An ASR-NG installed
at one of Hendsoldt's
customer's premises

INNOVATION IN ATM - UTM SOLUTIONS

How the latest technical solutions are enabling military air traffic control and civil ANSPs to safely expand the use of their airspace

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means of artificial intelligence (AI) allows for further enhancements.

Hensoldt ATM - UTM solutions enable the green economy, such as wind farm installation and the hydrogen supported economy whilst at the same time maintaining safe air traffic control and air space capacity. ASR-NG ensures proven co-existence between wind farms and ATC while increasing the efficiency of ATC above wind farms. TwInvis – the non-emitting, non-cooperative surveillance radar – reduces emissions and installations footprint while supporting an increased air situational awareness.

Superior performance

Hensoldt stationary and deployable ASR solutions are combining its PSR and MSSR 2000ID with partner SSRs, offering future proven capabilities including clutter suppression for wind farm mitigation, an extended range of up to 120 nautical miles and deployable features.

The ASR radar consists of an integrated primary and secondary radar system. The primary radar detects non-cooperative objects such as small aircraft without transponders or hostile aircraft. ASR radar is based on a semiconductor transmitter and includes special signal processing techniques for wide-area surveillance and wind farm mitigation. The secondary radar, MSSR 2000 I, provides automatic identification of cooperative aircraft. It meets all "Mode S / Mode 5" ATC standards, which improve aircraft identification queries and are currently being used in all NATO countries and allied forces.

A modular and scalable deployable ASR-NG, with the same superior performance was developed for civil and military ATC, being transportable by land, sea and air to be deployed all over the world.

The deployable ASR-NG exploits the superior detection performance and accuracy of the stationary variant and can be moved by a single transport aircraft. It has a deployment time of less than six hours.

The versatility of the new product combined with ASR-NG's superior performance makes it suitable for ATC purposes in joint and combined missions of expeditionary units. The deployable ASR-NG has already been contracted by a European NATO member and has finished its first acceptance tests during delivery. This proven technology will enable the customer to provide ATC services to their forces using the deployable ASR-NG during out of area missions.

A TwInvis installation with FM, DAB and DVB capabilities

Passive surveillance

The TwInvis passive radar supports airspace surveillance and enables the detection of up to 200 aircraft in 3D within a radius of 250km (155 miles) in a noncooperative scenario without any emission. An air-situation picture is generated by analyzing reflected signals from existing third-party sources such as radio and television stations and provides additional primary radar information to the air traffic controllers with an update rate of just one second.

A passive radar acts purely as a receiver. It does not transmit itself and locates aircraft by evaluating the signals reflected at the target from existing external transmitters. TwInvis is creating a comprehensive air situation picture, which is generated from the simultaneous evaluation of a large number of frequency ranges. TwInvis is able to simultaneously evaluate up to 16 FM transmitters (analogue radio) and five frequencies from digital radio or television due to its highly developed digital receiver technology and special algorithms.

Furthermore, passive radar enables the low-cost control of civilian air traffic without additional emissions and without using scarce transmission frequencies.

In military applications, the system can provide surveillance for large areas using networked receivers and offers the advantage

Hensoldt enables efficient air traffic management (ATM) and unmanned traffic management (UTM) airspace integration in both military and civil domains while ensuring robust flight safety is maintained.

This is achieved by using the latest technology products such as ASR-NG (Airport Surveillance Radar- Next Generation), TwInvis passive radar surveillance, and Xpeller (Counter Unmanned Aerial System). The company also provides technological solutions such as MSI (multi sources integration), that by

The Xpeller system features high-resolution cameras to enable the accurate threat assessment of drones

that the "passive radar" cannot be located by hostile forces, nor can it be jammed.

Enabling safe UTM and counter UAV

Another highlight of Hensoldt's portfolio is the Xpeller counter - UAS (unmanned aerial system) Solution, to provide protection from the threat posed by drones in the military and the civil sector. Xpeller uses a combination of sensors to detect, track and classify many different types of drones and assess the threat potential at ranges from a few hundred meters up to several kilometers. High-resolution cameras make it possible to decide whether there is a serious threat. If so, the threat can then be countered by choosing the appropriate countermeasures.

> **"Xpeller uses a combination of sensors to detect, track and classify many different types of drones and assess the threat potential"**

The modular and scalable Xpeller system allows tailored solutions to be provided by means of combining different types of sensor technology from the Hensoldt portfolio, according to customer requirements and the local conditions.

The Xpeller system can also be plugged into an UTM scenario as a drone-enabled solution to ensure non cooperative surveillance at the highest standard of safety for the future airspace.

Multi-source integration

Furthermore, a key for future UTM-ATM integration is multi-source integration (MSI), which has a long history within Hensoldt. MSI uses a mix of traditional and future sensors and data sources. Using emerging data fusion algorithms with AI, it augments and supplies the best 4D data to downstream systems and provides situational awareness and decision support to controllers and operators.

The kind of sources and sensors that are currently integrated include but are not limited to tactical datalinks data, radar / IFF data, asterix data, ESM sensors data and intelligence data.

The MSI in conjunction with the sound cyber capability that is available from Hensoldt is essential for the cloud-based surveillance that will be a pillar of the future airspace design.

Hensoldt is a technology pioneer for defence and security electronics. Based in Germany, near Munich, and present in more than 25 countries globaly, the company is one of the market leaders of sensor solutions for defence and non-defence applications. ❖