsed the idea of an EU Initial Entry Force. The approximately 5,000-strong unit (land forces, supported by air force and naval components if needed) would be deployed quickly in the early stages of a crisis. For those familiar with the Common Foreign and Security Policy: old wine in new barrels. As early as 1999, the 'European Headline Goal' gave birth to the idea of international crisis management with a force of 60,000 troops ready for worldwide operations within 60 days (within the framework of the Petersberg tasks in force at the time). In 2007, the rotating EU Battle Group was established to respond quickly to crises. Since then, two battle groups (1,500 men each) have always been on standby for a period of six months on a rotating basis. They have never been used so far. It could form the nucleus for the 'initial entry force' that has now been raised.

Brussels observers believe that the new initiative is a fresh attempt on the road to an EU army. After Brexit, the Union finds itself freed from a fierce opponent of such aspirations.

On the other hand, it is not for lack of ideas that the European Union still does not use the language of power, as High Representative Josep Borrell likes to put it. The EU is proving to be financially strong, to be sure. It has a common budget for defence. Overall, however, it appears powerless. This is not only due to internal differences of opinion among the member states regarding the form of EU foreign policy. As the example, the special conference on the situation in the Middle East on 18 May showed it was not possible to agree on a joint final communiqué. Member states are only – to a limited extent – fulfilling their obligations in terms of missions and operations. This ranges from the lack of deployment of capabilities to individual soldiers. In an earlier interview with our sister magazine +Maritime Security and Defence+, the head of the EU Military Staff, Admiral Hervé Bléjean, referred to capability gaps due to a lack of units and the shortage of personnel in ongoing operations.

Hans Uwe Mergener



Photo: Crown Copyright 2020

The discovery of significant energy resources in the Eastern Mediterranean has served to fuel longstanding tensions amongst countries bordering its waters.

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German Bundeswehr Selects Laser Light Modules from Rheinmetall

(jh) The Bundeswehr has selected Rheinmetall to supply laser light modules for the German armed forces. A corresponding framework contract envisages delivery of up to 130,000 units. The first batch, comprising 2,460 devices, is worth a total of €3 million. The framework agreement covers up to €178 million in potential supplies. This is the largest order for laser light modules ever booked



Photo: Rheinmetall

by Rheinmetall Soldier Electronics. The framework contract is initially set to run for seven years. The devices can be mounted via a standard interface

to all assault rifles, submachine guns, machine guns and sniper rifles currently in the Bundeswehr inventory. Deliveries will begin this year. The Bundeswehr will initially take delivery of 360 devices earmarked for integrated verification management. These will be followed by the remaining 2,100 laser light modules now on order.

The device selected is a version of the Rheinmetall's latest-generation LLM-VarioRay laser light module. Intended primarily for small arms carried by infantry and other soldiers who fight on foot, it is used for detecting, identifying and marking targets. Weighing around 250 grams the LLM-VarioRay can be mounted on any assault rifle with a MIL-STD 1913 rail/STANAG 4694 and operated via a trigger cable. It features a white lamp, a red-light laser marker, an infrared laser marker and an electrically focusable infrared illuminator. The light source can be selected with a rotary switch and is infinitely adjustable. The device has a fully integrated, factory-aligned laser block, enabling adjustment and alignment of the aiming device and weapon. Together with night observation and thermal imaging devices, it is expected to support the troops performing operational missions around the clock and independent from weather conditions.

Among other things, the LLM-VarioRay product family forms part of the German soldier system "Future Soldier – Expanded System" (IdZ-ES). It is also in service with the British Army, which calls it the Laser Light Module MK3, and with the Swiss Army, where it is known as the Laser-Licht-Modul 19.

Fourth Submarine Delivered to Egypt

(jh) The Egyptian Navy has received S44, the last of the four type 209/1400mod submarines from thyssenkrupp Marine Systems ordered in 2011 and 2015.



Photo: tkMS

The first three submarines were delivered in 2016 (S41), 2017 (S42) and 2020 (S43) respectively.

The type 209 is an export submarine design. The boat is 62 m long, has a diameter of 6.2 m and displaces 1,600 tonnes underwater. Complement is 30. Powered by a diesel-electric propulsion system, the type 209 reaches a top speed of 40 km/h/22 kn (submerged).

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Poland to Receive 250 M1A2 ABRAMS MBTs

(gwh) On 14 July 2021, Polish Deputy Prime Minister Jarosław Kaczyński, together with Polish Defence Minister Mariusz Błaszczak, announced details of a contract for the procurement of 250 M1A2SEPV3 ABRAMS main battle tanks. According to the contract, the tanks are to be delivered from the end of

Photo: GDLS



2022. They are earmarked to equip at least four tank battalions and to be deployed in the 1st Warsaw Armoured Brigade and the 19th Mechanised Brigade as part of the 18th Mechanised Division in the east of the country. Among other things, they are to form the counterweight to the most modern Russian T-14 ARMATA tanks in a possible first line of defence. Poland is only the second country after Australia to receive this version.

In addition to the main battle tanks, the procurement package includes support vehicles, packages for training (including simulators) and logistics, as well as large stocks of ammunition. The government is providing the equivalent of US\$6 billion for the entire procurement, which will be financed outside the defence budget.

M1A2SEPV3 version is the most modern ABRAMS version, which has been entering service with the US Army since 2019. The most important innovation of the tank is the modernised fire control system in a new electronic system architecture as well as the power generation systems. The modular architecture provides growth potential for easy integration of additional systems. The 120 mm smoothbore gun can fire the new sub-calibre M829A4 ammunition as well as the programmable XM1147 multi-purpose ammunition. Two second-generation thermal imaging cameras for the commander and gunner enable hunter-killer capabilities in all visibility conditions.

The 67-tonne tank is powered by an AGT-1500 gas turbine with a maximum power of 1,120 kW and reaches a top speed of 68 km/h. Depleted uranium elements, composite and cage armour and reactive armour, among others, are used for protection. It is not known whether the protection of the Polish fleet will be equivalent to that of the American tanks.

The new tanks are to replace the T-72 and PT-91 tanks from the Soviet era. The 447 LEOPARD 2 A4 and A5 main battle tanks acquired from Germany in 2002 and 2013 are apparently to remain in service. For Australia, the US Government had approved the purchase of 75 M1A2SEPV3 in April 2021, in combination with other armoured vehicles. General Dynamics Land Systems, BAE Systems, and Leonardo DRS are listed as the main suppliers.

Baykar Presents the MIUS UCAS

(jh) Baykar Technologies has presented the MIUS (Muharip İnsansız Uçak Sistemi) Unmanned Combat Aircraft System (UCAS). According to the company, MIUS has a weight in excess of 3.5 tonnes and can carry a payload of 1.5 tonnes. The service ceiling is 40,000 feet and the maximum flight time is 5 hours at Mach 0.8, with the objective to reach Mach 1.0 in the future.

Image: Baykar



The tail wings and canard wings are to enable aggressive manoeuvres, in particular for dog-fight environments. The AI-supported MIUS has been designed to accomplish primarily air-to-air and air-to-ground combat missions including:

- Close air support
- SEAD (Suppression of Enemy Air Defence)
- DEAD (Destruction of Enemy Air Defence)
- Missile attack.

MIUS will be able to take off and land from LPD/LHD TCG ANADOLU. Take-off will be possible without catapult and arrestor cables will be used for landing.

Draken Europe and Collins Aerospace Collaborate on Air Combat Training Systems

(jh) Draken Europe and Collins Aerospace have signed an agreement that will introduce Collins Aerospace's Joint Secure Air combat training System (JSAS) for use with Draken's FALCON 20 fleet in support of operational readiness training for the Royal Air Force and Royal Navy.

The solution is comprised of aircraft-mounted JSAS pods plus a ground station, built in cooperation with Leonardo DRS, and offers

Photo: Collins Aerospace



advanced, high capacity, low latency, and multi-hop mesh networking using a software defined radio hosting multiple waveforms providing key enablers to achieve secure, LVC, multi domain collective training. With the first systems delivered to Draken Europe's headquarters, these pods based on CRIIS (Common Range Integrated Instrumentation System) and already used by the USAF and USN for training and analysis, will be cleared for flight on the FALCON 20 fleet, with first trials by the end of 2021. As part of Draken's current operational readiness training contract with the UK MoD, JSAS pods will enable near real time combat training information to be viewed at the aircraft base, and be ready for de-brief immediately after landing. This interoperability is made possible by the Multiple Independent Levels of Security (MILS) architecture that ensures that classified data is protected while it is shared across platforms with the same security levels.

The system will be upgraded in time with a variant of the next generation Tactical Combat Training System – Increment II (TCTS II) pods enabling fully encrypted interoperability with all coalition platforms across legacy P5 and future P6 Air Combat Manoeuvring Instrumentation (ACMI) waveforms. The agreement goes beyond system provision and includes a commitment to seek opportunities to demonstrate the technology more widely with coalition partners and to use it as a platform for introducing virtual and constructive training effects.

Escribano Consolidates its Presence in Peru

(jh) SENTINEL 2.0 and SENTINEL 30 systems from the Spanish company Escribano M&E have successfully passed the SAT tests in Peru undertaken on the Peruvian Navy patrol boats PPMM 208 BAP RÍO TUMBES and PPMM 209 RÍO LOCUM-

Photo: Escribano



BA. The SENTINEL 2.0 station integrates Browning 12.70 mm calibre heavy machine guns. Equipped with an infrared and a day camera and a laser range finder (LRF), SENTINEL 30 allows the operator to locate and engage targets around the clock. Besides, automatic target tracking using video from both cameras provides for immediate and lethal effectiveness. The SENTINEL 30 station can mount a 30mm cannon (MK44S BUSHMASTER II) and can be adapted to 40mm without modification. Both weapon stations can be remotely controlled from a console by a single operator under protection inside the boat.

Both systems are "stand-alone" solutions that can either be integrated with the combat, navigation or data system of the patrol boat or can integrate an electro-optical system for long range detection and threat tracking, as, for example, the configurations installed on the BAP UNION or the BAP PISCO of the Peruvian Navy. The performance and firepower of the SENTINEL RWS has been combined with a new generation of the OTEOS electro-optical system, thus enhancing observation and surveillance capabilities. Escribano M&E has cooperated with SIMA in Peru for years. This cooperation has resulted in the installation of different naval systems on ships of the Peruvian Navy, such as the river patrol boats CLAVERO and CASTILLA, the sailing training ship BAP UNION and the multipurpose ship BAP PISCO with the SCAMO system (System of Control of Remote Stations by Optronic Means).

■ EU to Co-Finance EURODRONE

(jh) On behalf of the EU Commission, OCCAR has signed a €100 million grant agreement with the industrial partners to jointly develop and manufacture the Medium Altitude Long Endurance Remotely Piloted Aircraft System (MALE RPAS) unmanned reconnaissance drone system. The system, also called EURODRONE, will be co-financed by the €1.2 billion European Defence Fund (EDF), which the EU Commission kick-started on 2 July 2021. The EURODRONE and ESSOR, a programme to develop waveforms for software-defined



Image: OCCAR

radios, are the only projects directly funded by the EDF.

The MALE RPAS programme aims to develop and manufacture 20 Unmanned Aerial Systems (UAS). Each UAS consists of three aircraft and two ground control stations. It also includes ground support equipment, spare parts including storage, training and operational support for the first 6.5 years. With unique capabilities in unmanned aerial surveillance, the MALE RPAS is expected to become one of the main pillars of any future combat aircraft system.

On the industry side, the EURODRONE programme is coordinated by Airbus Defence and Space. Other significant industrial partners include Leonardo and Dassault Aviation.

■ PHILOCTETES Infantry Combat System

(gwh) At the DEFEXA defence exhibition in Athens, Greece, Nexter presented the VBCi PHILOCTETES infantry combat system for the first time. Based on the requirements of the Greek Army, the armoured infantry combat vehicle (Véhicule Blindé de Combat d'Infanterie, VBCi) received a newly equipped remote-controlled 40-mm CT turret.



Image: Nexter

The main weapon is the 40 mm Cased Telescoped Weapon System (CTWS) machine gun developed by the joint venture Cased Telescoped Ammunition International (CTA International, CTAI) with the support of the ministries of defence from France and Great Britain. CTAI was founded in 1994 by Nexter and BAE Systems as a joint venture for the development and production of this gun.

The compact weapon system takes up no more space than conventional 30 mm weapon systems. It fires 40 mm telescopic ammunition with the projectile entirely surrounded by the cartridge casing and immersed in the propellant charge. As a result, the cartridge is only 255 mm long with a diameter of 65 mm. The 30 per cent smaller volume results in space and weight savings, or more ammunition for the same space requirement. Two insensitive combat-ammunition types are available:

- General Purpose Round (GPR), programmable in the cartridge chamber, with impact fuse or air burst point, and
- Armour Piercing Fin-Stabilised Discarding Sabot Tracer (APFSDS-T) with 1,600 m/s muzzle velocity.

In addition, there is a laser-guided sub-calibre projectile that can be used at Mach 3 muzzle velocity against moving targets up to a distance of 4.5 km. Practice projectiles without a warhead can be used for training.

In addition to the main weapon, the crew can deploy MBDA's Missile Moyenne Portée (MMP) anti-tank guided missile from a medium-range launcher.

The name PHILOCTETES, which Nexter chose in reference to the mythological hero of the Trojan War, illustrates the system's orientation towards Greek requirements. According to Nexter, the weapon system was presented in the livery of Greek combat vehicles and meets the requirements of the Greek Army in terms of mobility, protection, modularity and firepower.

■ Russian Navy Continues ZIRCON Testing

(yl) The frigate ADMIRAL GORSHKOV of the Russian Northern Fleet successfully engaged a land target with a ZIRCON hypersonic missile. The missile was launched while the frigate was operating in the White Sea and hit a spot target on the Barents Sea coast.

A Russian MoD spokesman referred to the objective control data to confirm a direct hit



Photo: Russian MoD

of the target at a distance of over 350 km. The test proved all the tactical and technical characteristics of the ZIRCON missile including the flight speed of almost Mach 7.

The ADMIRAL GORSHKOV has made several test firings of the ZIRCON since October 2020. Previously, the missiles hit surface targets at sea and on the shore successfully. Further ZIRCON tests are expected to be carried out from the Project 22350 frigates ADMIRAL GORSHKOV and ADMIRAL KASATONOV. The first naval unit to be equipped with series production ZIRCON missiles will be ADMIRAL GOLOVKO, the next frigate of this series. In August 2022, the nuclear submarine SEVERODVINSK is scheduled for submerged ZIRCON test firings.

The Turkish-Egyptian Diplomatic Tango: Context, Demands and Actions

Dr Andreea Stoian Karadeli

The sensitive rapprochement between Turkey and Egypt, in the shadow of the Libyan war and a disputed Eastern Mediterranean, needs efforts on both sides to reach a common path that can guide towards a secure future. Behind the diplomatic tango, Turkey and Egypt remain two rival strong heads with no other choice than accepting that they need each other more than ever before. If managed correctly, Ankara, Cairo, and the whole region will have a lot to gain from the compromise and cooperation of those two states.

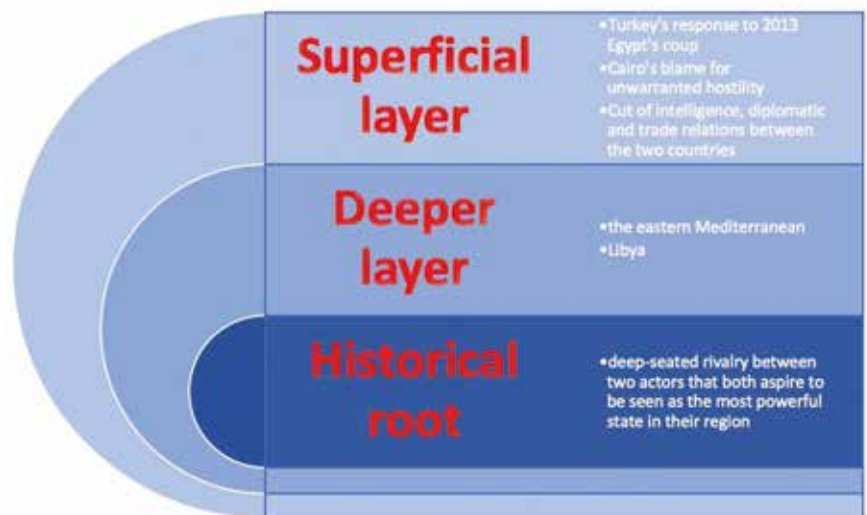
Turkey and Egypt are key countries both for the Eastern Mediterranean and for the Middle East and North Africa. In early May this year, deputy foreign ministers and diplomats from both countries met for a two-day, high-level summit to discuss multiple open files that explore ways to normalise bilateral relations after eight years of political tensions. On an optimistic note, the recent talks pave the way for a possible reconciliation between Egypt and Turkey, which could, in turn, significantly shift the region's diplomatic balance. Still, there is a long, fragile and uncertain path to a compromise between the two titans, both having divergent perspectives on key issues regarding both internal and regional contexts.

Post-2013 Turkey-Egypt Relations: Three Levels of Grievance

While Turkish-Egyptian relation have never been perfect, the 2013 Egyptian coup d'état marked the beginning of a deteriorating trend in their bilateral relations, peppered with antagonistic declarations and actions from both sides. President Erdogan claimed the el-Sisi regime as illegitimate, following the de-

posing of Ankara ally and Muslim Brotherhood figure Mohammed Morsi. Nevertheless, Ankara asked the UN to act against Egypt and allowed the Muslim Brotherhood to settle in Turkey, claiming the country as their new headquarters and transforming Istanbul into one of the main destinations for the Egyptian opposition fleeing the post-coup crackdown. The Justice and Development Party (AKP) embraced the four-fingered 'Rabaa' sa-

Deeper under the surface, the issues that have pushed the two actors further away from each other are their differences over two main subjects: the Eastern Mediterranean and Libya. Turkey and Egypt have supported opposing sides in Libya's civil war and Cairo has blamed Ankara for its military involvement in the country. In the Mediterranean, Egypt sided with Greece and Cyprus in a row over gas exploration that Turkey sees as an attack on its territorial rights.



Author

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lute, a direct reference to the mass killing of demonstrators who were protesting the military takeover of power from the elected government of President Morsi in the Rabaa al-Adawiya square in 2013 in Egypt, as one of its political symbols. On its side, Cairo has blamed Turkey for unwarranted hostility towards Egypt and has cut back intelligence, diplomatic and trade relations since 2014. But these elements bond into just a superficial layer reflecting the bilateral relations between the two actors.

While all the reasons mentioned so far are crucial reasons for the decline in the Turkish-Egyptian relations, one cannot turn a blind eye to the historical element that reflects the most striking difference between the two countries, pointing at the root of the current issues: the deep-seated rivalry between two actors that both aspire to be seen as the most powerful state in their region. Compromise and a common path might be reached, but if the fundamental rivalry persists, the potential for conflict will remain.

2021 Dynamics of Reproachment: a Tango on Shifting Sands

In the aftermath of the Arab Spring, the power politics chess table of the Middle East has been impacted by two overlapping axes. On one side, the geopolitical and ideological competition between the Islamic Republic of Iran's "Resistance Front" and the conservative Arab states led by Saudi Arabia; on the other side, the newer struggle axis represented by the intra-Sunni competition between the circle of Saudi Arabia, the United Arab Emirates (UAE), Egypt and the couple Turkey-Qatar. While all the states acting in the second axis used to be part of the same strategic architecture, the management of the 2011 uprisings have divided them into two main sides: pro- and against- the Arab Spring. In this context, Turkey (and eventually Qatar) has been seen as a promoter of the Arab uprisings, demanding democracy in the region. Together with its increasing involvement in Syria and Libya, Turkey's role, status, and power in the region has expanded, although its foreign policy agenda isolated Ankara from many of its formal partners. Therefore, the current necessity to de-escalate the bilateral relations between Turkey and Egypt is a consequence of geopolitical transformations in the MENA region. Although Turkey has been portrayed as the most eager side among the two, due to its quest to safeguard the recent gains in Libya and ensure its position in the eastern Mediterranean region, Egypt has also understood that any initiative in the region does not stand a chance without Turkey's participation. Also, a pressing factor on the Egyptian side is the Grand Ethiopian Renaissance Dam (GERD) dispute. The GERD is a matter of national security for Cairo as the country relies heavily on the water supply from the Nile, and the negotiations between Egypt and Ethiopia did not produce any positive outcome as the two most populous countries in the Nile Basin face a violent confrontation. Considering the ties between Ankara and Addis Ababa, Egypt might benefit from Turkey's mediator role in resolving the crisis. All in one, from Egypt's perspective, Cairo perceives the normalisation process as an opportunity and necessity to counter some of the political and economic weight it has had to carry since the 2013 military coup. On the other side of the table, the normalisation initiative is a clear sign of Ankara's constructive foreign policy agenda, which aims to reduce regional tensions to prevent further deterioration in regional politics. At present, Ankara's efforts towards reassess-

ing its diplomatic strategy to break the isolation trend of recent years is also related to the deepening economic crisis that pushes Turkey towards preserving and expanding regional trade and energy opportunities. Moreover, as Qatar improved its relations with Saudi Arabia, the UAE and Egypt after the three-and-a-half-year blockade, Turkey might be following Qatar in terms of foreign policy strategy in the Middle East. In other words, the rapprochement

are rather hard to meet. According to recent estimations, there are between 5,000 and 7,000 members of the Brotherhood living in Turkey, 3,000 of whom have already received their Turkish naturalisation documents.

According to the Turkish Foreign Minister speaking in the context of the high-level summit in May, "Turkey did not receive any prerequisites from Egypt and did not stipulate any conditions, either. When ties are



efforts between Turkey and Egypt might be extended to Saudi Arabia and the United Arab Emirates (UAE) in not-so-distant future. In addition, Turkey's relations with Iran – the old antagonist of the block – have deteriorated because of the latest conflict in Nagorno-Karabakh where they supported opposite sides, and the continued Iranian support for the Bashar al-Assad regime in Syria.

In addition to critical global and regional developments, domestic reasons are also vital for regional countries to tone down their rivalries and zero-sum competition. The negative socio-economic impact of COVID-19 and the fall in oil prices, which have exacerbated already existing problems, hold true for both Turkey and Egypt, and they can both benefit from boosting their economic ties.

Premises and Prospects

Egypt's Foreign Minister Sameh Shoukri said about Turkey's attempts for rapprochement that "if real actions from Turkey show alignment with Egyptian principles and goals then the groundwork will be laid for relations to return to normal." In this regard, Turkey has already made a step forward, restricting the Brotherhood's political activities and broadcasts criticising the Egyptian government: TV channels of the Muslim Brotherhood based in Istanbul — alSharq, Mekamleen and Watan — have been told to tone down their criticism of the Egyptian Government. However, Egyptian expectations regarding the expel of the organisations' members from Turkey

severed for such a long time, it is not that simple just to act as if nothing has changed. Ties are developing through gradual meetings, by determining a roadmap and acting on those matters. Since there was such disassociation for years, a lack of trust is also inevitable. Therefore, meetings are ongoing within the framework of a certain strategy and roadmap. We have made contact at the intelligence and foreign ministry level. Our diplomatic meetings have begun." While more positive than its counterpart, the message given by Ankara is simple: discussions have been re-activated, but there is a long way ahead of us. Just like in Shukry's statement, it can be ascertained that diplomatic relations between the two states have re-started, but that there is no clear emphasis that "negotiations" are underway. This corresponds to Çavuşoğlu's explanation that meetings are "gradual." Beyond the political and ideological sphere, in the past years, Turkey has developed its relations with its neighbours from a military/intelligence perspective, related to deployment of Turkish troops in foreign territories or naval activities. Therefore, the rapprochement with Egypt might represent an extension of Turkey's policy in Libya. This might explain the reason behind Turkish Intelligence's initiation of the talks with Egypt, while Turkish Foreign Ministry will probably have a secondary role in technicalities and public relations. Binding the relations with Egypt can ensure Turkey's recent strategic gains in Libya. Still, Egypt has its own strategy and expectations regarding Libya that might not match Ankara's plans. To begin with, Cairo requests the

withdrawal of all Turkish forces from Libya along with the Syrian militias contracted by the Turks to fight in the country. Otherwise, Egypt perceives Turkey as playing a double game, willing to normalise but not acting accordingly. For now, the lack of trust is visible on both sides, but most of the keys stay in the Turkish hands.

Turkey needs to shape its strategy towards Egypt carefully, as Cairo has the potential to become vital ally for Ankara on a double power game: on the one hand, Egypt, Cyprus, Greece, and the EU countries are acting together to counterbalance Turkey's maritime policy in the Eastern Mediterranean, on the other hand Egypt, Saudi Arabia, Syria and the United Arab Emirates (UAE) are trying to reverse Turkey's influence in Syria and Libya. For now, apart from Qatar, Turkey is left alone to compete against these alliances. Therefore, Egypt might switch the balance into a win-win situation. Turkey and Egypt can reach a modus operandi that is acceptable to both sides at the end of the talks, but compromise is crucial.

Egypt's Demands vs Turkey's Actions

While for Ankara the top priorities for the rapprochement are a demarcation deal with Egypt in the Eastern Mediterranean, preventing the emergence of a regional energy and security order in the Eastern Mediterranean without Turkey, and ensuring the recent gains in Libya, Egypt's priorities are the Libyan conflict and the presence of the Egyptian opposition actors and media in Istanbul.

According to several sources, without any confirmation from officials of either Turkish or Egyptian sides, Cairo stipulated several conditions for the negotiations with their Turkish counterparts, such as:

- The adherence of Turkey to the maritime international law in order for a maritime demarcation between the two countries to be considered;
- Reducing Turkish support for the Muslim Brotherhood and stopping all the organisation's activities (especially media outlets) taking place within its boundaries;
- A Turkish comprehensive agreement with the European allies, and specifically with the Greek and Cypriot sides;
- Turkey's departure from Libya politically, militarily and security wise;
- Abandoning the Libyan file completely and pledging to withdraw the mercenaries it brought to the Libyan territories;
- Presenting a timetable for the withdrawal of Turkish troops from northern Syria and signing a binding agreement with the Iraqi Government pledging never to intervene in Iraqi territories;
- Apologise for the offences perpetrated in recent years by Turkey against the Gulf states and pledge for non-interference in the affairs of the Arab states and to observe the contours of Arab national security.

Although not officially confirmed, some of these conditions have been discussed on official channels, but no consensus has been reached yet. Still, observers point out that even if these conditions do represent a wish list of the Sisi regime, it is highly unlikely that they will ever be met. After listing similar demands for the restoration of diplomatic ties with Qatar, Egypt and its Gulf allies have quietly ended their blockade, without Doha meeting any of their demands.

On its side, Turkey has expressed a desire for a new deal in the Mediterranean, a delimitation agreement and an exclusive economic zone that would offer Egypt extra territory the size of Qatar. According to the Turkish side, the good will exhibited by Ankara with

respect to re-establishing these relations is not a declaration of defeat or submission and does not require it to abandon the ethical-humanitarian policies it has been adamant on until now. Therefore, Turkey defends its position in the Libyan conflict, stating that its presence on the ground is completely legitimate.

Opportunities for the European Policymakers

On the European side, the rapprochement between Egypt and Turkey also brings opportunities, having the potential to contribute to de-escalating the tense situation in the eastern Mediterranean. The objective here should be to use the occasion to integrate Turkey into regional formats. This would make processes to reach agreements, including over contentious border issues, easier to construct. A first concrete step could be to grant Turkey observer status in the East Mediterranean Gas Forum.

In the case of Libya, both Turkey and Egypt are vital partners to preserve the fragile balance of power. While all countries involved should be discouraged from using potential shifts in the power balance during the elections planned for December 2021, Ankara and Cairo could play a part in driving back the influence of other external actors, such as Russia and the UAE.

Beyond the Libyan conflict and the Eastern Mediterranean power struggle, European policymakers must understand that behind the two regimes' rapprochement lies a deep-rooted rivalry and the fear that their room for manoeuvre in foreign policy might be curtailed or even lost entirely. Due to external factors and economic ones, Erdoğan and al-Sisi are equally dependent on readjusting bilateral relations, which had previously been predicated on confrontation. The timing is therefore right to encourage the two sides towards a political reassessment in other areas as well, such as the problematic human rights situation in both Egypt and Turkey.

Conclusion

In the current circumstances, Turkey-Egypt relations are still at the flirting stage, while the tango is just to begin. Unfortunately, the stage for the two to perform resembles the shifting sands of the desert and it will only worsen while they keep the rest of the dance on hold. Although hard to perceive for the moment, the premises of the Turkish-Egyptian rapprochement have been settled, but the path for compromise is a rocky road, especially when it comes through Libya. ■

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A Look at Turkish Armament Programmes

Kubilai Han

Exporting its defence products to 70 countries, Turkey has become the world's sixth largest exporter in terms of defence and aerospace systems. On 9 February 2021, Industry and Technology Minister Mustafa Varank disclosed that Turkish Defence & Aerospace Industry had achieved a turnover of over US\$11Bn, 30% of which was obtained through exports.

According to "Strategic Plan 2019-2023" issued by the procurement authority SSB on 4 December 2019, the Defence and Aerospace Sector's annual turnover will rise to US\$26.9Bn from US\$8.761Bn in 2018, defence and aerospace (both military and commercial) exports to US\$10.2Bn. The local content rate in defence projects will reach 75% by 2023 - the year that marks the first centennial of the Republic of Turkey. According to current estimates, local content reached 70% in 2020.

Photo: Author



The ALTAY T1 MBT technology demonstrator is based on the ALTAY PV2 prototype with many dummy subsystems.

Major MoD Projects

Whatever Turkey's Defence & Aerospace Industry has produced for the Turkish Armed and Security Forces, the country has been able to sell internationally.

ALTAY Main Battle Tank (MBT)

The €3.5Bn ALTAY MBT Series Production Phase Contract was signed between SSB and prime contractor BMC on 9 November 2018. It covers the production and delivery of 251 tanks in three different configurations; 40 T1, 210 T2, and 1 T3 prototype with an unmanned turret. However, although 28 months have passed since the signing of the agreement, the contract could not enter into force due to problems in the procurement of critical subsystems including German Europowerpack. A domestic 1,500 hp powerpack named BATU was planned to be used in some ALTAY MBTs and for this

purpose, SSB signed a contract with BMC Power on 13 June 2018. On 24 March 2021, Mesude Kilinc, Head of SSB Department of Engine and Power Transmission Systems, declared that the acceptance test of the BATU National Powerpack System will take place in 2024. First test runs with the domestic 1,500hp V12 diesel engine took place in April 2021. Meanwhile, after failing to receive an export licence from the German Government for the Europowerpack to be installed on ALTAY MBTs during the last three years, Turkey has recently started negotiations with South Korean tank engine manufacturer Doosan Infracore Corporation (1,500 hp rated 12-cylinder DV27K diesel engine) and the transmission manufacturer S&T Dynamics (EST15K automatic transmis-

sion) through the South Korean Hyundai Rotem to save the ALTAY MBT Series Production Phase contract.

ISTIF Class Frigates

The ISTIF class frigate programme was launched to construct four frigates, the enhanced version of ADA class corvettes, to replace aging YAVUZ class frigates by mid-2020. Istanbul Naval Shipyard is responsible for the design and the prototype ship construction. Launched on 23 January 2021 at Istanbul Naval Shipyard, the first ship of the class, TCG ISTANBUL (F-515) is scheduled to start Sea Acceptance Tests (SATs) in January 2023 and is planned to enter Turkish Naval Forces' (TNF) service on 6 September 2023.

Author

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TCG ANADOLU Multipurpose Amphibious Assault Ship (LHD)

Under the Multipurpose Amphibious Assault Ship (LHD) Project Contract signed on 1 June 2015 between SSB and Sedef Shipbuilding Inc. (Sedef Shipyard), the Keel Laying Ceremony of TCG ANADOLU (L-400), planned to be constructed with 68% domestic input, was held on 30 April 2016 at Sedef Shipyard in Tuzla, Istanbul and the project activities were started as of 18 September 2015. TCG ANADOLU LHD was launched in May 2019 and Harbour Acceptance Tests were performed in 2020. The outfitting efforts on the ship are currently ongoing. The vessel was planned to be inducted into the Turkish Navy (TNF) late 2020, but this deadline was extended until the end of 2022. In March 2021, SSB disclosed that the ship would carry UAVs and Unmanned Combat Aerial Vehicles (UCAVs), along with helicopters and armoured land vehicles. For this purpose, structural modifications on the flight deck and the ski-jump ramp in front and upgrades will be carried out to allow take-off, landing and hangar operation on the ship to operate UAVs and UCAVs.



Photo: MoND

The launching ceremony of the TCG PIRIREIS submarine at the floating dock

TF-2000 Air Defence Warfare (ADW) Destroyer

TNF has initiated a project called TF-2000 to construct a total of four (+2 optional) destroyers fitted with enhanced anti-air weapon and sensor systems. The main aim of this project is to acquire fleet area air defence capability. The TF-2000 Air Defence Warfare (ADW) Destroyer is expected to have an overall length of 166 metres, displacement of 7,000 tonnes, an overall beam

of 21.5 metres and draught of 4.96 metres. To be powered by two diesel engines (driving two shafts) and two gas turbines, the TF-2000 ADW Destroyer will have a maximum speed of 28 kn, an economical speed of 18 kn and endurance of 5,000 nm at 18 kn. Under the TF-2000 ADW Destroyer Programme, which is expected to cost around US\$4Bn, construction of the first ship will take place at Istanbul Naval Shipyard while the remaining three sister ships are planned to be constructed in pri-

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Photo: MoND



TCG SALIHREIS during a NATO naval exercise

Photo: TUSAS



The first T129B Phase II ATAK helicopter at TAI's facilities

Photo: MoND



Submarine PIRIREIS leaves the floating dock.

vate shipyards. The first ship's delivery was previously planned for 2027.

REIS Class Type 214TN Submarines

A total of six REIS class Type 214TN Air Independent Propulsion (AIP) submarines will be constructed at Gölcük Naval Shipyard. The construction of the first submarine TCG PIRI REIS (S-330) started in October 2015, the second one (TCG HIZIR REIS) started in 2016, and the third submarine, TCG MURAT REIS was officially started on 25 February 2018 with a 'first welding ceremony', while on 4 November 2018 the first welding ceremony for the fourth REIS class submarine TCG AYDIN REIS (S-333) was conducted. The construction of the fifth submarine TCG SEYDI ALI REIS (S-334) started on 22 December 2019. TCG PIRI REIS was transferred to the dry dock for outfitting activities on 22 December 2019 and launched on 22 March 2021 at Gölcük Naval Shipyard. The submarine is expected to be commissioned by the TNF in 2022 following acceptance tests. The REIS class Type 214TN AIP submarines are planned to be commissioned between 2022 and 2027. The Type 214TN REIS class submarines are set to be the first AIP-equipped submarines operated by the TNF, and will replace four AY class (Type 209/1200) diesel/electric powered submarines.

MMU/TF-X: National Combat Aircraft

Turkey's next-gen National Combat Aircraft – MMU in Turkish, also known as TF-X – is a single-seat, twin-engine all-weather multi-role fighter developed by Turkish Aerospace (TUSAS) with technological assistance from BAE Systems. The MMU/TF-X will replace the F-4E 2020 PHANTOM and F-16C/D FIGHTING FALCON aircraft currently in service during the first quarter of the 2030s. Cost for the prototype is estimated at US\$120M but each series production MMU/TF-X is targeted to cost US\$80M.

Featuring Stealth and Supercruise capabilities and to be equipped with domestically developed systems and sensors, the MMU/TF-X will be a 5th generation indigenous air superiority fighter with secondary ground attack capability. The MMU/TF-X prototype will be in Block-0 (4+ Generation aircraft) configuration and is expected to be rolled-out in 2023 (planned for March 18, 2023), when Turkey will celebrate its 100th anniversary of the founding of the Republic. Following

ground tests that are scheduled to start some time in 2024 and to last around two years, the maiden flight will be performed in December 2026. MMU/TF-X delivery to the TurAF will commence in 2029 and the first aircraft expected to enter TurAF service in 2029 will be in Block-I configuration. The TurAF is expected to declare Initial Operational Capability (IOC) with Block-I MMU/TF-X in 2031. According to the programme schedule TUSAS will start MMU/TF-X Block-II (in full 5th Generation fighter configuration) deliveries in 2031 and following their entrance into TurAF service, Full Operational Capability (FOC) will be declared by the end of 2032.

HURJET Advanced Jet Trainer (AJT) and Light Combat Aircraft (LCA)

The Critical Design Review (CDR) of the HURJET twin-seat, single-engine supersonic AJT and LCA was completed in March 2021. Speaking at a ceremony at TUSAS facilities on 25 February 2021, TUSAS CEO Temel Kotil disclosed that the HURJET prototype will perform its maiden flight in December 2022, after the completion of the design, prototype production and ground testing phases. HURJET is developed by TUSAS under a protocol signed between TUSAS, the SSB and the TurAF on 2 July 2018. The initial studies for the HURJET project were started in July 2017 and the project was launched in 2017 as a company funded project (which was funded from TUSAS' own resources) after receiving the green light to go ahead from the TUSAS Board.

ATAK Multi-Role Combat Helicopters

TUSAS manufactures the T129A/B helicopters under licence from Leonardo and as of 23 February 2021, the company has completed the delivery of 53 T129A/Bs (9A, 42B1 and 2 B2) to the Turkish Land Forces (TLF), 6 T129B1s to the Gendarmerie General Command and 1 T129B Phase-II (B2) to the Aviation Department of Security General Directorate (Turkish Police).

Valued at US\$3.3Bn, the ATAK programme of the Turkish Land Forces Command (TLF) covers the procurement of nine T129A EDHs (Early Delivery Helicopters), 50 T129Bs (29 in Phase-I and 21 in Phase-II configurations +32 optional) tactical reconnaissance and attack helicopters. The T129B ATAK helicopters for the TLF have two basic configurations; Phase-I (B1, covering 29 helicopters) and Phase-II (B2, covering 21 helicopters). The T129B2 prototype performed its maiden flight at TUSAS facilities on 12 November 2019 and deliveries of the Phase-II T129Bs started on 15 February 2021. As of late February 2021 the T129 ATAK fleet has accumulated more than 30,000 flight hours.

In February 2019, the contract for the T129 Mk-II heavy attack helicopter was signed between TUSAS and SSB. The 10-tonne T129 Mk-II will be powered by two turboshaft engines and will have double the take-off weight of the T129A/B Mk-I ATAK multi-role light combat helicopter. The payload capacity will be more than 1,200 kg, and there will be three hard points on each wing and the armament will include a 30 mm, single-barrel automatic cannon attached to a turret under the helicopter's nose. The duration of the project is projected as 8.5 years. The Naval and Land Forces versions of Heavy Class Attack Helicopters are planned to be developed and at the end of development phase the three helicopter prototypes are planned to be delivered to the SSB along with the Technical Data Package.



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Photo: TUSAS



A T70 TUHP undergoing ground tests

Photo: TUSAS



T129B Phase-II ATAK Helicopter prototype seen here during qualification tests

Photo: via author



TCG ANADOLU LHD is being converted into a UAV and UCAV Carrier.

The TS3000 turboshaft engine with 3,000 hp propulsion capacity to be deployed on T129 Mk-II ATAK Helicopters is currently developed by TEI. TUSAS CEO Temel Kotil stated in March 2021 that the T129 Mk-II Heavy Class Attack Helicopter will have MTOW of 11 tonnes, a payload capacity of 1,500 kg and the prototype helicopter will perform its first flight with 2,500 hp class Ukrainian turboshaft engines on 18 March 2023. The Ukrainian engines will serve as a stop-gap solution until TEI will be able to deliver TS3000 engines for the project.

T70 TUHP

Valued at approximately US\$3.5Bn, the Turkish Utility Helicopter Programme (TUHP) contract was signed on 21 February 2014 and became effective on 15 June 2016. Under the contract 109 T70 (S-70i International BLACK HAWK) helicopters (+191 options) will be manufactured with 63% local content over the next 10 years at TUSAS facilities. The Turkish Land Forces will receive 22 Utility/SAR configured T70s, the Special Forces will receive 11 T70s in the SAR/CSAR configuration, the Turkish Air Force will receive 6 in SAR/CSAR configuration, the Gendarmerie General Command will receive 30 in the SAR/CSAR/Armed Reconnaissance Helicopter (ARH)/UH configurations, the Security General Directorate (SGD, Turkish National Police) will receive 20 UH versions and the Directorate General of Forestry will receive 20 T70s in fire-fighting configuration. Ongoing qualification processes, including flight tests, will be completed in 2021 and deliveries are expected to start in 2022. TUSAS has previously declared its goal to deliver 36 T70s by the end of 2023.

T625 GOKBEY TLUH

The T625 GOKBEY Turkish Light Utility Helicopter (TLUH) programme will be executed under a US\$687.3M contract awarded on 26 June 2013 by SSB to prime contractor TUSAS. Under the terms of the TLUH programme TUSAS has completed design, development and manufacture of an indigenous twin-engine 5-tonne class light utility helicopter with a take-off weight of 6 tonnes and powered by two CTS800-4AT turboshaft engines.

The T625 TLUH can accommodate a maximum of two crew, namely a pilot and co-pilot, and up to 12 passengers. The T625 TLUH prototype performed its first flight on 6 September 2018. The T625 GOKBEY TLUH will initially be certified by Turkish SHGM (Directorate General of Civil Aviation) and then converted with mission equipment for Turkish military use to replace the aging UH-1Hs and AB-205s. Certification and qualification efforts started in 2018. In December 2020, the TUSAS Board made a decision to start mass production of GOKBEY TLUH in 2021. The first confirmed customer of the helicopter was the Turkish Gendarmerie General Command (GGC), which placed an order for 20 GOKBEY TLUH to replace the aging 13 AB-205s in its inventory. TUSAS is



Photo: TUSAS

TF-X mock-up in front of Tusas' new engineering building

currently manufacturing first batch of three GOKBEYs for the Turkish GGC. TUSAS President & CEO Temel KOTIL declared in a live TV programme that he attended on 14 March 2021 that the first delivery date of GOKBEY, which he previously announced as 29 October 2021, had been postponed to 2022. Within

the scope of the project, the first T625 GOKBEY TLUHs will be delivered in mid-2022 and deliveries of the first batch of three T625 GOKBUY TLUHs will be completed by the end of 2022. Starting from 2023, TUSAS will be able to manufacture and deliver two T625 GOKBEYs per month. ■



NORA B52
Self-propelled gun-howitzer 155 mm

Turkey's Combat Support Ship Programme

Kubilai Han

Increasing its Operational Capability, Replenishment At Sea Capability is a Significant Force Multiplier for the Turkish Naval Forces.

Since 2009, Turkey's support for counter-piracy operations off the coast of Somalia and in the Gulf of Aden under the framework of the United Nations Security Council (and the Grand National Assembly of Turkey, in addition to the deployment of the BARBAROS Turkish Naval Task Group in 2014, represent the first concrete signs that Turkish Naval Forces (TNF) intended to operate on the high seas. These deployments have also triggered the construction of new ships, submarines and missile projects aimed at building up the country's future naval forces.

The current Fleet Replenishment Ships, TCG AKAR (A-580) and TCG YARBAY KUDRET GUNGOR (A-595) which belong to the Turkish Logistic Support Ship Division based in Gölcük have been engaged in providing support to the Turkish Naval Task Group. This is a high seas formation created in 2010 to operate globally far from Turkish ports following Ankara's "Open Sea" policy. However, due to their low cruising speeds (13 kn), they were unable to keep pace with the frigates they were supporting, causing the Task Group to sail at slower speeds. Learning from this experience, the TNF requested that the next generation replenishment vessels, being constructed under the DIMDEG project, need to have a higher cruising speed.

Replenishment at Sea and TNF's Logistical Support Ship Programmes

Given the realities of Turkey's geostrategic situation and the TNF's recent Open Sea strategy and priorities, a maritime support capability is essential. As a sig-

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Photo: TNFC



TNF SAS commandos landing at TCG AKAR during a naval drill

nificant force multiplier, a replenishment at sea (RAS) capability extends the range and sustainment of both surface combatants and amphibious vessels.

RAS vessels provide for greater reach and endurance and allow self-reliant and sustained operations to be conducted away from the shore support base. This support capability, which enables warships to provide an ongoing presence and an immediate response to a developing situation, is vital for the TNF and Turkish Naval Task Group. Without such a maritime support ship to replenish fuel and other essential consumable stores, TNF surface units are restricted to operating at distances no greater than half their range. As proved by the Turkish Naval Task Group, with suitable replenishment ships and the ability to resupply at sea, surface combatants/units are able to remain at sea for weeks at a time. As a general indication, a surface combatant supported by a replenishment ship is limited only by crew rest considerations.

Although the acquisition of new surface combatants and amphibious ships is important, being able to support them as part of the TNF's capability to deploy locally, regionally and worldwide, is also vital. In this context, along with the surface combatants, the TNF launched projects to renew its logistics assets. The TNF intends to expand its logistics fleet by 2025 with the induction of a locally constructed 22,000-tonne Replenishment At Sea and Combat Support Ship (DIMDEG) TCG DERYA, two medium-sized Logistic Support Ships and two new (with two more optional) Replenishment Tankers. These new logistic support ships will assist the existing fleet which is currently comprised of TCG AKAR (which entered service in September 1987) and TCG YARBAY KUDRET GUNGOR (in service since October 1995, the first ever ship built for the Turkish Navy by a private Turkish shipyard). In addition, the fleet is supported by TCG ALBAY HAKKIBURAK (A-571) and TCG YUZBASI I. TOLUNAY (A572) Liquid Fuel Tankers.

TCG DERYA Replenishment at Sea and Combat Support Ship (DIMDEG)

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

The DIMDEG contract was signed between SSB and Istanbul-based private shipyard Sefine Shipyard on 28 June 2018. On 25 January 2019, Sefine Shipyard signed a contract with Aselsan-Havelsan Business Partnership for the procurement and integration of combat systems (including Havelsan's ADVENT Combat Management System [CMS], Ship Data Distribution System, Ship Information System and Message Operating System, as well as Aselsan's MAR-D Surveillance Radar, 25 mm STOP Stabilised Naval Gun System, IFF System, Integrated Communication System, KIRLANGIÇ EO/IR Reconnaissance and Surveillance System, SatCom System, and 2x GÖKDENİZ CIWS) to the DIMDEG.

TCG DERYA will be a multi-purpose replenishment ship (AOR) which effectively combines the functions of a fleet oiler and store ship. The platform will be used for replenishment at sea of fuel, water, food, spare parts, medical supplies, and ammunition. The vessel will have an overall length of 194.8 metres, a height of 7.2 metres, displacement of 22,000 tonnes



Photo: TNFC

A-595 YARBAY KUDRET GUNGOR and Italian FREMM class frigate ITS CARABINIERE (F-593) conducting a joint patrol in the Mediterranean

and a beam of 24.4 metres. To be powered by two gas turbines, (in June 2020, GE Marine received a contract from Sefine Shipyard to provide two LM2500 marine gas turbines for DIMDEG and two diesel engines. TCG DERYA will have a maximum speed of 24 kn, an endurance of 30 days (minimum) and a maximum range of 4,500

NM. The ship will also have a large helipad and dual enclosed hangar facilities to embark two multi-purpose helicopters up to 15 tonnes. It will also be capable of serving as a command and control ship. The DERYA is scheduled to enter service in 2024.

Logistic Support Ship Project

Covering the acquisition of two oil tankers from a local shipyard, the Logistic Support Ship Project began in July 2012. The ships will provide combat support in terms of logistic support to meet the liquid fuel (F-76 and JP-5), fresh water and food requirements of the surface combatants, both at sea and ashore. Logistic Support Ships with their onboard capabilities can also support humanitarian aid and peace operations.

Istanbul-based private shipyard Selah Shipyard was selected in May 2014 and the contract was awarded on 4 November 2014, with an advance payment by the SSB taking place on 24 November 2014. According to the contract, the Logistic Support Ships were scheduled for commission in 2018. Construction of the first Logistic Support Ship TCG YUZBASI GUNGOR DURMUS (A-574) started in 2015 and the ship was launched on 8 October 2016 at Selah Shipyard. The second ship of the project, TCG USTEGMEN ARIF EKMEKCI (A-575) was launched on 8 July 2017.

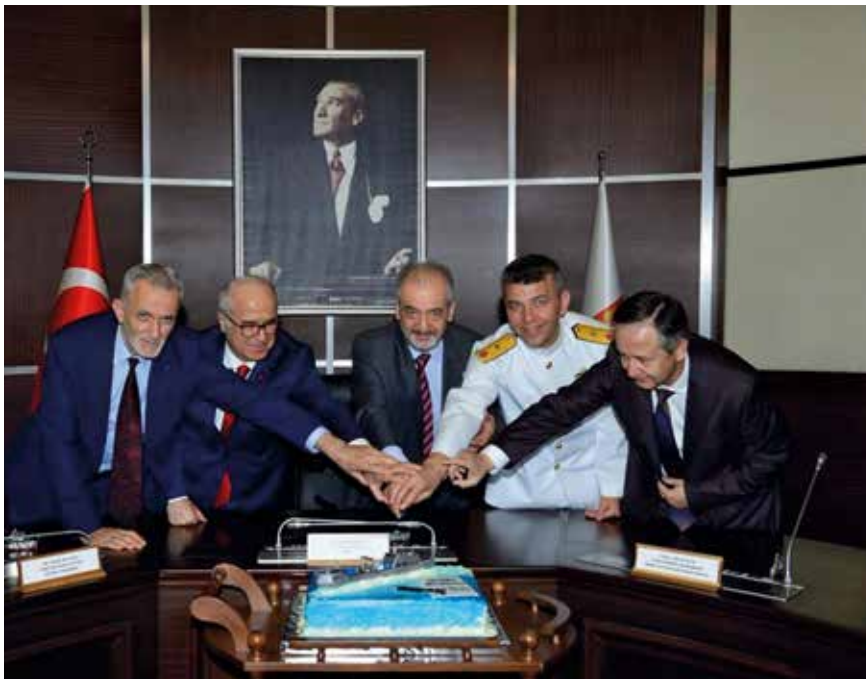


Photo: SSB

On 28 June 2018, SSB and Istanbul-based private shipyard Sefine Shipyard signed the DIMDEG contract.



Photo: SSB

A computer-generated model of the DIMDEG ship

a hydraulic crane with a lifting capacity of 18 tonnes and an electrical crane, with a lifting capacity of 2 tonnes.

Replenishment Tankers for the FACs

Under the Replenishment Tankers Procurement Project, on 9 December 2020, SSB issued a Request for Proposals (RFP) document to local shipyards for the procurement of two new (plus two optional) Replenishment Tankers along with spare parts, training service and related documents. According to the RFP document, bidders should submit their proposals by 15 March 2021. According to the RFP, the main mission of these ships is to meet the liquid fuel requirements of the Fast Attack Craft (FACs) in a safe and rapid manner in a possible naval operation and/or war, while they are in a waiting/hiding place. The Turkish Navy's two ALBAY HAKKI BURAK class liquid fuel tankers are currently providing fuel support capability for the FACs. Speaking at a Defence & Technology Days event organised by ITU SAVTEK on 24 March 2021, Alper Kose, Head of the SSB Naval Platforms Department, disclosed that SSB will soon launch a tender for the procurement of the Replenishment Tankers Procurement Project.

Photo: Yoruk Isik



The Turkish Navy GUNGOR fleet replenishment ship (A-595)

In 2019, Selah Shipyard declared illiquid due to the economic crisis and was unable to fulfil its commitments under the contract, meaning that during the second half of 2019, the SSB terminated the contract signed with Selah Shipyard under the Logistic Support Ship Project. SSB then selected STM for the completion and delivery of the Logistic Support Vessels. According to the current schedule, TCG YUZBASI GUNGOR DURMUS will be delivered in 2021 and TCG USTEGMEN ARIF EKMEKCI will be delivered in 2022. With a displacement of 8,744 tonnes at full load, the 105.44-metre Logistic Support Ships' maximum speed will be more than 12 kn and they could reach a range of 9,500 NM at full load displacement, at sea state 2. The vessels have a capacity of 4,036 tonnes of F-76 diesel fuel, 336 tonnes of helicopter fuel (F-44/JP-5) and 594 tonnes of freshwater and at least 108m³ of food/meals. The ships also have a large helicopter deck that allows take-off and landing and can refuel helicopters. The helipad also allows for day and night-time helicopter take-off and landing and is designed to support multi-purpose helicopters up to 15 tonnes. The ship is also equipped with

Photo: TNFC



The Turkish Navy TCG AKAR (A-580) performs replenishment at Sea to the GABYA class frigate GIRE SUN

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Naval Programmes in the Eastern Mediterranean

Conrad Waters

The discovery of significant energy resources in the Eastern Mediterranean has served to fuel long-standing tensions amongst countries bordering its waters. These strains have been exacerbated by the Turkish President Erdoğan’s desire to expand its regional influence, an ambition that has been supported through the active deployment of an increasingly powerful navy.

When considered against the backdrop of broader political instability extending from the Black Sea through the Middle East to North Africa, it is unsurprising that regional naval procurement is as active now as at any time since the Cold War’s end. This article analyses the programmes and plans of the region’s four major fleets.

Photo: US Navy



The Turkish Navy has become a leading maritime power in the Eastern Mediterranean. Here the MILGEM type corvette BURGAZADA is seen exercising with the MEKO 200-TN class frigate BARBAROS in 2020.

Turkish Naval Ambitions

The Turkish Navy is arguably the leading maritime power in the Eastern Mediterranean. It maintains a powerful fleet of both seagoing and coastal surface combatants supplemented by Europe’s largest submarine flotilla. The attention devoted to the Turkish Navy is partly attributable to the country’s strategic position controlling transit from the Mediterranean to the Black Sea through its command of the Bosphorus and Dardanelles, along with the need to protect the security of its maritime interests in both these seas. There is also a strong imperative to maintain a balanced fleet comprising both littoral and blue water assets given the varying maritime environments in which the navy is required to operate.

Turkish naval construction has followed a similar trajectory to that seen in many emergent economies, with the acquisition of warships from abroad followed by the licensed construction of foreign designs. This process has resulted in particularly

strong links with the German shipbuilding sector. The navy’s MEKO 200-TN series of frigates, AYDIN class mine countermeasures vessels and all of its existing fast attack and submarine classes are of German origin, albeit with many of the vessels subject to local assembly. Collaboration between Germany and Turkey continues in the form of the current Type 214-TN REIS class submarines. Six of these are in the course of construction at the Gölcük Naval Shipyard to a modified Thyssen-Krupp Marine Systems (TKMS) air independent propulsion (AIP) Type 214 design. The contract for the €2.1bn programme was first agreed in 2009 but implementation has been slow, possibly due to a desire to incorporate significant amounts of Turkish-manufactured equipment into the new boats. The lead submarine, PIRI REIS, was finally launched on 22 December 2019 and she is expected to become operational in the course of 2022. The

other five members of the class are then expected to follow at annual intervals. Local sources suggest that completion of the programme will be followed by a project for a fully national “MILDEN” submarine. The desire to develop a full indigenous submarine design and manufacturing capability reflects a similar process that is already evident in the development of Turkey’s surface fleet. The “poster boy” for this national naval effort has been the MILGEM – an acronym of the Turkish word Milli Gemi (national ship) – programme for four corvettes. First originating in the late 1990s, this was intended to establish the industrial and technical capability required to design, manufacture and integrate a complex warship. As well as seeking to drive Turkey’s naval capabilities, the programme had a key economic objective in terms of expanding the potential of the country’s naval defence industry.

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Marine Systems

The booster for AIP submarines: Lithium-ion batteries (LIBs) from Kiel:

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Photo: Turkish Navy



The MILGEM programme has been in the forefront of developing indigenous Turkish warship design and construction capabilities. This is the second ADA class MILGEM variant BÜYÜKADA.

Photo: Hellenic Navy



Greece's financial woes have significantly impeded naval modernisation. The sixth ROUSSEN class fast attack craft KARATHANASIS was delivered in mid-2020 after years of delay.

Despite several significant challenges, four ADA class MILGEM variants were delivered by Istanbul Naval Shipyard between 2011 and 2019. Attention has now turned to the evolved and enlarged "I" class frigates, four of which are also planned. The lead ship, ISTANBUL, was launched on 23 January 2021 and is expected to enter service in 2023. Completion of this programme should, in turn, allow implementation of long-awaited plans to construct a class of much larger TF-2000 air defence destroyers. Design work on these ships commenced in 2017 and should be informed by the current mid-life upgrade of the MEKO 200-TN Batch 2 BARBAROS class frigates that is being led by Turkish defence conglomerates ASELSAN and HAVELSAN. Meanwhile, the economic benefits sought from the national ship programme have been demonstrated by Pakistan's selection of the ADA design as the basis for a quartet of its own corvettes, two of which are being assembled at Karachi Shipyard and Engineering Works with Turkish assistance. Recent reports also suggest that Ukraine is also close to acquiring ADA-type vessels, whilst the design has formed the basis for the new intelligence gathering ship UFUK, which started sea trials in mid-2020. One aim of the MILGEM programme that has yet to be fully realised is the expansion of complex warship construction into Turkey's large network of private shipyards. However, the privately-owned Sedef Shipyard has been given responsibility for the Turkish Navy's most prestigious shipbuilding programme in the form of the new LHD type amphibious assault ship ANADOLU. Constructed in alliance

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with Spain's Navantia as a modified variant of the Spanish Navy's JUAN CARLOS I, completion of the project is expected in the course of 2021 in spite of delays resulting from an onboard fire in April 2019. The ski-jump equipped ship was destined to be equipped with F-35B Lightning II STOVL strike fighters to provide the navy with an aircraft carrier-like capability. However, the US decision to eject Turkey from the F-35 programme following the Erdoğan administration's decision to acquire Russian S-400 surface-to-air missiles means that these plans are on ice. Turkish industry has already delivered a number of tank landing ships and smaller tank landing craft in recent years, with additional units planned.

Another important project entrusted to the private sector is the construction of a new replenishment vessel at Sefine Shipyard under a contract signed in July 2018. More details of the ship emerged in mid-2020 when GE announced it had been selected to provide two LM-2500 gas turbines for the ship. Her delivery, anticipated before the middle of the decade, will significantly extend the fleet's ability to project power at greater distance from its home bases. However, littoral warfare is not being ignored with an indigenous fast attack craft (FAC) programme amongst the latest to be launched. This will be based on



Photo: US Navy

The mid-life modernisation of the Hellenic Navy's four MEKO 200-HN HYDRA class frigates forms a key part of current fleet enhancement plans. This is PSARA in March 2021.

an entirely national design derived from STM's FAC-55 concept.

A Greek Revival?

In contrast with the Turkish Navy's steady process of qualitative improvement and higher levels of indigenisation, Greece's Hellenic Navy has essentially stood still as a result of the country's financial problems of the past decade. The start of the new millennium saw the Hellenic Navy in

a relatively strong position. Programmes for new Type 214-HN AIP-equipped submarines and ROUSSEN (British SUPER VITA) class fast attack craft offered the prospects both of substantial upgrades of surface and sub-surface capabilities and the further expansion of the naval industrial base through significant elements of licensed production in local yards. Subsequent contractual disputes with TKMS over allegations of design deficiencies with the lead – and only German-built

Eastern Mediterranean Naval Procurement: Selected Programmes

| Warship Type | Warship Class | Supplier | Ordered | Completed | Under Build | Planned |
|--------------------|-------------------------|--------------------------------|--------------|-----------|-------------|---------|
| Turkey | | | | | | |
| Corvette | MILGEM/Ada | Istanbul Naval Shipyard | c. 2005 | 4 | 0 | 0 |
| Submarine | Type 214-TN | TKMS/ Gölcük Naval Shipyard | 2009 | 0 | 6 | 0 |
| Amph. Assault Ship | ANADOLU | Navantia/ Sedef Shipyard | 2015 | 0 | 1 | 0 |
| Frigate | MILGEM/ISTANBUL | Istanbul Naval Shipyard | c. 2017 | 0 | 1 | 3 |
| Destroyer | TF-2000 | To be Advised (TBA) | TBA | 0 | 0 | Up to 7 |
| Greece | | | | | | |
| Submarine | Type 214-HN | TKMS/Hellenic Shipyards | 2000 onwards | 4 | 0 | 0 |
| Fast Attack Craft | ROUSSEN | BAE Systems/ Elefsis Shipyards | 2000 onwards | 6 | 1 | Up to 2 |
| Frigate | TBA | TBA | TBA | 0 | 0 | 4 |
| Israel | | | | | | |
| Submarine | DOLPHIN (Batch 2) | TKMS | 2006 onwards | 2 | 1 | 0 |
| Corvette | MAGEN | TKMS/GNY Kiel/Israel Shipyards | 2015 | 0 | 4 | 0 |
| Fast Attack Craft | RESHEF | Israel Shipyards | TBA | 0 | 0 | Up to 8 |
| Submarine | DOLPHIN (Batch 3) | TKMS | TBA | 0 | 0 | 3 |
| Egypt | | | | | | |
| Submarine | Type 209/1400 | TKMS | 2011 onwards | 3 | 1 | 0 |
| Corvette | "Gowind 2500" | Naval Group | 2014 | 2 | 2 | 0 |
| Frigate | FREMM – French Variant | Naval Group | 2015 | 1 | 0 | 0 |
| Amph. Assault Ship | MISTRAL | Naval Group | 2015 | 2 | 0 | 0 |
| Corvette | MEKO A200 | TKMS | 2018 | 0 | 0 | 4 |
| Frigate | FREMM – Italian Variant | Fincantieri | 2020 | 1 | 1 | 0 |

Photo: TKMS



Israel's MAGEN class corvettes have been built in Germany but are being outfitted with Israeli combat systems with the help of Israel Shipyards.

– Type 214-HN submarine PAPANIKOLIS followed by the onset of financial problems that impacted local shipyards associated with both projects essentially served to derail these ambitions. Deliveries of the remaining quartet of submarines from Hellenic Shipyards were eventually concluded in 2016, whilst the Elefsis yard is now close to delivering the seventh and final ROUSSEN. However, the Hellenic Navy has clearly fallen behind its main regional rival at a time when tensions with Turkey have mounted.

The most urgent requirement is recapitalisation of the navy's flotilla of major surface combatants. The existing four MEKO 200-HN and nine former Dutch ELLI ("Standard") class frigates are all well in excess of 20 years old and in need of modernisation or replacement. As part of wider plans for a major upgrade of the country's armed forces announced by

Greek Premier Kyriakos Mitsotakis in September 2020, the MEKO 200 type vessels will benefit from major midlife modernisation whilst four new, multi-role surface combatants will be acquired. In late 2019, Greece had signed a letter of intent to purchase two "Belh@rra" export variants of Naval Group's Frégate de Défense et d'Intervention (FDI). However, it seems that a wider portfolio of designs is now under consideration for the enlarged contract. Much may depend on the industrial strategy adopted to support construction, including the priority attached to ambitions to revitalise the Hellenic and Elefsis shipyards under new ownership. Pending selection of a preferred contractor, the Hellenic Navy is also taking steps to address other deficiencies. In October 2020, a contract for four MH-60R SEAHAWK helicopters was placed with Lockheed Martin. The following month saw a long-delayed

agreement to acquire 36 SeaHake mod 4 torpedoes from Atlas Elektronik to equip the Type 214 submarines. There have also been local press reports that construction of the ROUSSEN class may be extended to encompass another two units, although a proposal from Israel Shipyards for the licensed production of a THERMISTOCLES variant of its SA'AR 72 design provides another potential option. In any event, Greece has much to do to make up the ground lost to its Aegean rival.

Israeli Modernisation

Meanwhile, Israel Shipyards is benefitting from a significant modernisation of Israeli Navy capabilities as the increasingly evident need to secure the country's own offshore energy resources has expanded the importance of a service that has historically been accorded a lower priority than the other branches of the country's armed forces. As a result, the company is heavily involved in projects that will see the wholesale replacement of the fleet's major surface units with vessels that are better suited to protecting the country's interests in its exclusive economic zone (EEZ).

The centrepiece of this initiative is a flotilla of four SA'AR 6 or MAGEN class corvettes that were ordered from TKMS with German financial assistance in 2015. With a displacement in the region of 2,000 tonnes and a length approaching 90 metres, the corvettes are significantly larger than existing Israeli surface combatants and thus better suited for extended deployments. The ships are being assembled in Germany by German Naval Yards Kiel to a design reportedly derived from the K130 BRAUNSCHWEIG class. However, much of the programme's cost re-

Photo: Crown Copyright 2020



The Egyptian Navy has undergone a remarkable period of expansion. Here the veteran frigate SHARM EL SHEIKH exercises with the new amphibious assault ship ANWAR EL SADAT.



Photo: TKMS

The Egyptian flag is raised over the submarine S43 for the first time in April 2020. Current Egyptian modernisation efforts can be traced back to orders for Type 209/1400 submarines almost a decade ago.

lates to outfitting the vessels with largely indigenously manufactured weapons and electronic systems. This process will be completed by Israel Shipyards, who will also subsequently be responsible for maintaining the corvettes in a new floating dock specially built for the purpose. The lead ship arrived in home waters in December 2020 and is scheduled to enter operational service in 2022.

The SA'AR 6 corvettes will eventually be supplemented by a class of smaller SA'AR 72 RESHEF class vessels for which Israel Shipyards were awarded a design contract towards the end of 2019. These ships are intended to replace the navy's eight existing 62 metre SA'AR 4.5 fast attack craft that were delivered over the course of two decades from the early 1980s onwards. They are likely to share

many locally developed systems with their larger MAGEN class counterparts. Although no official details have been released, it seems reasonable to assume that eight of the new ships will eventually be built, thereby maintaining overall force numbers as the old craft decommission. The other major element of Israel's fleet modernisation relates to its submarine flotilla. This is widely reported to have a strategic function through an ability to deploy nuclear-armed cruise missiles. The force also has an undoubted value in the fields of intelligence gathering and other covert operations. The coming months will see completion of the navy's second, AIP-equipped batch of the German-built DOLPHIN class submarines with the delivery of DRAGEN from TKMS in Kiel. The third of the batch,

she will become the sixth member of the overall class. A memorandum of understanding agreed between Israel and Germany in 2017 envisages the completion of a third batch of three submarines over the course of the current decade, which will ultimately replace the first trio as they fall due for withdrawal. As is the case for other recent contracts agreed with German shipyards, the memorandum envisages the German government subsidising a third of overall construction costs.

Egyptian Expansion

The most remarkable programme of regional naval expansion currently underway is that being undertaken by Egypt. In common with Turkey, the country occupies a position of immense maritime strategic influence, in this case by virtue of its control over the Suez Canal. Long focused on the defence of the waterway and its immediate approaches, the Egyptian Navy has recently benefitted from a major surge in investment that has transformed it into an instrument of regional influence with meaningful expeditionary capabilities. Much of this expansion has been directed with an eye to the waters south of the canal. Indeed, some view the enlarged fleet as providing a proxy force for Egypt's regional allies in the ongoing stand-off in Iran. However, just like its



Photo: Israel Shipyards

The design of Israel's planned SA'AR 72 RESHEF class has been allocated to Israel Shipyards.

Masthead

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more northerly maritime neighbours, Egypt also has substantial energy interests in its Mediterranean offshore waters that require protection. The recent cooling of relations with Turkey, exacerbated by Turkish involvement in Libya's civil war, has doubtless provided an additional incentive to build a strong navy.

It is notable that recent Egyptian naval procurement differs from that undertaken by the other major regional navies in two significant aspects. One of these is the seemingly short term, almost opportunistic, nature of many Egyptian programmes. This is also reflected in the varied national origins of the suppliers supporting naval expansion. Current modernisation efforts can be traced back to the order for two Type 209/1400(mod) submarines from TKMS in 2011, a project subsequently bolstered by the exercise of options for a pair of additional boats in 2015. By this time, attention had shifted to surface fleet modernisation, which was initially carried out in conjunction with what is now the French Naval Group. Orders for a quartet of GOWIND type corvettes were quickly followed by "off the shelf" purchases of a single French FREMM type frigate and the two MISTRAL class amphibious assault ships originally built for the Russian Navy but put on the market when the deal collapsed following the Crimea annexation. However, subsequent warship acquisitions – for four newly-built MEKO A200 frigates from TKMS and two Fincantieri-built Italian FREMM variants originally destined for the Italian Navy – will result in a less than homogenous fleet mix. The motivation behind this selection of diverse suppliers is seemingly driven by a desire to ensure security of arms imports by avoiding over reliance on any one country. The cost of the additional training and logistic support burden that this approach will inevitably entail is seemingly considered a price worth paying.

Another notable aspect of recent Egyptian warship programmes has been the relatively low priority attached to using naval investment to bolster the domestic shipbuilding sector. Three of the four Naval Group GOWIND corvettes are being assembled at the Alexandria Shipyard (ASY). The facility delivered the first of the indigenously built ships, PORT SAID, on 6 January 2021 and has already launched the two other units. In September 2020, ASY also revealed that it had been allocated responsibility for constructing one of the MEKO A200 frigates ordered from TKMS. However, in general terms much of the Egyptian Navy's expansion has been driven by the acquisition of "off the shelf" ships completed in foreign yards, whilst efforts to develop indigenous upgrade and equipment manufacturing facilities in similar fashion to Turkey have also been largely absent. This seems to be a missed opportunity. Recent investment has undoubtedly radically expanded the Egyptian Navy's potential but reports circulating at the time of the Italian FREMM acquisitions suggest that more ships might be obtained as part of a wider armaments deal said to amount to as much as €10Bn. However, Egyptian procurement plans are notoriously opaque and there is also the question as to whether the fleet's training organisation would be able to support further growth. However, the more fundamental question is whether the lack of an underlying industrial strategy means that the Egyptian Navy's undoubtedly impressive leap forward is built on much shakier foundations than the slower but deeper rooted approach adopted by some of its regional neighbours. ■

Rising Demand for Medium Tanks

Christopher F Foss

While many countries continue to deploy main battle tanks (MBTs), there is now an emerging market in some parts of the world for the so-called medium tank (MT).

The main role for MTs would normally be to provide direct fire support to dismounted infantry using High Explosive (HE), High Explosive Squash Head (HESH) or in the longer term, Air Burst HE (AB HE) types of ammunition. Some of these recently developed MTs are essentially an infantry fighting vehicle (IFV) or armoured personnel carrier (APC) platform fitted with a manned turret typically armed with a 105 mm rifled gun, or in some cases, a 120 mm smooth bore gun.

US Mobile Protected Firepower

The US Army did deploy the M551 SHERIDAN which was officially called the SHERIDAN Armoured Reconnaissance Airborne Assault Vehicle, Full Tracked, 152 mm, but the vehicle was phased out of service. Using internal research and development funding, the now BAE Systems (then FMC Corporation) developed the Close Combat Vehicle – Light (CCV-L) featuring a 105 mm M35 rifled gun fed by an automatic loader enabling the crew to be reduced to commander, gunner and driver. Its low weight enabled it to be carried in a Lockheed Martin C-130 transport aircraft. The vehicle never entered production but further development resulted in the M8 Armoured Gun System (AGS) which, although type classified by the US Army, also never entered production. It was also armed with a 105 mm gun fed by an automatic loader and had a modular armour package that could be tailored to meet the anticipated threat level with the Stage 3 featuring explosive reactive armour (ERA) packages for its hull and turret to provide a high level of



General Dynamics Land Systems entry for the US Army Mobile Protected Firepower requirement fitted with a turret armed with a 105 mm rifled gun, 7.62 mm co-axial MG and roof mounted 12.7 mm MG

protection against threat weapons fitted with a HEAT warhead.

The US Army has a new requirement for a Mobile Protected Firepower (MPF) and following a competition, General Dynamics Land Systems (GDLS) and BAE Systems were each awarded contracts to build 12 prototypes which are undergoing extensive trials. The chosen prototype will be selected for Low Rate Initial Production (LRIP) phase under which 26 will be built with an anticipated total production run of 504 units for use with the Infantry Brigade Combat Teams (IBCT).

GDLS confirmed that their "MPF approach leverages a combination of recently developed and battle tested designs." It features a four-person crew and will be powered by a front-mounted diesel engine coupled to a fully automatic transmission with hydro-pneumatic suspension for higher cross-country mobility. The main armament is a 105 mm rifled gun, coupled to the ABRAMS M1A2 System Enhancement Package (SEP) v3 fire control system (FCS) and a Commander's Independent Thermal Viewer (CITV), to provide a hunter/killer capability.

The BAE Systems prototype is a further development of the M8 AGS and is also being armed with a 105 mm gun fed by an automatic loader which will be laid onto

the target using a computerised FCS. It has a crew of three and is fitted with a rear-mounted roll-out power pack consisting of engine, transmission and cooling system. Its composite track is quieter, has lower vibration than a conventional steel track and has less rolling resistance.

The Swedish CV90120-T

Using internal research and development, BAE Systems Hägglunds designed and built the CV90120-T tank consisting of a CV90 Mk 0 IFV hull fitted with a new three-person turret armed with a Swiss RUAG Defence 120 mm L50 smooth bore Compact Tank Gun (CTG).

When RUAG ceased marketing this 120 mm CTG, it was changed for a Rheinmetall Rh 120 LLR L/47 120 mm smooth bore gun. According to Dan Lindell, of Direct Combat Vehicles, "The LLR L/47 was integrated, mechanically and electronically into the turret, but never fired. The proof of concept, firing wise, has been with the 120 mm CTG." Marketing the CV90120-T is still ongoing but production would be based on the latest CV90 Mk 4 hull launched in 2018 with the option of the new D series turret which can be fitted with a variety of weapons, ranging from a 30 mm cannon up to a 120 mm smooth bore gun and a 7.62 mm co-axial MG. BAE Systems Hägglunds are quoting the CV90 Mk 4 with a gross vehicle weight (GVW) of up to 38 tonnes of which 19 tonnes is the payload. The CV90 Mk 4 also has fourth generation NATO-standard electronic architecture,

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Christopher F. Foss has been writing on armoured fighting vehicles and artillery systems since 1970. He has also lectured on these subjects in many countries as well as chairing conferences all over the world. He has also driven over 50 tracked and wheeled AFVs.

active damping suspension and a power pack consisting of a Scania diesel, developing 860 hp, with growth potential up to 1,000 hp, coupled to a Caterpillar X-300 fully automatic transmission. In a statement, BAE Systems said, "We also have an active dialogue with a number of countries interested in the 120 mm capability and we have performed demonstrations during 2019."

Photo: BAE



The TIGER / HARIMAU Medium Tank

The TIGER, or HARIMAU in Turkish, is being developed by FNSS Savunma Sistemleri (Turkey), PT Pindad (Indonesia) and John Cockerill Defense (previously CMI Defence) (Belgium) to meet the requirements of the Indonesian Army. It is also referred to as the KAPLAN Modern Medium Weight Tank (MMWT) by FNSS.

The TIGER consists of a new platform that is based on the FNSS Armoured Combat Vehicle - 30 (ACV-30) fitted with the Belgian John Cockerill Defense C3105 turret armed with a high pressure 105 mm rifled gun fed by a bustle-mounted automatic loader enabling the crew to be reduced to commander, gunner and driver. Two examples of the TIGER MT were completed, one in Turkey (P1) and one in the Philippines (P2), plus a hull for ballistic trials.

In May 2019, FNSS and Pindad signed an agreement to support serial production of the TIGER with an initial contract signed for a first production batch of 18 vehicles manufactured in Indonesia with sub-systems such as the power pack and suspension supplied by FNSS and the turret from John Cockerill Defense.

FNSS are quoting a combat weight of 30 tonnes with the Caterpillar 700 hp diesel coupled to an Allison automatic transmission giving a maximum road speed of up to 70 km/h. A computerised FCS is fitted

BAE Systems' proposal for the US Army MPF requirement is based on their M8 Armoured Gun System armed with a 105 mm gun fed by an automatic loader.

with commander and gunner with stabilised day/thermal sights incorporating a laser rangefinder for increased first round hit. Other features include an auxiliary power unit (APU) allowing for the main engine to be shut down to save power, land navigation system, battle management system (BMS), laser warning system and 360 degrees situational awareness cameras.

The ASCOD 120 mm

This is officially called the ASCOD Medium Main Battle Tank (MMBT) and was shown for the first time in mid-2018, representing a joint development for the export market between General Dynamics European Land Systems Santa Barbara Sistemas (GDELS-SBS) of Spain and Leonardo Defence Systems of Italy. ASCOD refers to Austrian Spanish Co-operative Development (ASCOD) and is deployed in Spain as the PIZARRO IFV and in Austria as the ULAN IFV. Further development of the ASCOD has resulted in the British Army's new fleet of tracked vehicles with AJAX being the key reconnaissance platform.

The ASCOD MMBT uses a common base platform (CBP) with GDELS offering a different upper hull to meet specific user requirements. GDELS are quoting a GVW of 42 tonnes with the hull incorporating stealth technology, qualified mine protection package, modular add-on armour package and full digital electronic architecture.

The ASCOD MMBT is fitted with the Leonardo Defence Systems HITFACT 120 turret armed with a manually loaded 120 mm smooth bore gun fitted with a muzzle brake, thermal sleeve and fume extractor, 7.62 mm co-axial MG, one roof mounted 7.62 mm MG and one RWS armed with a .50 M2 HB MG.

A computerised FCS is fitted plus day/thermal sights for commander and gunners incorporating a laser rangefinder. The commander's sight is of the panoramic type.

The first example of the ASCOD MMBT was fitted with one of the prototype HITFACT 120 turrets installed on the CENTAURO 2 Mobile Gun System (MGS) developed for the Italian Army as a follow-on to the currently deployed 105 mm CENTAURO.

Since the ASCOD MMBT was launched, a production order for CENTAURO 2 has been placed consisting of 10 production vehicles, plus the original prototype rebuilt to the latest production standard. This includes improvements to the HITFACT 120 turret which would be fitted to the ASCOD MMBT if this entered production.

The SABRAH

In January 2021, Elbit Systems announced that it had been awarded a US\$172M contract to supply light tanks to an undisclosed country in Asia with deliveries to be carried out over a three-year period.

The customer is the Philippines with two platforms, one the GDELS ASCOD and

Photo: BAE Systems



BAE Systems Hägglunds CV 90120-T armed with a Rheinmetall 120 mm smoothbore gun and fitted with adaptive signature reduction package for trial purposes.

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Photo: Christopher F Foss



TIGER (HARIMAU) MT has been developed to meet the operational requirements of Indonesia and is fitted with a John Cockerill Defense C3105 turret armed with a 105 mm high pressure rifled gun fed by an automatic loader.

Photo: Christopher F Foss



The ASCOD MMBT is based on an ASCOD platform fitted with the Leonardo Defense Systems HITFACT 120 turret armed with a 120 mm manually loaded smoothbore gun.

the other the PANDUR II (8x8) which was originally designed and manufactured by GDELS in Austria but is now manufactured by Excalibur in the Czech Republic.

Both of these vehicles feature a turret armed with a 105 mm rifled gun coupled to a computerised FCS supplied by Elbit which is also fitting the TORCH-X battle management system and the E-LYNX software defined radio system.

The Otokar TULPAR MT

The TULPAR has been developed by Otokar as a private venture for the export market and complements their expanding range of 4x4, 6x6 and 8x8 wheeled AFVs. It essentially consists of the hull of their TULPAR IFV fitted with the John Cockerill Defense C3015 turret previously mentioned and which is currently in production for the GDLS – Canada LAV (8x8) for the Kingdom of Saudi Arabia.

The TULPAR was originally powered by a German MTU 8V 199 16-litre turbo-charged diesel engine developing 720 hp coupled to a Renk HSWL automatic transmission. The latest version is powered by a Swedish Scania DI 16 diesel developing 850 hp coupled to a Spanish SAPA Transmission 860C fully automatic power shift transmission. The TULPAR GVW weight depends

on the weapon fit and the armour package but Otokar are quoting a maximum GVW of up to 42 tonnes.

The Rheinmetall LYNX

Rheinmetall Defence of Germany launched their private venture LYNX KF41 (Kettenfahrzeug – meaning tracked vehicle) IFV in

June 2016 followed by a second example in 2018. Hungary has placed a contract order for 218 LYNX IFVs and it has been short-listed by Australia for Land 400 Phase 3 for a new tracked FOV. The other contender is the REDBACK from South Korea.

While it is currently configured for the IFV roles with a weight of between 34 – 50 tonnes, the LYNX has an adaptable and re-configurable design allowing it to be fitted with much heavier turrets, including armed with a 120 mm smooth bore gun.

The HUNTER Fire Support Variant

To meet the operational requirements of the Singapore Army, STK Engineering Land Systems, in conjunction with the Singapore Defence Science and Technology Agency, developed the Next Generation Armoured Fighting Vehicle (Next Gen AFV) which was subsequently called the HUNTER and is now in production for Singapore in the IFV configuration.

To meet the MPF programme of the US Army, Science Applications International Corporation (SAIC) and ST Engineering Land Systems offered a version of the NGAFFV fitted with the John Cockerill Defense C3105 turret as previously mentioned. This proposal was not selected, but STK Land Engineering Land Systems is now marketing this combination as the HUNTER Fire Support Variant and the first version has been retained in Singapore. STK Engineering Land Systems are quoting a GVW of 32.5 tonnes which depends on the protection level required. It is powered by a MTU 8V-199 TE20 diesel coupled to the Kinetics Drive Solutions

Photo: STK Engineering Land Systems



The HUNTER Fire Support Variant integrates the STK Engineering Land Systems HUNTER platform with the John Cockerill Defense C3015 two-person turret.

HMX3000 automatic transmission which gives a power-to-weight ratio of 21.8 hp/tonne, maximum road speed of up to 70 km/h and a range of up to 500 km. As the chassis and turret are in production, early deliveries could potentially be made to potential customers.

The K-21 105 mm/120 mm

Hanwha Land Systems of South Korea marketed their K-21 IFV platform fitted with a John Cockerill Defense turret armed with a 105 mm or 120 mm gun. Production of the K-21 IFV has been completed and the main emphasis is now on their latest REDBACK platform; fitted with the latest C3105, this was also a contender for the Philippines requirement subsequently won by Elbit Systems.

Other Contenders

The only similar vehicle to come out of Russia is the 2S25 SPRUT-D, which is referred to as a self-propelled anti-tank gun (SPATG). But with a GVW of 18 tonnes, it could potentially be classed as a MT. The SPRUT is armed with a 125 mm 2A75 smooth bore gun fed by an automatic



Photo: Elbit

First photo released of the SABRAH MT developed by Elbit Systems and based on the ASCOD platform with the Philippines as the launch customer.

loader holding 22 rounds of separate loading ammunition and in addition to firing conventional natures of ammunition, can also fire a LGP as fired by Russian MBTs. It also has a co-axial 7.62 mm MG and has adjustable hydro pneumatic suspension and is fully amphibious being propelled in the water by two water jets. Further development has resulted in the 2S25 SDM1 which has a similar layout but a new hull and turret with the latter being armed with the 125 mm 2A75M smooth bore gun fed by an automatic loader holding 22 rounds of separate loading ammunition, 7.62 mm co-axial MG and a roof mounted 7.62 mm RWS.

China North Industries Corporation (NORINCO) are marketing the VT5 Light-weight MBT which has a crew of three and is armed with a 105 mm gun fed by a bustle mounted automatic loader which has enabled the crew to be reduced to three. Its GVW is quoted as being between 33 and 36 tonnes, depending on the modular armour package fitted.

The VT5 is in service with the Peoples Liberation Army (Army) as the Type 15 and has also been sold to Bangladesh. Components of the VT5 are also used as the basis for an IFV fitted with a remote controlled turret armed with a 30 mm cannon, 7.62 mm MG and an ATGW either side. ■

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Spain's Military to Rework its Modernisation Priorities



Photo: DGAM

Spain is in the midst of rejuvenating its Armed Forces. The Spanish procurement authority Dirección General de Armamento y Material (DGAM) is currently conducting 40 armament programmes, some of which are big-ticket acquisitions. ESD had the opportunity to talk to Adm. Santiago Ramón González Gómez, the General Director of DGAM.

ESD: As the central Spanish defence procurement authority, is DGAM the only organisation in charge of responding to the materiel needs of the Spanish military? Are there other organisations involved in defence procurement in Spain?

Adm. González: The responsibility for planning the financial and materiel resources necessary for the functioning of the Spanish Armed Forces lies with the Secretary of State for Defence (SEDEF), to whom the Directorate General for Armament and Materiel (DGAM) reports.

The DGAM is responsible for the procurement process of armaments and its associated materiel, and for the research and development activities related to such materiel. The maintenance of this materiel throughout its life-cycle is the responsibility of the end user, except in the case of dual-use materiel, in which case it is centralised in the DGAM. The procurement processes for the rest of the resources (financial and materiel) necessary for the functioning of the Armed Forces and the Department are planned and managed in the SEDEF directorates and centres associated with these resources (DIGENIN, CESTIC, DIGENECO).

ESD: What effects did the establishment of the Permanent Structured Cooperation pattern (PESCO) have on your organisation's structure and work? What developments are yet to be expected in this context?

Adm. González: The current development of European initiatives such as PESCO and the European Defence Fund (EDF) has had

a direct impact on the structure of our organisation. Spain is firmly committed to the European Defence project, as demonstrated by the large number of European initiatives in which our country participates. The establishment of PESCO implies meeting a series of commitments. Some of these commitments, such as the harmonisation of needs, military capabilities and industrial cooperation within the framework of the European Defence Agency (EDA), are those that fall mainly within the scope of the DGAM.

In this regard, the DGAM has been adapting its structures and organisation to efficiently attend to the various PESCO initiatives and activities. Currently, staff from different DGAM directorates are actively and constantly involved in various working

groups in connection with PESCO projects, plans and programmes. As a result of this participation, the DGAM has developed an internal procedure, fully implemented in 2020, for sharing information and evaluating and managing PESCO, European Defence Industrial Development Programme (EDIDP) and EDF projects.

Where PESCO projects are concerned, Spain will continue to participate actively in this initiative. Spain is currently coordinating two projects ("Strategic C2 system for CSDP missions and operations" from the first wave and "Airborne Electronic Attack (AEA)" from the third wave of projects). Spain also participates in a further 22 projects and is an observer in 10 more projects led by other countries.

Photo: Navantia



Providing Spain's homeland with a defence for evolving threats and equipped with the latest digital technology, the F-110 programme will further protect the country and its citizens.



Photo: GDELS

DGAM, these can be divided into two main areas: national activities and transnational cooperation activities, most of them under the umbrella of the European Defence Action Plan (EDAP).

Within the framework of cooperative Research, Development, and Innovation (RDI) activities at European level, Spain has actively participated in the (EDIDP). In 2019, the European Commission (EC) received a total of 40 proposals, 18 of which were selected for co-funding. Spain participates in 15 of the selected industrial consortia, four of which are led by national entities. In the 2020 call, the Spanish Ministry of Defence sponsors 29 proposals, 11 of which are coordinated by Spanish entities.

Regarding national RDI activities, earlier this year the Secretary of State for Defence approved a new research and technology strategy that will boost the Ministry of Defence's RDI investments in the years to come. This strategy prioritises some strategic objectives with regard to the development of sophisticated and complex weapon systems (aircraft, ships, satellites, etc.), as well as others that target specific technological challenges, in areas such as cyber defence, electronic warfare, com-

Spain has placed a €1.74Bn contract to procure 348 8x8 DRAGÓN VCR wheeled combat vehicles.

The National Implementation Plan 2021, the new call for PESCO projects and the workshop on collaborative opportunities are some examples of the developments we are currently working on in this field.

ESD: We understand that DGAM is also the MoD's centre of excellence for Research & Development (R&D) Programmes? In terms

of budget allocations, what is the share assigned to R&D? Can you provide a brief survey of your current R&D activities?

Adm. González: The planned R&D expenditure in the Ministry of Defence's 2021 budget is €58.8M, which represents 2.22 per cent of the budget allocated to materiel procurement. With reference to the current RDI activities carried out by the

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Photo: Airbus Helicopters



Under the OCCAR-EA TIGER Programme, Spain received its first TIGER HADIE Helicopters in 2014.

munications, the fight against asymmetric threats, the use of civilian technology for military purposes (AI, materials, robotics, small satellites, etc.), digital transformation and sustainable energy, among others.

ESD: What is the total annual budget available for defence procurement in Spain? What is the share of the procurement budget if compared to the entire defence budget or even the Spanish GNP?

Adm. González: Around 22 per cent of Spain's total defence expenditure, some €3.2Bn, is allocated to defence procurement.

ESD: What are the most important defence programmes currently executed by your organisation?

Adm. González: The DGAM is currently managing 40 armament programmes. In terms of economic and technological relevance, the programmes concerning the 8x8 DRAGÓN combat vehicle, the S-80 submarines and the F-110 frigates are worth mentioning.

In terms of RDI, the most important programme is the Next Generation Weapon System (NGWS) within the concept of the Future Combat Air System (FCAS).

This international initiative in which Spain participates together with France and Germany aims not only to form the backbone of our Air Forces from 2040 onwards, replacing the fourth-generation fighters currently inherited in the fleets – the EUROFIGHTER and the RAFALE – but also to promote the aeronautics and defence industry as one of the main contributors to the common European defence.

In connection with ongoing land force modernisation programmes, the Spanish Army has drawn up the Integrated Brigade Combat System Plan (SCI-BRI). The plan

defines different types of Army brigades, in addition to the Marine Infantry brigade, integrating all the necessary combat capabilities at brigade level to successfully face future scenarios and fields of action envisaged in Horizon 2035.

ESD: Which of your current programmes are carried out in international partnerships with other national or multinational procurement organisations? Are there defence procurement efforts executed in the scope of public-private partnerships?

Adm. González: We consider our participation in OCCAR (Organisation for Joint Armament Cooperation) and EDF to be the priority options for participation in European projects and programmes.

Spain, like other countries, is a significant contributor to the following OCCAR programmes: the TIGER combat helicopter, A400M transport aircraft, EuroMALE remotely piloted air system and Europan Secure Software Defined Radio (ESSOR).

Under the auspices of NATO, NETMA (NATO Eurofighter and Tornado Management Agency) manages the predecessor of the NGWS, the EF-2000 Eurofighter Programme, while NAHEMA (NATO Helicopter Management Agency) manages the NH-90 Programme. Based on the experience of these programmes, an ad hoc organisation has been created in Paris, the Combined Project Team (CPT), with the mandate to manage the NGWS programme, at least in the initial phases, although the long-term plan is to transfer it to OCCAR, as it is already covered by the NGWS international foundation agreement, within the FCAS Framework Agreement.

Regarding EDF support, Spain participates in 13 of the projects selected by the EC in the EDIDP 2019 call, leading four of them, and has chosen EDA as Programme Man-

agement Office for two projects (ECYSAP and ESC2) and OCCAR to manage the other two (OPTISSE (Optical Payload) and REACT (AEA)). For future EDF calls, Spain's position regarding EDA and OCCAR will remain unchanged in both the short and medium term.

ESD: The DRAGÓN is certainly among your current lighthouse projects. What is the current status of the programme, and has a decision been made regarding the vehicle's main armament, especially the turret? How many versions of the vehicle are to be introduced?

Adm. González: The initial design of the 8x8 combat vehicle is currently being agreed on so that series production can begin next year. Tess, as the company awarded the production contract, will make the final decision on the main gun turret to be mounted on the vehicle by the end of the first half of this year. The first production tranche comprises five versions: infantry fighting vehicle, cavalry scout vehicle, battalion command post vehicle, sapper fighting vehicle and forward observation vehicle.

ESD: How is the F-110 programme coming along? Do you envision serious export potential for this design?

Adm. González: Upon completion of the definition of the ships and the selection of the main equipment of the ship, the Execution Phase of the Programme started on 23 April 2019, upon the signing of the Design and Construction Execution Order with NAVANTIA. In relation to the equipment contemplated in the Execution Order, more than half of the contracts envisaged have been formalised; contracts that represent 85 per cent of the budget allocated to this item.

The preliminary design review will be carried out shortly (second half of May), and the critical design review (CDR) will be carried out 14 months later. Both design reviews will be unique to the series of five ships to be built for the Navy, with the construction of the first frigate (F-111) starting immediately after the CDR.

The planned delivery schedule is one frigate per year starting in 2027.

In order for export to be successful, the competitiveness of NAVANTIA's products is crucial, and the Defence/Navy-NAVANTIA collaboration model is one of the pillars on which to build this competitiveness. In this environment, the F-110 frigate programme is key to the modernisation of the Navy's fleet, to secure NAVANTIA's future in the export of this type of products, continuing along the same path started on by the F-100 frigates and, above all, acting as

the driving force that will take the Spanish Naval sector to Industry 4.0 excellence.

ESD: In light of such technologically demanding requirements like EuroMALE and FCAS, to what extent is the Spanish defence industrial base capable of responding to the materiel requirements of the Spanish Armed Forces? In which areas do you have to rely on foreign contractors?

Adm. González: Spain decided to join the highly selective club of nations with a vocation for the design, development and production of highly complex weapon systems, thus ceasing to be a mere consumer. This decision has implied a major effort by the Spanish defence industry in the field of innovation, process improvement, etc., supported by the Spanish Government. The Spanish defence industrial base has the necessary technical and industrial skills to enable the design, development and integration of complete weapon systems.

The best example of our capability to participate in this type of project was the recognition of our partners in the NGWS programme when we entered into negotiations and expressed our ambition to participate at the same level as the rest of the interested parties. Taking this decision gave rise to a huge qualitative leap for the



Photo: Naviris (Fincantieri / Naval Group)

Spain has joined the European Patrol Corvette (EPC) programme to develop a prototype of a modular 3,300-tonne ship responsible for a number of tasks and missions, including those performed by offshore patrol vessels and light frigates. Depicted is an official design rendering of the EPC PESCO project.

Spanish Defence Industry, and the intention to maintain the pace of improvement is one of the key guidelines in the Spanish Ministry of Defence.

EuroMALE is a collaborative project in which the participating industries work together, developing an agreement that has enabled a shared working scheme towards the fulfilment of a common objective to be defined. This system will underpin the execution of stage 2 of the EuroMALE contract covering the development, production and initial 5-year support of the system, which is expected to be signed this year.

In an increasingly globalised world, further European and transatlantic integration is irrevocable. The development of increasingly

complex weapon systems, based on the system-of-systems concept, makes it virtually impossible for any single nation to have the market influence and the technological and purchasing capability to fully cover the entire design.

Institutional commitment to Spanish defence companies, characterised by their high technological and innovative level, is a key line of action for the DGAM. The defence industrial sector is a basic strategic element for national defence and security, contributing to the economic activity of our country and to the creation of employment, especially highly qualified employment.

The interview was conducted by Esteban Villarejo.



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Protecting Critical Infrastructure – Cyber or Sabotage

Tony Kingham

This article looks at one of the most pressing threats to critical national infrastructure.

On 10 April 2021, the heavily guarded Natanz nuclear plant, Iran's main uranium enrichment facility and part of the country's critical national infrastructure (CNI), was the target of a cyber-attack, which the Iranians claim was an act of sabotage carried out by Israel. Nobody seems to dispute that it was the Israelis, least of all the Israelis themselves. According to reports in the New York Times, an explosion destroyed an independently protected power supply, which damaged the centrifuges.

The intriguing aspect about this particular attack is that one would assume that such a high-profile target, currently at the

centre of a global geopolitical controversy, would be safely tucked away behind an air gap between its supervisory control and data acquisition (SCADA) and any external networks. In addition, electronic memory devices of any kind, capable of introducing malware to the system, would be strictly banned from the facility and its independent power supply, with all the necessary measures in place to enforce such a ban. After all, the Iranians are not new to cyber-attacks.

In 2010, they were the target of the computer worm Stuxnet, which reportedly destroyed 984 centrifuges at Natanz and other facilities, by causing them to burn them-

cyber warfare offered an incredibly powerful game-changing method of asymmetric warfare, creating a level playing field with regional and global powers, and carrying a very low risk of things escalating into an actual shooting war.

Consequently, from 2010, Iran began to invest a considerable amount of time, money and energy in developing their own cyber capability in the form of an organisation called "The Cyber Defense Command". Iran is now considered a major emerging power in the field of cyber warfare.

In 2012, Iranian hackers targeted several big American banks including JPMorgan Chase, Bank of America and Capital One.

Photo: Pixahive



Author

Tony Kingham is the Editor of Border Security Report magazine and a Director of the World Border Security Congress and the International Association of Critical Infrastructure Protection Professionals (IACIPP).

selfs out. The facility was not connected to the internet and the worm was introduced to the system via a USB connection, or in other words, by a saboteur. On that occasion, the finger was pointed at Israel, and at the US as well. This first attack obviously constituted a huge embarrassment for the Iranians and was a major wake-up call. But as well as a threat, the Iranians realised that

They flooded the banks' computer networks with traffic, knocking them offline and incurring millions of dollars in lost business. In 2014, an Israeli official told a press conference that Iran had launched numerous significant attacks against Israel's internet infrastructure. In Turkey in 2015, a massive power outage occurred, lasting 12 hours in 44 of Turkey's 81 provinces, af-

EVPÚ Defence Introduces New Weapon Stations

Czech electro-optical equipment manufacturer EVPÚ Defence is planning to focus their IDEF 21 exhibition on its specialised products including remote-controlled weapon stations (RCWS). The EVPÚ Defence RCWS are designed for enhanced perimeter surveillance, tracking, targeting and fire control. The turnkey defence solutions provider currently offers two types of RWCS suitable for land and naval applications – with plans to expand its portfolio in the near

future, according to sources at EVPÚ Defence.

RCWS 12, the larger of the two systems, is a device based on a modular concept. Its standard version is capable of being fitted with a 7.62 mm to 12.7 mm NATO or Russian calibre machine gun and 30 mm – 40 mm grenade launchers. Available modifications include the integration of SPIKE guided anti-tank missiles or adjusting the system to carry two weapons at the same time. On the other hand, ZSRD-07 is a lighter

and more compact product designed for 5.56 mm – 7.62 mm machine guns.

Both of these remote-controlled weapon stations use a high-quality electro-optical system with a Full HD day camera, high-resolution thermal imaging camera, laser rangefinder and an optional aiming camera. They also both share two all-important features: a tradition of use within the NATO forces and maximum adaptability to suit the requirements of a specific application.



A close-up view of the CWS 12

Photos: EVPÚ Defence



THE ZSRD-07 RCWS is designed to integrate 5.56 mm and 7.62 mm machine guns.

fecting 40 million people. In June 2017, the UK's Daily Telegraph newspaper reported that intelligence officials concluded that Iran was responsible for a cyberattack carried out on the British Parliament, lasting 12 hours and compromising roughly 90 email accounts belonging to MPs. In 2018, a ransomware attack crippled the city of Atlanta. Once again, Iran was blamed. So, given their bitter experience and hard-won expertise in this area, it seems surpris-

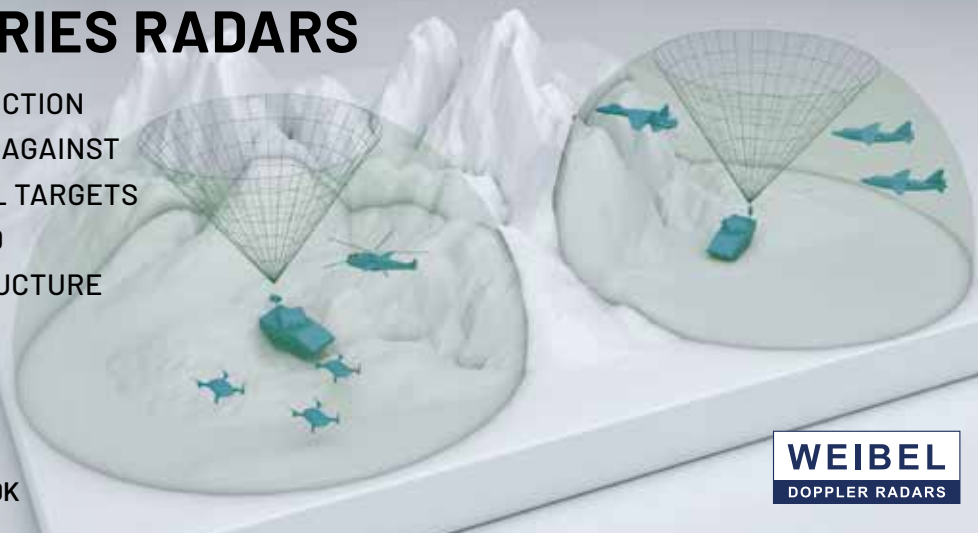
ing that Iran has been caught out again and in the same manner. Iranian State TV reported that Iran's intelligence services claimed to have identified an individual named Reza Karimi as the saboteur responsible for the attack, alleging that he fled Iran shortly before the blast. Assuming that the Iranians have continued to protect their plant by some sort of air gap, another insider being responsible would make sense. But as in all cases of international espionage,

the most obvious answers should always be treated with caution. For the Iranians, producing a saboteur shows that the plant was not vulnerable to an external cyber-attack. For the attackers, (whoever they may be) a 'saboteur' fleeing the country at the right time, may put the Iranians off looking for another modus operandi. Perhaps I have been reading too much John le Carré since even with an air gap, there are other possibilities. By spoofing the time, it is possible

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US cyberwarfare specialists training at the Warfield Air National Guard Base in Maryland

to disrupt the power flow to CNI systems causing them to burn out. Other possibilities include phishing emails to gain access to the corporate network with malware via staff members' emails. In all likelihood however, we may never know the truth! Of course, it is not just the Iranians and Israelis are engaged in a CNI cyber struggle.

In 2000, a disgruntled employee in Australia hacked into a computerised waste management system in Queensland, causing millions of litres of raw sewage to spill out into local parks, rivers and even the grounds of a Hyatt Regency hotel. In December 2015, hackers compromised SCADA systems of three energy distribution companies in Ukraine and temporarily disrupted the electricity supply to consumers. The Ukrainians said that the attack had come from an IP address inside Russia. In 2017, an unspecified state hacked into systems at a Schneider Electric SE facility in the Middle East causing an emergency shutdown. In February 2021, a hacker accessed the network of a water treatment plant in Florida with the intention of increasing the amount of 'lye' content (a substance used in water purification) in the town's water from 100 parts per million to more than 11,000. This would have been harmful to people if consumed. Fortunately, the hack was spotted and reversed.

It is clear therefore that cyber-attacks are not just the domain of nation states, bad

actors from terrorist organisations and organised crime groups, but also include disgruntled employees and lone wolves, all of whom have the potential to cause massive damage and bring down entire systems.

Ways to Protect Critical Infrastructure

The most effective way to protect systems is to physically disconnect from the internet and external devices. Obviously, this is problematic, because if you are operating and maintaining a nationwide system, there may be no other way to communicate, and send and receive data, unless the whole system is independent of the national network. However, in the case of critical sites and systems this may be necessary.

Where this is not possible, regularly updated and robust firewalls are needed, and since cyber-attacks require two-way communication to pull off an attack, Unidirectional Security Gateways (USG), which is hardware that limits the sending of information in only one direction, is required.

Training

The most vulnerable part of any system is nearly always the people. Staff need to be regularly trained in the dark arts of hackers and their phishing emails, how to

spot them and how to avoid them. This applies equally to their personal emails and web habits, because hackers may use their personal lives to coerce employees into acts that they would not otherwise do. Training should therefore also include how to spot potential insider behaviour. Finally, they also need to be trained to have secure passwords.

Insider Threats

Deep background checks and systems like user activity monitoring software, which alerts the administration to any anomalies in the systems should be in place. Staff should only be granted access to the parts of the SCADA system they need to have, and no more. There should be a manual override of the system in place in case the system is hacked. Furthermore, regular penetration tests of all systems and manual overrides should be carried out. Memory devices of all kinds should also be prohibited and technology put in place to detect it.

Conclusion

The attack on the Florida water treatment plant is a vivid illustration of the sort of scenario that many have been predicting for so long. Luckily, an alert colleague spotted the attempt and blocked it before any harm could be done. Had the attack succeeded however, we could have been looking at hundreds, maybe thousands of people being harmed.

However, it is perhaps the Natanz incident that we should really be worrying about the most, even though it was aimed at a so-called rogue state. Whoever the perpetrators were, and whatever method they used to achieve their objective, it is clear that sabotaging Iran's nuclear programme was the aim, not to cause a mass casualty incident.

But the attackers succeeded in penetrating a highly sophisticated security system of a cyber-savvy organisation, and were able to destroy the centrifuges. If one can, others can!

Let us not forget that in 2014, an insider at the Doel-4 nuclear reactor facility drained the lubricant for the reactor turbine, causing it to overheat, resulting in an estimated US\$100 - US\$200M in damage.

We must assume that at some point our CNI, including nuclear facilities, will be the target of a terrorist or state-sponsored attack. We must therefore learn the lessons of past incidents, from friends and foes alike, and implement the necessary measures to safeguard our CNI. ■

A Drone Superpower

How Turkey's UAV Manufacturers are Transforming "Drone Diplomacy"

Korhan Özkilinc

Turkey has successfully closed the value chain for the production of UAVs by the domestic industry, thus ending its dependence on foreign suppliers which is important for Turkey given recent embroilments with the US over the F-35 aircraft and Russia over the S400 air defence system.

For the past decades, military UAVs have been very simple pieces of equipment but the technology has since evolved rapidly and profoundly. These systems are now in global use and represent a multi-billion dollar industry. One country that has begun to catch up in the last decade in particular is Turkey.

The first Turkish UAV was developed by Turkish Aerospace Industries (TAI) in 1989 under the name UAV-X1 at a time when there was no real strategy, except that Ankara just wanted to keep up with developments in western countries. At the outset, the pioneers were not aware as to the importance of the step they had taken for the future of the Turkish aviation industry. At that time, the Turkish defence research agency, SSM (today SSB), was the driving force behind this move and allocated a budget of US\$278,000 which increased to US\$828,000 with additional agreements. Later, the UAV-XP succeeded the UAV-X1, but unfortunately, in the following years, no breakthrough was made so it was decided to procure UAVs from the US because of the acute needs of the Turkish Armed Forces. In 1992, US company General Atomics bought the GNAT 750 and it entered service in 1993, but expectations could not be realised. As a result, Turkey ceased with the purchase of foreign-made UAVs through a decision of the Defence Industry Executive Committee. It was decided that the State's goals in this field should be realised through self-development, though shortly before that, the purchase of 10 Israeli IAI HERON UAVs was approved for the transitional period. TAI was commissioned by SSM in 2004 to develop a domestic UAV, however, at the same time, the cooperation with Israel's armament partner for UAVs was intensified. In the case of the IAI HERON, there were clear discrepancies between the two countries. Although the project began in 2005,



Photo: TAI Industries

The AKSUNGUR UAV of TAI is capable of day and night reconnaissance and ISR and attack missions.



Photo: TAI Industries

The AKSUNGUR carrying MAM-L ammunition

it was delayed for technical reasons for a long period of time. Despite delays, the Turkish military was nevertheless confident that deliveries could start in early 2010. Although the Turkish Armed Forces acquired 10 HERONS, as well as ground control and support systems, there was constant bickering over the EO payload. Turkey insisted

on using its own AselFlir 300T instead of the Israeli MOSP-3000, arguing that it was a case of 'big brother' watching you. Although the MOSP-3000 weighed a third of the Aselsans AselFlir 300T, it did not offer the capability of laser marking. The Turkish Defense Procurement Authority prevailed and at the same time, work on the develop-

ment of a Turkish UAV was accelerated significantly so as not to be left behind. What follows is an overview of the ecosystem of the Turkish UAV industry.

Propulsion Technology

Turkish Aerospace Industries founded the JV Turkish Engine Industries (TEI) with General Electric (GE) in 1985. The company has been working in recent years on the development and production of engine models, the reason being that in spite of political and economic obstacles, technological developments continue. The export of UAVs with external engines is difficult and therefore SSM placed an order for the development of the TEI-PD170 in December 2012. The engine successfully completed its first test on an ANKA-S UAV in December 2018. It is a 2.1 litre turbo diesel engine with a power output of 172 (± 2) hp, the engine generates 170 hp at an altitude of 20,000 ft., at 25,000 ft. 155 hp, 30,000ft 130 hp, 35,000 ft. 105 hp and 90 hp at 40,000 ft. It has enough power to work at an altitude of 45,000 ft. A little later, the PD170 was redeveloped with the TEI-PD222ST, which has 220 (± 2) hp with the engine generating 180 hp at an altitude of 20,000 ft. and 115 hp at 30,000 ft.

With the more powerful PD-170 engines and the modification of the wings by removing the flaps and increasing the wing area, the ANKA-S was able to increase its payload capacity from 200 kg to 350 kg and to spend 50% more time at higher altitudes. This meant that ANKA-S was able to prove its capability at an altitude of almost 14 km with the corresponding payload. The TAI engineers have learned to get more out of

Photo: TAI Industries



The AKSUNGUR UAV can be armed with a variety of air-to-ground weapons.

the ANKA and to integrate the accumulated knowledge into its bigger brother, AKSUNGUR, in a cheap and effective way. The TEI-PD170 and TEI-PD220ST are used as push propellers for the ANKA, and as pull propellers for the AKSUNGUR. The FEDEC engine control system was also developed by TEI and was put into series production after 6,000 hours of testing. On 23 November 2019, TEI delivered 40 PD-170 engines. The TEI PD-series is the property of the SSB and can be upgraded at will on domestic UAVs and easily exported. The TEI is also working at full steam on propulsion systems for future UAVs or for combat UAVs with jet engines. Recently, TEI has developed and presented the rocket engine TEI-TJ300, which is intended to carry rockets, but also to equip UAVs, but TEI has already launched the tur-

bojet engine TEI-TJ90 in 2011 in cooperation with TÜBİTAK (Scientific and Technological Research Council of Turkey) and integrated it into target drones in June 2013.

Baykar Technologies has gone its own way and together with the Ukrainian company, Ivchenko Progress, founded the joint venture BLACK SEA SHIELD, whose first project is the development and production of the AI-450T turboprop engine from 450 hp to 750 hp for the UAV AKINCI. In the future, Turkish UAVs will definitely be equipped with turboshaft and jet engines with very high performance levels. There are two reasons for this: the UAVs will not only be able to fly at higher altitudes with greater payloads, but also able to engage in dogfights.

System Architecture

In 2012, the "Roadmap for the Turkish UAV-Production" was created to meet the needs of the Turkish security forces, Gendarmerie, Police and also the Secret Service. The development of UAVs was therefore given the highest priority with the ultimate goal of becoming independent from foreign countries and to successfully make a name for itself on the world markets.

Many companies are involved in this industry and here are just a select few: CTECH develops ultra-light UAVs (approx. 20 kg) with very compact satellite communication systems that allow for uninterrupted communication with very high data volumes and speed while moving without any distance restrictions. The satellite terminal DEV-KU-12/18/20 inch SOTM (SATCOM-On-The-Move) has data transmission speeds of 20 Mbit/s using the Ku and Ka wave bands. The full-duplex communi-

Photo: Korhan Özkilinc



A range of armaments for the AKINCI UAV on display

cation link is encrypted using Encryption AES256 FIPS 140-2 technology. In addition, the line-of-sight (LOS) communication system provides reliable and uninterrupted communication with the UAV ground control station in all weather and operating conditions. The real-time transmission of control commands to the UAV during the air-to-ground channel sensor, video and audio data from electro-optical UAV devices to the ground station is operated at well over 200 km distance and at a height of 40,000 ft. ESEN System Integration is a subsidiary of the US aerospace company SNC in Ankara and is involved in the Wide Area Surveillance System (WAS) which provides real-time continuous surveillance capability over a city sized area (~20 km²). Through the utilisation of this system, complete situational awareness is achieved whilst gathering more intelligence data in combination with the Big Data Fusion, Analysis and Decision Support System. The company Meteksan researches and develops technologies that are optimally adapted to the volume size, weight and power consumption of the UAVs in a minimalist manner, thereby ensuring that the UAV can remain in an operational area for a very long time. To mention some technology, the TMV Telemetry Trans-

mitter enables the telemetry data to be sent under difficult conditions and poor weather conditions. The multifunctional MILSAR, a SAR (Synthetic Aperture Radar) and GMTI (Ground Moving Target Indicator) is under 30 kg and outperforms similar systems on the market in terms of size and functionality. The radar allows it to obtain quality images under all conditions. Images are generated with a resolution of 1 metre and in spot mode, the MILSAR displays an image of the target area with an accuracy of 30 cm. In the near future, a function for detecting coherent changes is planned. The system also features DMTI (Dismounted Moving Target Indication) and MMTI (Maritime Moving Target Indication) modes for maritime targets. The Flight Control Computer and the Automatic Take-off and Landing System, as well as the Airborne and Ground Segment OCIS system, enable reliable take-off and landing under all conditions. The radar altimeters CRA-201 and CRA-501 provide accurate altitude data and the Anti Jamming-GNSS suppresses GPS controlled mixed signals during operations. The Anti Jamming GNSS device, which can be operated in the wavebands GPS L1, GPS L2 and GLONASS L1, has a 4-channel antenna and supports

the global satellite navigation signals GPS, GLONASS, GALILEO and BIDOU and operates with a wide frequency range. The C-band UAV Data Link, Airborne Omni Antenna and Ground Directional Antenna provide not only secure communications, but also reduces high data transmission speed.

Milsoft company is engaged in developing a complete mission system solution of Ground Control Station GCSMS of UAVs which consists of Mission Planning Software, Payload Control Software, Communications System, Integrated Test and Monitoring Software. Furthermore, it is developing the Mil-INTEL, designed for efficiently and effectively analysing different types of intelligence data. This provides the intelligence organization the opportunity to turn a massive amount of data into actionable high value information. These include 2D/3D Map and Drawing Capabilities, Common Intelligence Picture, Search & Geo-Search, Image Exploitation & Analysis, and Video Drawing & Annotation Capabilities.

The Savronik company develops satellite ground terminals and stations for voice and data transmission in the X and Ku wave range, as well as flight control outside the line of sight for UAVs.

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- User-friendly
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- Statistically confirmed accuracy of targeting - 1.5 m CEP
- Flight duration 70 min.



WB GROUP 

Photo: TAI Industries



An ANKA-I reconnaissance UAV

The company Space Defence Technologies (SDT) develops and produces Image Processing and Pattern Recognition Capabilities, for example Automatic Target Detection & Recognition, Classification, Change Detection, Visualization, Video Analytics and Multi-sensor Data Fusion. Furthermore, Hyper-spectral Data Processing and LIDAR Signal Processing, and Spatial Intelligence Management System are this company's key strengths.

Armaments

Armaments for Turkish UAVs are mainly provided by Roketsan and TÜBITAK SAGE. In 2016, Roketsan introduced the MAM-L, a laser-guided smart micro ammunition that has proven to be highly effective in military operations. The 1-metre long MAM-L weighs 22 kg, with a diameter of 160 mm and is capable of neutralising targets at a distance of 14 km at an optimal launch. The MAM-L has a Semi-Active Laser Seeker and different warheads, which include an Anti-Tank Warhead, High-Explosive Blast Fragmentation, Tandem Effective against Reactive Armour or Thermobaric. The Smart Micro Ammunition attacks targets through an Inertial Navigation System/Global Positioning System. The smaller version of the MAM-L is the MAM-C ammunition, which uses fragmentation effects against accumulations, as well as unarmoured vehicles or military installations such as radar systems. This munition has a diameter of 70 mm, is 970 mm in length and weighs only 6.5 kg. It can fly up to 12 km and the impact accuracy is stated as 3 m. The smallest in the bunch is YATAGAN, a miniature ammunition (40 cm in length, weighing just 1 kg) which was presented at IDEF-2019. YATAGAN can hit targets at a distance of 8 km with a deviation of up to 1 m, thanks to a laser-guided

warhead. Due to its size and weight, a UAV can carry several dozen of these and can be used effectively in an operational area for a longer period of time.

Recently, Roketsan began serial production of the L-UMTAS, a highly effective anti-tank missile with an effective range of 14 km. The missiles are 1.8 m long, weigh about 37.5 kg and have laser seekers. The warheads have TANDEM armour piercing warhead against reactive armour High Explosive Fragmentation. The lightest of the anti-tank missiles is the CIRIT, with an effective range of 8 km. It was developed in order to bridge the gap between simple unguided missiles and expensive anti-tank guided missiles.

The TÜBITAK SAGE equips the Turkish UAVs with heavy bombs or rockets with very long ranges. The TEBER-81 and TEBER-

82 are laser guidance kits for use on MK-81 and MK-82 general-purpose bombs, also on the MK-84 (2,000 lb), which can reach a range of 25 km at a height of 40,000 feet. Basically, this type of munition converts the Inertial Navigation System (INS), Global Positioning System (GPS) and Semi-Active-Laser (SAL) Seeker. Furthermore, a Wing Assisted Guidance Kit (KGK) converts the existing unguided 1,000 lb MK-83 and 500 lb MK-82 general-purpose bombs into long-range, air to ground smart weapons. These have a capability of precision hitting targets from an altitude of 37 km and at higher altitudes; the target should be hit within 10 m of the target. Finally yet importantly, the Stand-Off Missile (SOM) - the TAI AKSUNGUR and AKINCI will receive advanced cruise missiles capable of hitting targets from more than 200 km distance. Depending on the version, the cruise missiles weigh up to 500 kg, i.e. one AKINCI or AKSUNGUR UAV might be able to carry two. In all probability, combat drones in the future will be equipped with the air-to-air missile, BOZDOGAN (Merlin), and the GÖKDOGAN (Peregrine) both of which are under development.

The ANKA UAV

In 2004, the Defence Industry Executive Committee signed an agreement with TAI for the development of a domestic UAV. The first UAV was the ANKA-A which made its first maiden flight in February 2013. In the second phase of the programme, the first flight of the UAV ANKA-B took place in January 2015; this version had a Synthetic Aperture Radar/Ground Moving Target In-

Photo: TAI Industries



By modifying the wing surfaces, ANKA-S can take 50% more payload and operate for up to 24 hours at altitudes of 35-40,000 ft.



Photo: SSB

The TEBER-82 munition integrated into the AKSUNGUR drone with high payload capacity is intended to provide critical capabilities to the Turkish armed forces.

dicator/ Inverse Synthetic-Aperture Radar, plus an electro-optical Wescam CMX-15. This UAV was subsequently also equipped with weapon systems of the latest generation, e.g. MAM-L ammunition. The ANKA-B is made completely of composite materials and to enable it to operate in winter and at higher altitudes, an anti-icing system was integrated. This made ANKA-B interesting for export countries in colder regions. As early as October 2013, SSB and TAI signed an agreement on the purchase of 10 SATCOM controlled ANKA-S, plus 12 ground stations. The delivery of the first ANKA-S started in 2018 and the order was to be delivered in full by the end of 2020. ANKA-S is also capable of being controlled by the Turkish communication satellites Turksat 4B. The ANKA-S UAV is equipped with the ViaSat VR-18C high-power airborne satellite communications (SATCOM) antenna and a home flight control computer. As with the others, this can be upgraded with MAM-L and MAM-C ammunition, CIRIT, L-UMTAS. In September 2018, an ANKA-S with CATS (Common Aperture Targeting System), IR, HDTV and DI-NIR camera was subjected to rigorous testing. Towards the end of 2019, ANKA received the TEI PD-170 engine developed by TEI, so there is no obstacle to export this Turkish UAV to foreign buyers. The ANKA-S is 8.6 m long, 3.25 m high, with a wingspan of 17.5 m and a maximum take-off weight of 1,750 kg. The dimensions have slightly changed compared to the previous versions and by modifying the wing surfaces, ANKA-S can take 50% more payload and operate much longer (up to 24 hours) at altitudes of 35-40,000 ft. A special intelligence version of the ANKA was delivered to the Turkish Secret Services (MIT) in March 2018 in cooperation with Aselsan and TAI. This ANKA-I

version is equipped with the latest ELINT, COMINT and SIGINT capabilities. Formerly, the Turkish Armed Forces operated the COMINT and SIGINT under the Headquarters Genelkurmay Elektronik Sistemler Komutanlığı. By a decision of the President of the Republic, this Headquarters, including its electronic location, was subordinated to MIT on 15 May 2012. There are several versions of ANKA and the Turkish authorities are currently holding talks with several countries from North Africa, East Asia, Southeast Asia, the Middle East, Central Asia and South America regarding the sale of the ANKA-S. The Turkish Armed Forces, Gendarmerie and Police have so far received over three dozen units, mainly the ANKA-S. On 25 December 2019, three ANKA-S systems were sold to Tunisia.

The AKSUNGUR UAV

AKSUNGUR is a UAV system of the MALE (Medium Altitude Long Endurance) class based on the ANKA and had its maiden flight on 20 March 2019. It is capable of day and night reconnaissance, surveillance and reconnaissance (ISR) missions as well as attack missions with EO/IR, SAR and SIGINT payloads and a variety of air-to-ground weapons. AKSUNGUR is powered by two PD-220 twin turbocharged diesel engines with 222 hp each. The flight envelope is specified at 40,000 ft and has a wingspan of 24 m and weighs 3,300 kg. Under each wing, there are three hanging brackets to carry ammunition with different weights of 150 kg, 300 kg and 500 kg. With a payload of 750 kg, AKSUNGUR is capable of carrying out offensive and naval surveillance missions for 12 hours at an altitude of 24,000 feet and SIGINT reconnaissance with a 150 kg payload for

24 hours at an altitude of 40,000 feet. At the end of 2020, a record flight of 49 hours was achieved. AKSUNGUR has fully autonomous operational functions, a dual automated flight control system, an encrypted digital transmission channel and an anti-icing system for higher altitudes and cold winter periods. Like the ANKA-S, the SATCOM control system enables AKSUNGUR to cope with large mission radii and features a day camera, an infrared camera, a laser marker, an electro-optical payload combined with laser rangefinder, a SAR, GMTI-ISAR radar and a wide-range surveillance camera for video reconnaissance. The COMINT version has DF, ESM and the ELINT for signal intelligence, as well as a Personal Location Detection System (PLS), V, UHF radio relays and communication service containers for various communication purposes. For the naval patrol missions, it is equipped with SAR, GMTI-ISAR radar, AIS, Sonobuoy and MAD-Boom (Magnetic Anomaly Detector). The GÖKSUNGUR is a late-stage UAV equipped with turbojet propulsion, which will most likely be used as a combat drone with air-to-air missiles. It will have manned-unmanned teaming capabilities, but the drawback is that the delivery of the F-35 JSF has been blocked. TAI already had its first experience on the project around 2010 on the CASSIDIAN TALARION MALE UAV with EADS, which is now Airbus Defence and Space.

The BAYRAKTAR TB2 and AKINCI UAVs

Baykar Makina, which was founded in 1984 as a supplier to the automotive industry by the two sons of the company's founder (one of them the son-in-law of Turkey's President), entered the fledgling market in 2005 with the mini UAV BAYRAKTAR. The company was able to achieve important milestones in UAV technology from 2014 onwards and supplied the Turkish Armed Forces, the Gendarmerie and Police with the tactical UAV BAYRAKTAR TB2, which was primarily designed for reconnaissance missions, but was later converted to the attack mode. The BAYRAKTAR TB2 is capable of carrying out its tasks continuously for 24 hours at an altitude of 27,030 ft and with a range of 150 km. Powered by Rotax engines, producing almost 100 hp, the BAYRAKTAR TB2 has a maximum speed, according to the manufacturer, of about 70 kt. The BAYRAKTAR TB2 has a maximum weight of 630 kg. The original camera was the Wescam (Canada) but exports have since been suspended due to Nagorno

Karabakh conflict. This UAV now has a Turkish opto-electronic system supplied by Aselsan. The attack UAVs are equipped with MAM-L and MAM-C ammunition and with Live Broadcast Transfer System (BGAM), real-time image transmission, as well as live transmissions for command posts and central command posts are possible. Currently, more than 140 BAYRAKTAR TB2s are in service with the Turkish Security Forces, Gendarmerie, Navy and Police. In a 2017 deal, Baykar sold a batch of six TB2s to Qatar for US\$70M and later sold six to Ukraine. In the meantime, Baykar has completed the maiden flight on 6 December 2019 with its AKINCI UAV. The AKINCI has a wingspan of 20 m, is 12.3 m in length and is 4.1 m high. It can be equipped with a range of different ammunition, air-to-air missiles, bombs and cruise missiles. The UAV also features Artificial Intelligence, SAR radar, AESA radar, satellite communication systems. The 5.5-ton UAV is powered by AI-450C (approx. 450 hp) supplied by the Ukrainian company Motor Sich, though the company intends to equip the UAV with an even more powerful turboprop engine with approx. 750 hp. The UAV's mission duration is set at 24 hours with a maximum service ceiling of 40,000 feet. It appears that the AKINCI is planned to be produced in three versions (different types of engines) with the third UAV already undergoing flight testing. Operational missions will be supported by two SATCOM and LOS systems. The AKINCI also has a fully automatic flight control system and three spare autopilot systems. Ascent and descent functions are fully autonomous, as well as movement and trajectory tracking. Navigation is based on internal sensor data that works without a GPS connection. Baykar is also developing a UAV with turbojet engines, called MIUS (Fighter Unmanned Plane System), to fly 4-5 hours at a service ceiling of 40,000 feet and at a speed of 0.8 Mach. The take-off weight is listed at about 3.5 tonnes with a payload of 1 tonne.

The KARAYEL-SU UAV

Since its foundation in 2003, the company has developed and launched EFE, BORA and KARAYEL UAVs in order of size. The parent company, Vestel, is considered to be the third largest company in Turkey and has several subsidiaries including Ayesas with its extensive knowledge in defence matters, which include avionics design, aerodynamics design, autopilot systems, central control computer and ground control stations. Up until 2010, six tactical KARAYEL UAVs were delivered to the Turkish Armed Forces. These UAVs have been developed and manufactured ac-

ording to NATO standard STANAG-4671 for surveillance and reconnaissance purposes. The KARAYEL features highly complex systems such as triple redundant distributed avionics architecture designed to provide protection against uncontrolled crashes. As the domestic market is highly competitive between Baykar Technologies and TAI, Vestel Defence has established a foothold in foreign markets with the technically improved KARAYEL-SU UAV. The KARAYEL-SU is slightly larger than the basic version of the KARAYEL, and offers a higher payload capacity in addition to offering a payload for for a Wescam MX-15 EO/IR camera which offers 50x magnification in day camera mode and 30x in infrared camera mode. Furthermore, the system is equipped with a laser rangefinder, laser designer and laser pointer. The KARAYEL-SU is also equipped with a 97 hp engine of Belgian make and weighs 630 kg. The wingspan has been increased from 10.5 m to 13 m, the length is 6.5 m and it can be operational for about 20 hours. There are two weapon brackets under both wings, each of them with a load capacity of 30 kg, meaning a total of 120 kg of different ammunition types can be loaded, especially Roketsan's MAM-L and MAM-C ammunition, in addition to the fuselage, which has a load capacity of 50 kg. Vestel Defence has specified a maximum speed of 80 kt and an operational altitude of approximately 22,500 ft. The range of the Data Link LOS is set to be 150 km. At the Dubai Airshow 2017, Vestel Defence signed a contract with the Advanced Electronics Company (AEC) based in Saudi Arabia for the production of the KARAYEL SU in Saudi Arabia. Later on, the Saudi Arabian AEC exhibited the KARAYEL-SU on its own stand at the Dubai Airshow 2019. Saudi Arabia has deployed the KARAYEL-SU in the conflict in Yemen and in May 2020, the Saudi Arabian General Authority of Military Industries (GAMI) announced the purchase of 46 UAVs from the local defence contractor, which is scheduled to start in the first quarter of 2021 and is expected to cost US\$199.5M.

Reliable Pillar of Foreign Policy

It has been said that Turkey has become a "drone superpower", which is not true, but one thing Turkey has achieved, and with considerable effort, is that the value chain for the production of UAVs by the domestic industry has almost been closed, thus ceasing dependence on foreign suppliers. It is certainly true that drones can significantly

change the course of conflicts, because they are relatively cheap compared to aircraft, difficult to detect and do not endanger the lives of pilots. This technological development in Turkey has helped Ankara become an important regional power mediator, exerting more influence than before on the outcome of conflicts. The effectiveness of UAVs became very clear in the Syrian civil war in March 2020, which helped stall the Syrian offensive of Dictator Assad on the other side of the Turkish border, allowing for the construction of small settlements for the refugees at the border, thereby significantly mitigating the consequences for Europe. In May of the same year, Turkish UAVs were able to help the Libyan National Army against the forces of rebel leader General Khalifa Haftar, not only to end his offensive against Tripoli, but also to create all-important options at the negotiating table. The Azerbaijani forces were able to destroy over 300 armoured vehicles and as many mobile weapon systems in the second Nagorno-Karabakh war in September 2020 with the help of UAVs supplied by Turkey, pushing the Armenians out of the occupied territories. According to the statements of Azerbaijani President Aliyev, the value of the destroyed weapon systems by UAVs far exceeded US\$1Bn. In all conflicts, UAVs have been instrumental in shaping the outcome and will continue to play an important role in the future. The most interesting thing about three successive conflicts is that Turkey has not acted against its geostrategic goals with UAVs vis-à-vis Russia's plans in Syria, Libya and Nagorno-Karabakh, but has strengthened them. Whether the rivalry between the Turkish and Russian Presidents will continue in the current conflict between Ukraine and Russia is questionable, because Turkey plays more of a mediator role in this conflict setting, although Ankara has delivered not only the BAYRAKTAR TB2 UAVs to Ukraine, but will also produce them on-site with Ukrainian companies. Russian Deputy Foreign Minister Sergei Ryabkov made it clear on 13 April 2021, regarding the issue of Turkish drones in Ukraine, that Moscow would not be happy with the presence of these aircraft. It looks like Ankara will expand its drone diplomacy around the world through the export of its UAVs. The Turkish defence industry not only develops UAVs according to the requirements of the domestic armed forces, but also receives enormous feedback from different operational theatres, i.e. that they are "combat proven" from the very beginning. In other words, the enormous efforts that Turkish industries have invested in unmanned technologies form the basic requirement for the future combat domain, namely the "Digital Battlefield". ■

“We are ready for new global partnerships”



Photos: Aseksan

ASELSAN, one of the leading international defence and technology companies with a diversified 9,000 strong employee base, works extensively on future technologies in terms of research, development, integration and modernisation of advanced systems. The company provides innovative value-added products and solutions with a strong and growing commitment to globalisation and increasing impact on the global market.

ESD had the opportunity to speak with Prof. Dr. Haluk Görgün, Chairman, President and CEO of ASELSAN.

ESD: ASELSAN was established in 1975 and approaching its 50th anniversary. Where does the company sit in the overall Turkish security/defence industrial structure?

Prof. Görgün: The defence industry is one of the most critical sectors for a country's security. As Turkey is located between Europe and the Middle East, our strategic geopolitical position requires a strong defence infrastructure. In line with the vision of having a defence industry fulfilling our Army's needs, we have developed various solutions employing state-of-the-art technology.

Our starting point in 1975 was to establish a local technology centre addressing Turkey's needs in the defence industry. With nearly 50 years of experience, we are now the largest Turkish defence contractor and ranked 48th in the world Top 100 Defence Companies List.

ESD: The company's motto is "Technology Serving People and Planet". In the security and defence domains, what are your personal, favourite examples that support this description?

Prof. Görgün: Over the years, we have placed major emphasis on technology development and have adopted innovation as the cornerstone of our business. We see technology as an opportunity for creation that addresses both people's and the planet's needs.

We have also continuously invested in emerging technologies. In line with this, we have focused and invested in the healthcare

sector to deploy innovative solutions tackling the healthcare challenges of today. The coronavirus pandemic has changed both the social and commercial life throughout the world and Turkey is one of several countries that has developed fast and decisive initiatives proven to be effective in reducing the viral spread. We joined a consortium for national ventilator production and maximised our efforts in mechanical, software and electronic design with our strong engineering capabilities and advanced technological infrastructure to tackle the challenge.

Furthermore, as a company which is also implementing energy projects, we prioritise our environmental awareness in areas such as reducing waste and minimising carbon emissions and footprint. As a result of our sensitivity in this area, we have been awarded the highest score by the Carbon Disclosure Project (CDP).

We are also engaged in climate change mitigation; we view climate change not only as a risk factor, but also as an opportunity for widening our environment and user-friendly solutions. In short, we shape technology so that it creates value



Aselsan continues to be at the forefront in Turkey's technological independence efforts.



The Turkish Armed Forces have increased operational capability and minimised their foreign dependency by use of Aselsan's indigenously developed high-tech systems on many platforms.

for people: for our clients, our partners and our employees.

ESD: How was 2020 for ASELSAN and what are ASELSAN's priority programmes going forward? How do you see the company's growth into the next few years?

Prof. Görgün: Although the impact of the pandemic is felt in every field, I am very proud to say that we achieved record international sales figures in 2020. Our international sales are reflecting a remarkable upward trend, while we are breaking our own records year after year. On the other hand, we continue investing in our global engineering and manufacturing centres such as in Ukraine, Qatar and Pakistan. Our MRO Centre based in Qatar has been recently launched and is offering after-sales support services not only for Qatar but also other regional clients as well.

Within the next few years, we are targeting growth in global markets, while increasing our local presences in promising locations. Being a client-oriented technology company, we believe that it is vital to keep pace with evolving requirements and client expectations. In line with this concept, we have undertaken a transformational and localisation strategy, combined with organisational restructuring in order to maintain a competitive edge and better serve ASELSAN users.

We are ready for new global partnerships, aligned with our corporate strategy. We

would also like to foster our partnerships with governments that are planning and developing local programmes. Apart from this, we will continue to focus on localisation activities through local production, transfer of technology programmes, local maintenance, repair and overhaul centres supported by our local offices and joint ventures worldwide.

In addition to our commercial product lines, spanning from medical equipment to smart transportation, we will continue to expand and reach out to the people in more than 70 countries.

ESD: How do you manage the professional development of people within ASELSAN?

Prof. Görgün: ASELSAN is a big family. First of all, we ensure that our family members are well aware of the fact that their every effort is recognised and appreciated. This approach has seen us ranked as the number one employer in Turkey according to the Harvard Business Review Turkey's report. Additionally, we highly value the professional development of our employees, so much so that "Improve yourself, improve your team, enhance your organisation" is the motto that lies at the heart of our corporate values. We place much emphasis on development throughout various HR processes and practices.

We have also built a customised competency model and defined the behaviour-

al, managerial and technical competencies that should be achieved by ASELSAN employees at different seniority levels and in different fields of activities.

Furthermore, we employ a performance management system based on the continuous feedback and development process. Within the talent retention and succession management, we define various career development paths in order to turn our employees' potential into real value for our organisation. We believe that learning is a never-ending journey so we are investing in novel learning and development tools and processes.

ESD: How much internal R&D does the company undertake?

Prof. Görgün: We are one of the largest R&D centres in Turkey. Our R&D and engineering staff constitute 60% of our total headcount (around 5,200 people). Relative to our 2020 revenue figures, our R&D spending was around 21%, (US\$418M) a significant figure which shows our strong commitment to the technological growth and innovation.

Each year, 7% of the previous year's revenue is allocated for internally funded R&D projects. In 2020, there were around 200 internally funded R&D projects in ASELSAN.

The interview was conducted by Stephen Barnard.

An Astounding Turnaround



Photo: Aeromaritime Systembau

A year ago, Aeromaritime Systembau GmbH, a company with a long-standing tradition in naval shipbuilding, was teetering on the brink of bankruptcy. With harsh measures and under the stewardship of a former submarine commander, the company staged an amazing rebound. ESD had the opportunity to talk to newly appointed Jan Molter, Managing Director of Aeromaritime.

ESD: Only about a year ago, there were reports about Aeromaritime being in financial difficulties. In February 2021, you celebrated the company's 50th anniversary. What is the company - and what are its employees - like today?

Molter: Indeed, the last few years have not been easy, but with cross-divisional cost-cutting measures and the consistent implementation of current orders, we have returned to calmer waters, so that today's prospects look extremely good. We are recording new orders in all areas and intend to use this momentum to take further forward-looking steps. We are filling key positions with new personnel in order to generate sustainable growth again in the future. For this reason, we are looking in particular for systems engineers, qualified technicians, technical sales staff and software developers, to strengthen our project teams, but also for management positions. As you can imagine, these prospects are also very well received by the 60 employees currently working at our Neufahrn and Chemnitz sites. The mood in the teams is correspondingly positive.

ESD: How has Aeromaritime developed over these 50 years? What are the company's core capabilities today? Who owns the company?

Molter: Aeromaritime was founded in Munich on February 7, 1971. The decisive reasons for the choice of location were, on the one hand, the availability of highly specialised personnel and, on the other hand, the proximity to Munich International Airport, which allows us to

always provide on-site customer service worldwide within 24 hours. For 20 years, we have been located at our current site in Neufahrn near Freising and thus even closer to Munich Airport. From a small trading company we have grown to be a globally recognised system house for naval communication.

We have had an eventful 50 years, partly because things are rarely straightforward in the project business. This is particularly true of the marine business. In the first 40 years, we were almost exclusively active internationally. For example, we were able to realise our very first order for a complete system in Singapore - a very demanding customer, by the way. The German Armed Forces did not join us as a customer until 2009 with the F-125 class frigates, and this marked the beginning of a very turbulent period, which was also characterised by late payments to us. For a medium-sized system house, this is very difficult to cope with, and we reached our financial breaking point several times. On the subject of core competencies: The area of "Integrated Communication Systems (ICS) for submarines and military surface vessels" is by far the strongest in terms of sales and will remain so in the future. However, we are the world market leader with our submarine antennas for conventional submarines and also a leader in the Arab region with secure message handling systems (SAMMS). These businesses are significantly smaller compared to ICS complete systems, but are very attractive due to their niche and volume character with few competitors. Our main core competence lies in full

systems integration. With the F-125 frigate, we have delivered a communications system that is unparalleled anywhere in the world in terms of both complexity and system stability since it is a complex open system as opposed to the conventional black box of competitors allowing continuous development through nodes when needed.

Aeromaritime is a privately-owned family business. With the help of continuous financial support from shareholders, it has come through the last difficult years relatively unscathed.

ESD: What impact has the current pandemic had and is having on your business? What precautions have you taken?

Molter: In March 2020, positive Corona cases occurred among some employees and/or their families (fortunately none critical), whereupon we immediately closed the premises in Neufahrn for several weeks. Of course, we took further precautions (setting up a Corona Task Force, mandatory masks, plexiglass screens in the work and reception areas, further hygiene measures, etc.), but overall we came through the crisis relatively well, partly because our building in Neufahrn had enough and sufficient areas to ensure appropriately large distances between individual employees without any problems. On the other hand, the military project business has a long-term orientation anyway and was less affected by the pandemic than other sectors of the economy. We would have liked to celebrate our milestone birthday on 7 February, the day of our founding, but due to the tense

Covid-19 situation, we decided to postpone the celebration to the penultimate week of September. We will be happy to hold the celebration with our customers, friends and families, and it should potentially provide a welcome alternative to Munich's Oktoberfest, which is not yet clear if it will even take place.

ESD: Which military programmes at home and abroad can you refer to as a reference? What is the current focus of your business?

Molter: In the 50 years of our existence, we have delivered over 650 systems to more than 45 navies worldwide. Our most important reference today is certainly our Advanced Platform Communication System (APCOS-4000), which is used on the F-125 class frigates for the German Navy. Here we are the system provider for the entire internal and external communications, the Digital Communication Network (DKN) of the ships. This has been a focus of our work in recent years, although APCOS is also successfully deployed in many other countries, both on surface platforms and on submarines. As examples we would like to mention the Norwegian FRIDTJOF NANSEN class frigates and 214 class submarines, as well as the SCORPÈNE class in various countries. Our systems are mostly completely controlled by our own, very stable running software - Communication System Manager (COSYMA).

Today, fortunately, the submarine antenna business is also growing significantly again. As market leader for submarine antennas we are represented on more than 150 platforms worldwide. For some time now, our development department has been working very intensively on the next generation, so that we will be able to start the market launch at the end of 2021. Furthermore, we also focus on the secure message handling system SAMMS, which is used in more than 400 platforms and in maritime shore stations worldwide. You will find our reliable systems mainly in the Gulf region, but also in many other countries, such as Norway. We are working at full speed on the successor systems generation 8 in order to be able to start again with extensive sales commitments after the pandemic has been contained.

ESD: The international market in the field of ship communication is highly competitive. How do you hold your own against the "giants" of the industry?

Molter: Our decisive advantage lies precisely in the fact that we are not a "giant". The size of our company enables us to de-



Photo: Aeromaritime Systembau

Aeromaritime is under contract for the Integrated Communication Systems (ICS) for the German Navy's F-125 frigate.

velop individual solutions for our customers and to implement them quickly thanks to flat hierarchies and short communication paths. Compared to the large system houses, which usually offer a "black box" from a single source, our customers can integrate any device from any manufacturer into our systems. This means that our individual solutions are usually also very attractive in terms of price, because our customers only have to install what they really need. Our systems are particularly characterised by high system stability. This point in particular is often decisive in the naval business and ultimately led to us winning system responsibility for communications for the F-125 frigates in Germany against other "giants".

ESD: What technological trends do you have in mind for the future? What will be new at Aeromaritime in ten, twenty years?

Molter: Digitalisation is, of course, also an important issue for us, which is why we are already positioning ourselves accordingly today. When hiring new employees, especially in the area of software development, for example, we have to set the very highest professional standards in order to remain competitive. Naval shipbuilding in particular is also very conservative in its approach, so it is sometimes better for a device with just a few buttons to work perfectly well in a saltwater environment than for it to offer hundreds of configuration options that are mostly not needed and end up rather destabilising the overall system.

Over the next few years, we will continue to develop our systems and products to the latest technological stand-

ards, always keeping our ear close to the customer. The next generation of submarine antennas, equipped with additional frequency bands and with new functions, is already under development. In addition, we are working very closely with BAE-Systems on the software adaptation of our message handling systems SAMMS-7 and SAMMS-8. Together we will set new standards in the future.

Our core business will continue to be system control with APCOS and the associated COSYMA software. Both will still be in use on many naval vessels worldwide in 10 or even 20 years. You can be sure that at the 60th anniversary celebration in 2031, we will be able to present the modernised versions of our products, which will then have been heavily digitised but will still be characterised by robustness, stability and maximum customer benefit.

The interview was conducted by Jürgen Hensel.

Jan Molter (53) has been Managing Director of Aeromaritime Systembau GmbH since April 1, 2021. Previously, he served as Sales and Division Manager, as well as Managing Director in various companies in the military project business with a mainly maritime environment. He spent 14 years as a temporary soldier in the German Navy, most recently as Lieutenant Commander and Commanding Officer of the submarine U15.



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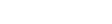
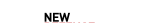
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