

Innovation in defence: the next generation of RF Data Link technology

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During the past year we've witnessed a shift in how defence organisations embrace innovations and implement new technologies. As we enter 2022, defence teams will rely more than ever on technologies to gather Intelligence, Surveillance and Reconnaissance (ISR) data for Situational Awareness (SA) so they're better placed to identify and respond to threats and make informed decisions to ensure operational and mission success. Confronted with more sophisticated and frequent threats these teams will greatly rely on the next generation of Radio Frequency (RF) Data Link solutions – the first of which is already being deployed today.

Responding to unmanned environments

Delivering data accurately, securely, in real time, over great distances relies on the technical capabilities of Tactical Data Links (TDLs) or Data Downlinks. These securely exchange mission-critical SA data between air and land based fixed and rotary wing platforms and decision-

makers in command centres. However, as the nature and frequency of threats continue to increase and the cost of unmanned systems decreases, defence organisations are demanding more agile, cost-effective and responsive options. For instance, surveillance via manned platforms can be expensive, have limited range and be complicated to instruct in the air space. Today, the appeal of drones in such scenarios is increasingly apparent.

In response, RF Data Link capabilities are being developed to take advantage of the opportunities presented by the evolving Unmanned Aerial Vehicle (UAV), Unmanned Ground Vehicle (UGV) and Unmanned Surface Vessel (USV) markets. For over 30 years Enterprise Control Systems (ECS) has designed, manufactured and supported teams in the defence sector, including with RF solutions in Counter-UAS. This technology is currently being deployed on active military and security operations across the world and used extensively within the UK home market as well as by NATO allies and global coalition forces in the defence sector.

The new RF Data Link solution: Tove

In ongoing support of the defence industry and the challenges they face, ECS has introduced a low-power, high-performance, lightweight small form factor data downlink certified to DO-160 (RTCA), designed specifically for unmanned, autonomous vehicle markets. When integrated into an unmanned system such as a drone, the **Tove RF Data Link** can cost-effectively distribute ISR data in air, sea or on land operations, which in some cases, require extreme ranges of up to 100 kilometres. Tove is the first in a family of low-profile lightweight form factor data downlinks developed by ECS.

Shifting to such a small form factor opens up new opportunities. With a significantly reduced profile, Tove can be added to a UAV to increase its capability or increase its endurance on a task. UAVs undoubtedly present significant cost, time and capability benefits in certain scenarios



Tove RF Data Link by Enterprise Control Systems

compared to carrying out the same task via high-value fixed or rotary-wing or land platforms.

Tove also benefits from Software Defined Radio (SDR) technology, allowing a seamless integration with existing ECS ground receiver infrastructure whilst maintaining robust long-range connection with rapid re-gain of the link – delivered in a lightweight form factor with a significantly reduced Size, Weight and Power (SwaP) requirements, making it the ideal UAV payload. Furthermore, this technology can be provided with a proprietary encryption and encryption management system that provides a sovereign capability to any nation's defence and security forces, ensuring the complete protection of their data.

Increased data security and efficiency

Intelligence gathering requires the ability to share information securely, especially where such large volumes of data are transferred in real time. In this context, when it comes to Data Links, data throughput can become vulnerable to attacks as the demands from sensors and unmanned robotics grow. ECS capabilities mitigate this and ensure data security while keeping the robustness it is known for, with the Tove solution offering highly secure data transmission using sophisticated, in-house designed, encryption software.

Furthermore, Tove's onboard high-definition, low-latency video encoder provides superior compression, reduces channel bandwidth, increases spectral efficiency, and offers best-in-class range. GPS and bidirectional telemetry data is also added to the Tove stream to provide positional information to the fixed or mobile receive stations whilst allowing for the remote control of onboard sensors. New and legacy third party sensors can be connected via various common inputs, extending the platform's capabilities without hindering its task. Data collected by digital or analogue sensors – such as video, audio, radar, or platform management information – is securely transmitted to the ground control centre.

As well as consistently acting ahead of the threats in the defence sector, ECS understands the developments that directly affect and inform technologies – such as

broadcast technology and the latest video compression trends – to ensure that the most cutting-edge developments and innovation can be deployed at speed. Equally critical is ensuring capabilities are not dependent on third party infrastructure such as LTE communications, guaranteeing a seamless data transfer in the event of a mobile network outage.

The next step in innovation

ECS' agile approach and ability to design products in-house is strengthened by long-term reliability through proven quality management processes. Having recently been acquired by SPX Corporation and joining its TCI business division, ECS is now able to combine expertise in RF countermeasures and encrypted Data Link systems with SPX's strengths in RF detection and location systems. Ultimately, hardware and software integration across offerings from both companies will optimise signals intelligence, paint a clearer battlefield picture and facilitate threat interdiction.

ECS is continuing to build close and trusted partnerships with defence organisations across the world to ensure they are equipped with the necessary tools and insights to confront new and emerging threats. Combined with its agile UK-based team of highly-skilled engineers and former defence professionals, the organisation's deep expertise brings the next generation of innovations to market at speed and at scale.

While there's a clear shift towards unmanned air platforms, interoperability between manned and unmanned platforms is a key challenge in today's security and defence environment. The ability to share data and utilise shared assets and Data Links can ultimately help inform better decisions and take the best immediate action. Tove is just the first step in ECS' strategic roadmap of RF Data Link capabilities for miniature environments, and the next step towards greater innovation in the defence industry. ■

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