

Evenlode

RF Data Links



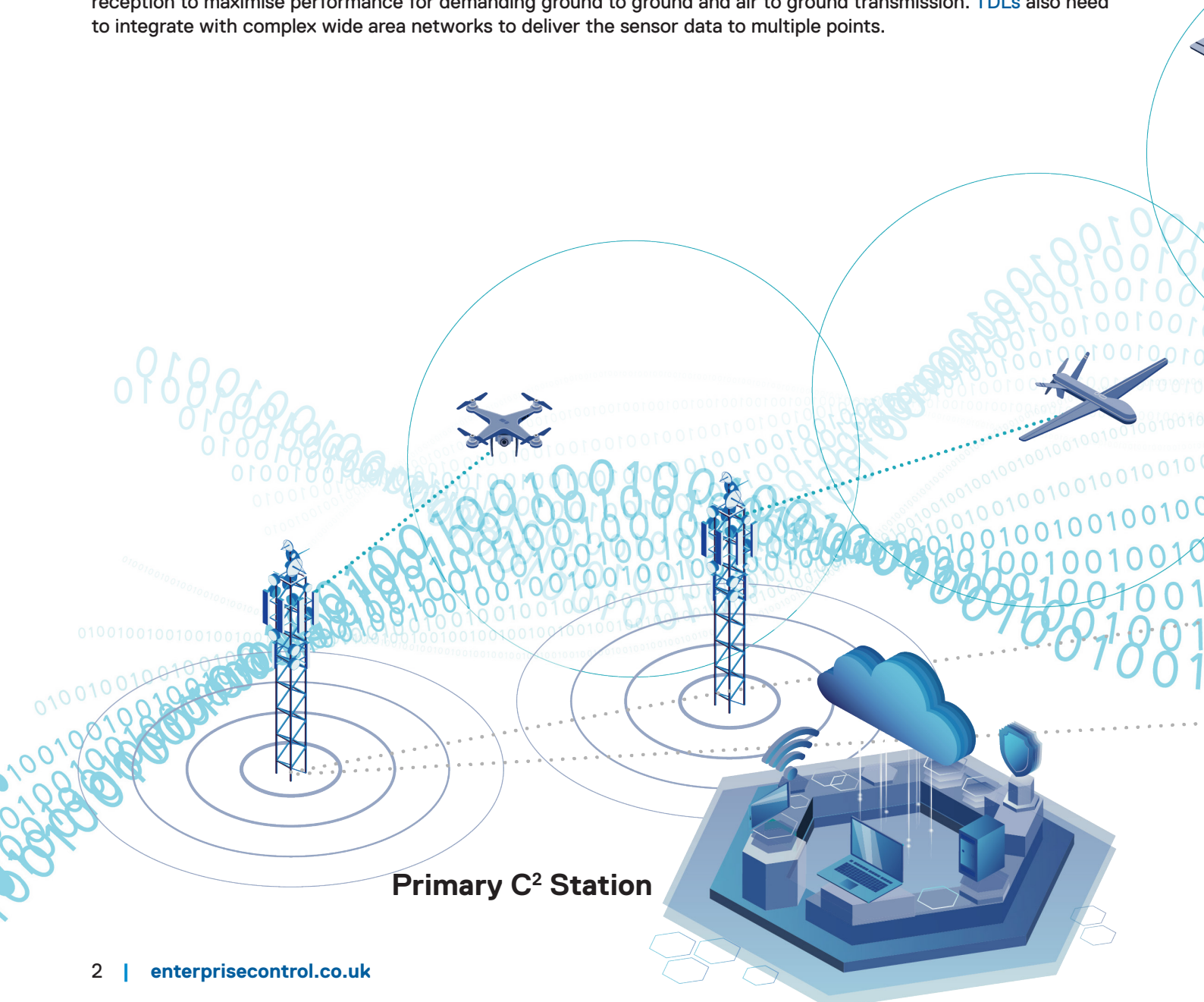
Tactical Data Link Technology

Tactical Data Link (TDL) Evolution

Since TDLs were first introduced, customers deploying Coded Orthogonal Frequency Division Multiplexing (COFDM)-based systems as the underlying technology, have demanded increased customisation and functionality.

Specifically, air platform users require their equipment to comply with DO-160, which is an aviation environmental conditions and Test Procedures certification. In addition, Military customers demand increased link robustness and security protocols such as encryption and very low failure rates.

ECS has adapted its TDL product family to suit the evolution of air-platforms, such as UAS which, require TDLs to be ever smaller and consume less power, whilst increasing their range and capability. ECS has developed diversity reception to maximise performance for demanding ground to ground and air to ground transmission. TDLs also need to integrate with complex wide area networks to deliver the sensor data to multiple points.

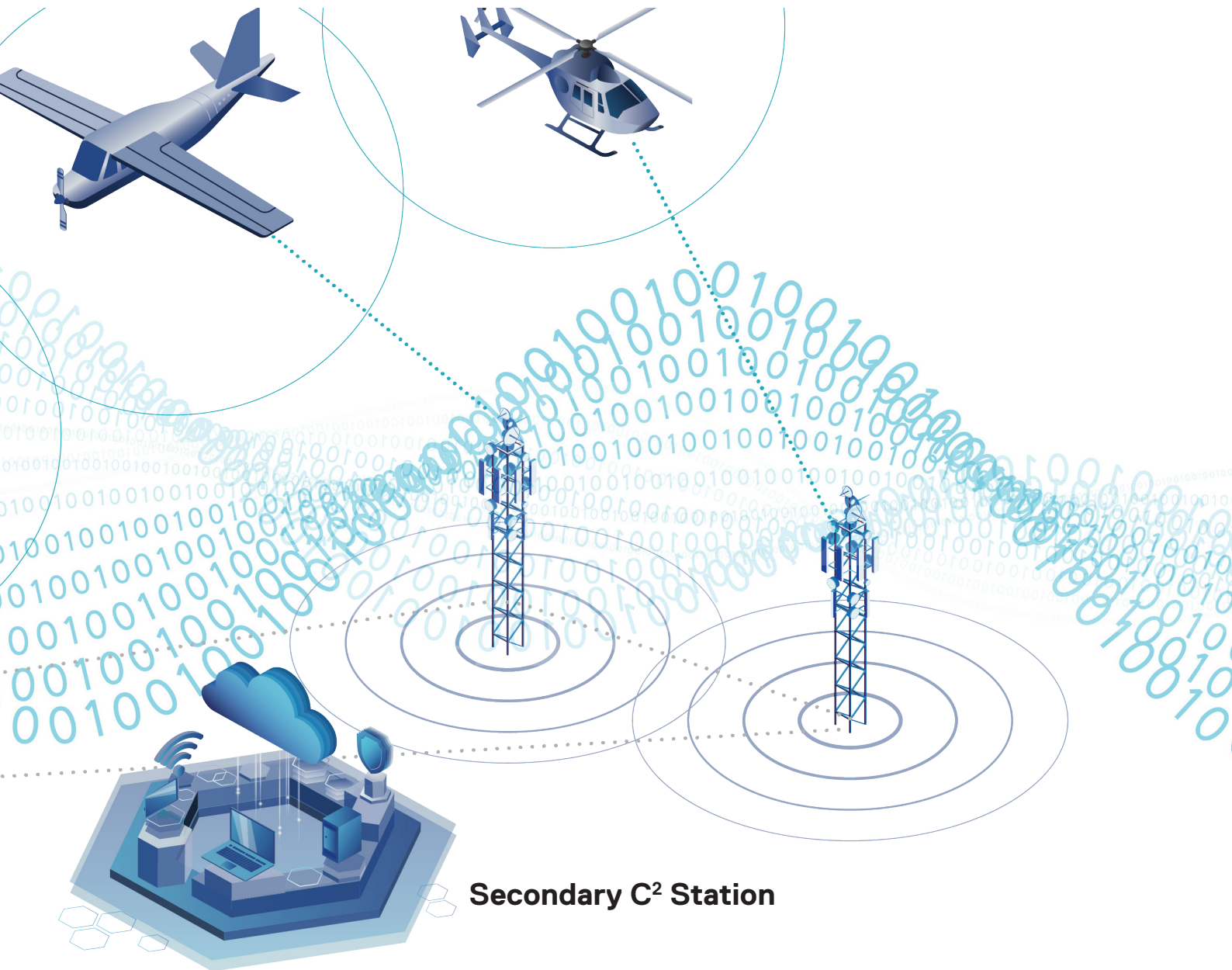


COFDM Advantages

ECS has adopted and developed **COFDM** as its underlying technology for **TDLs**, as the technology offers **extendable range**, sufficient bandwidth for Military and Security operations and low operational cost.

COFDM is robust against multipath interference, frequency selective fading, jamming and provides rapid regain after signal loss, making it ideal for the Military, Police and Security customers/end-users. ECS's next generation of Mini-Data Links demonstrate how **COFDM** will develop; namely by extending the capability and performance whilst reducing Size, Weight and Power (SWaP).

During operational use, Sovereign Nations require the ability to control communications networks and to not be beholden to third-party technology providers for their critical communications. ECS's application of **COFDM** enables users to address this requirement.



Secondary C² Station

Evenlode is the World Leading RF Data Link Solution

Evenlode is a TDL Technology with superior range performance for real-time video and **Internet Protocol (IP) Data for Airborne Intelligence Surveillance and Reconnaissance (ISR)**.

Evenlode is an upgradeable lightweight system for larger UAS, light aircraft and rotary wing platforms, with key attributes:

- Custom configured for specific end-user requirements.
- Lightweight envelope (including antenna) of 4kg.
- Designed for OEMs, 3rd-party integrators and end-users.

Evenlode offers highly secure data transmission using sophisticated in-house designed encryption software (subject to export approval) or Substitution Cipher Encryption.

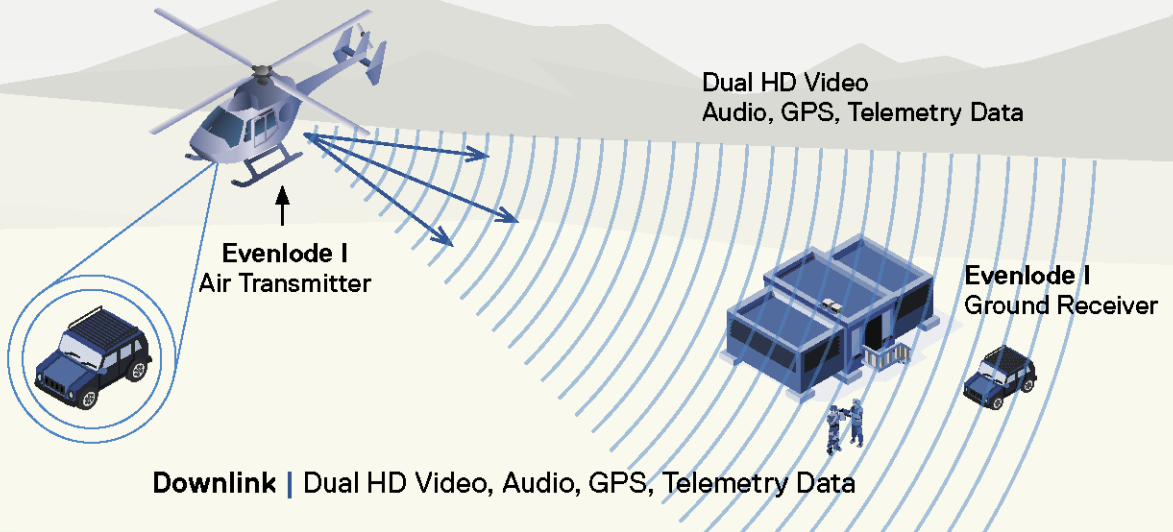
The customised **AES256 implementation** is based on an encryption process previously approved by UK Government, on an ECS legacy **TDL** for higher classification information transfer.

Evenlode offers three levels of capability:

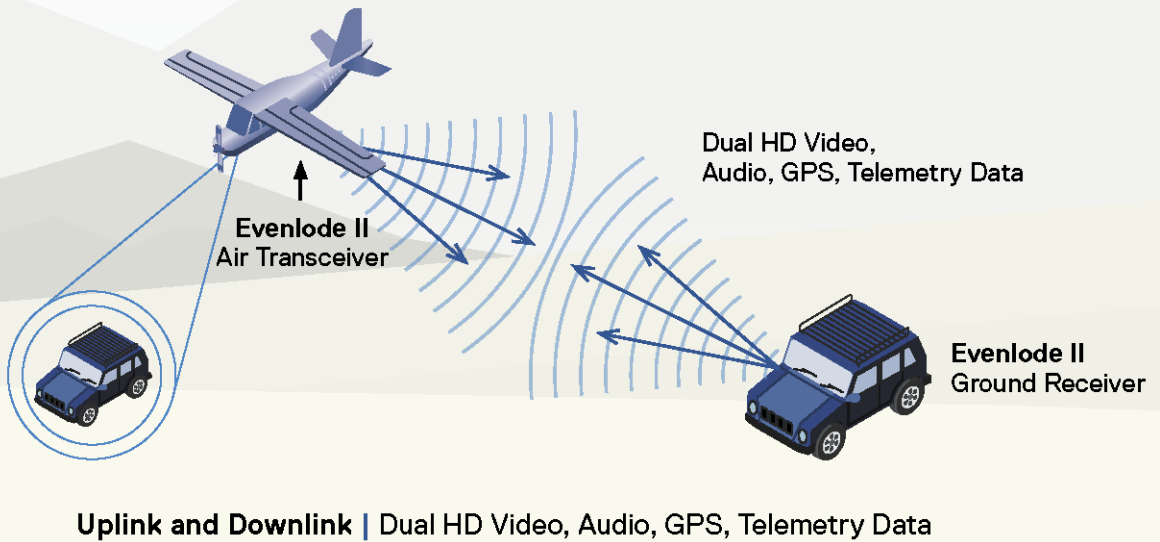
- | | |
|---------------------|---|
| Evenlode I | Data Terminal is a dual channel video and data downlink for HD Video, Audio, GPS data and telemetry data from the air-to-ground. |
| Evenlode II | Data Terminal is a transceiver with uplink/downlink capability and can also be used to extend the range of the downlink via a relay system. |
| Evenlode III | Data Terminal is a multi-channel Data Link, carrying bi-directional video data and IP data simultaneously. |

ECS had the regulatory obligation to maintain a log of all products sold with AES256.

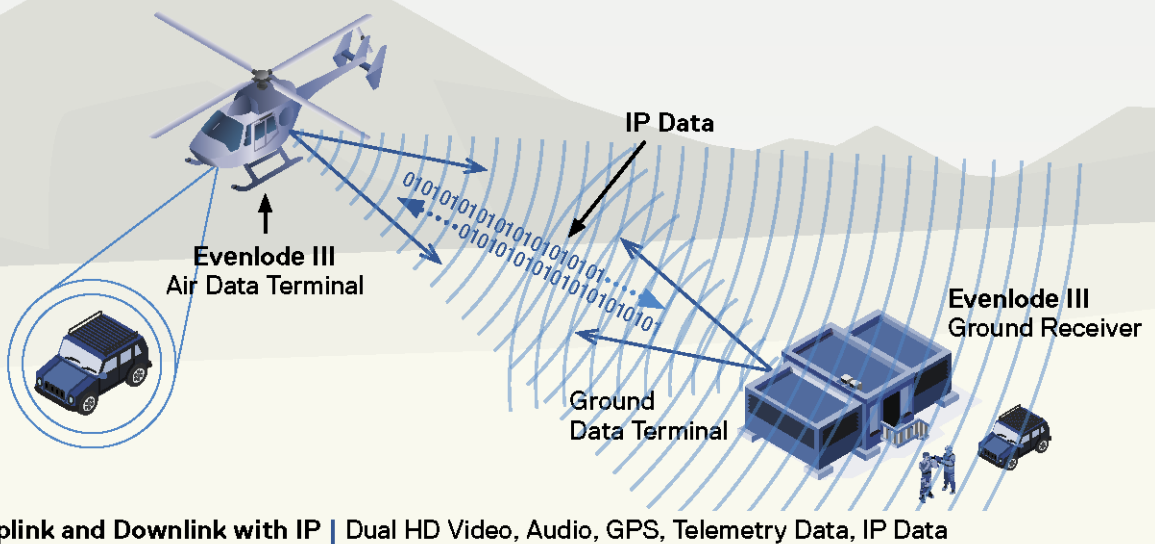
Evenlode I



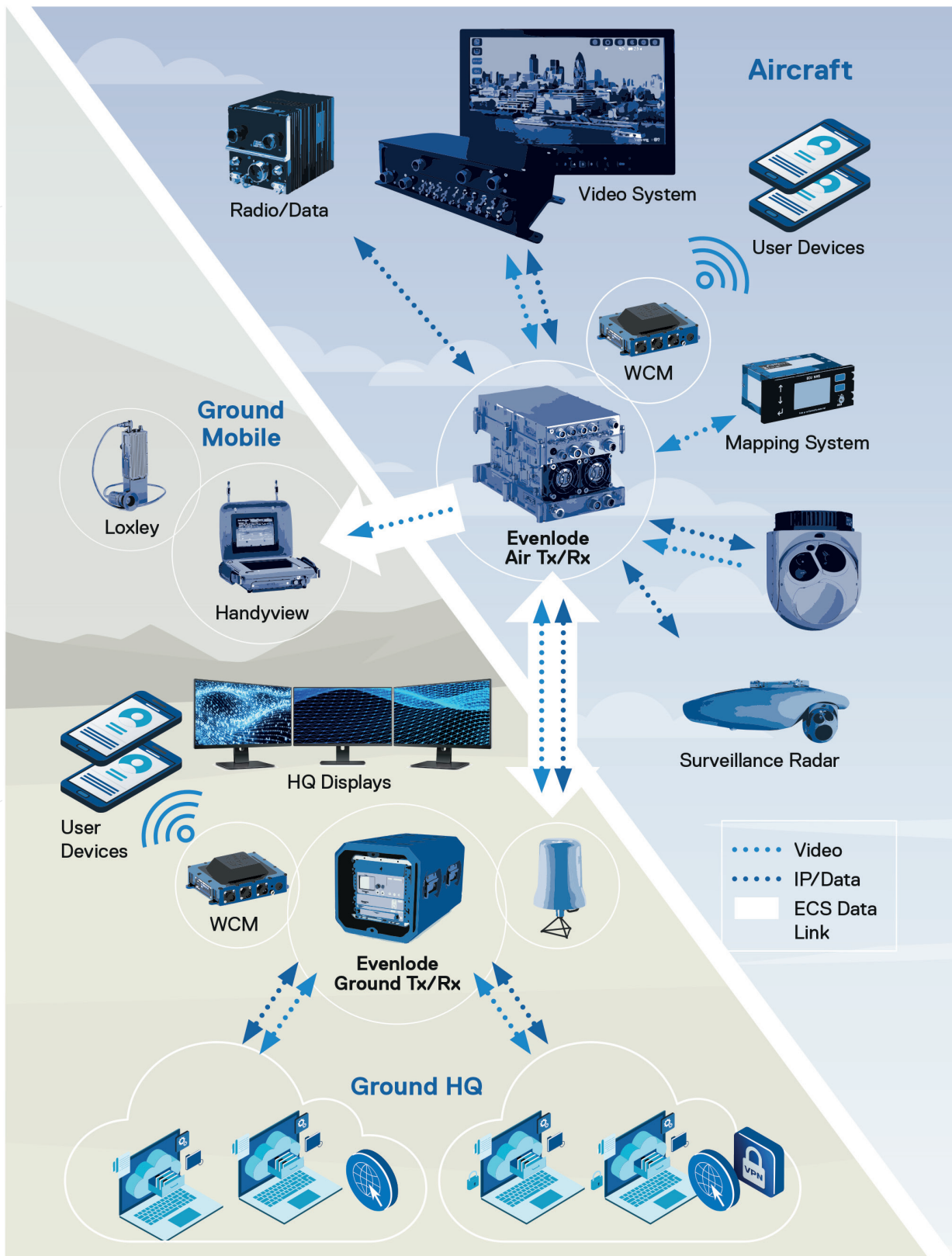
Evenlode II



Evenlode III



RF Data Links - Evenlode Integration



Evenlode provides the User with a Flexible Family of Products which can be seamlessly integrated with Third-Party Technology.

Air Transceiver

Evenlode Air Transceiver may be used to up/down link dual High-Definition Video, [Internet Protocol \(IP\)](#), Audio, GPS data and Telemetry from the air platform to the ground.

Ground Transceiver

Evenlode Ground Transceiver can extend the full range of [IP](#) services to the air platform; these include internet in the air, remote sensor control from the ground, remote access to databases and augmented reality.

Ground System Services

[Evenlode Ground Data System \(GDS\)](#) complements [Evenlode Airborne Data Links \(ADL\)](#) by providing a complete turnkey solution, encompassing antennas, cabling, lightning protection, diversity receivers, transmitters, power supply and test equipment, as well as installation and training.

Handyview

Handyview Diversity Receiver enables real-time situational awareness via its sophisticated automated decryption software. With a HD 8.4" display, its primary use is as a portable and vehicle borne receiver.

Video/Audio and Data Encoder

The low latency dual Video/Audio encoder Module is capable of encoding two video signals up to 4K (option dependant) using Advanced Video Coding (H.264) and High Efficiency Video Coding (H.265).

Customisation

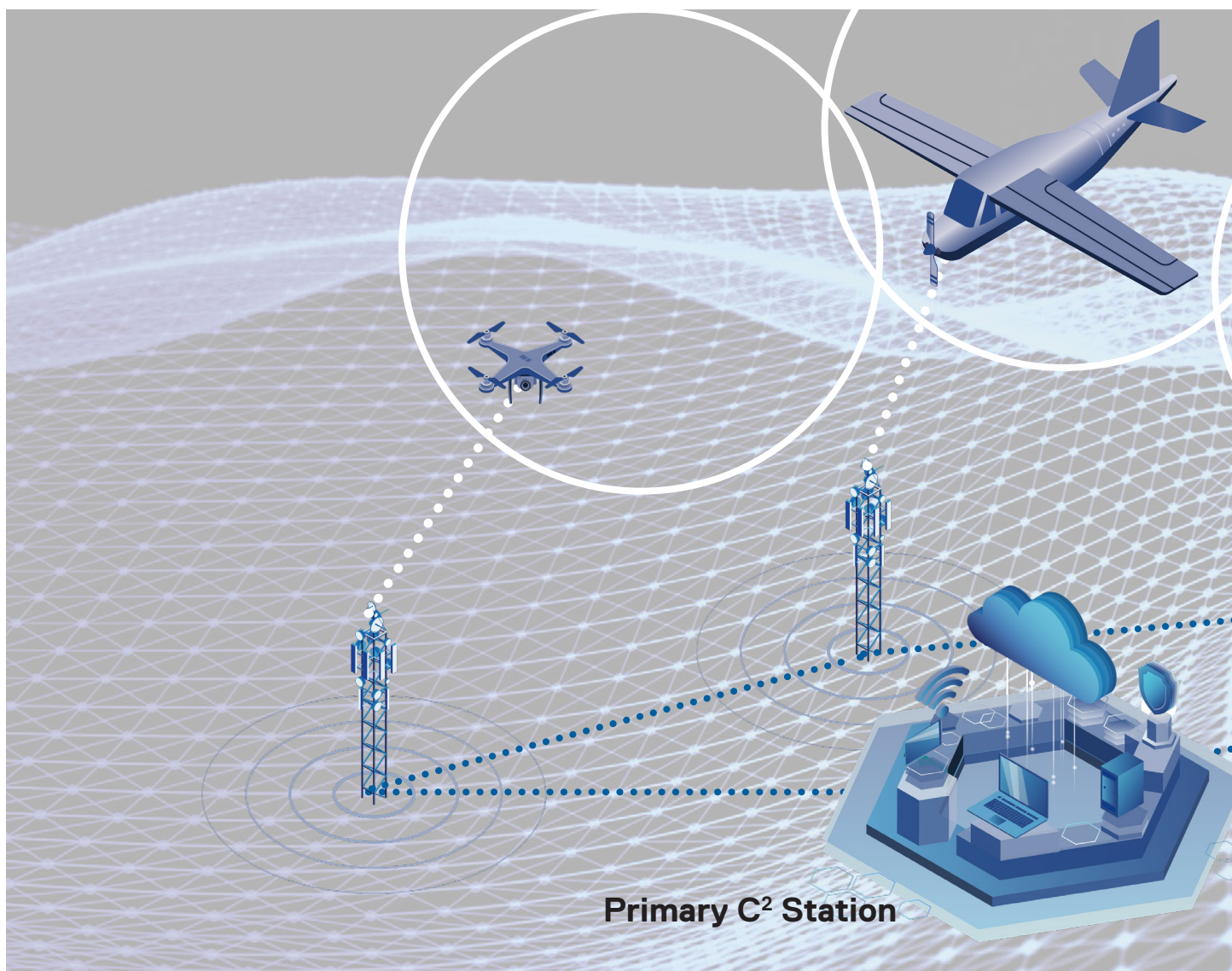
Static ground equipment may be deployed across a wide area and networked to provide extended coverage. ECS offers a range of antenna options, such as fixed, omni-directional or position-steered which, enables the end-user to tailor the system for enhanced range and data requirements.

Network Voting System

Any air-to-ground Data Link has a limited range using a single, fixed ground receiver site. **Enterprise Control Systems** has developed and deployed solutions extending the capability of a single receive site to an unlimited operational area.

The **Network Voting System (NVS)** consists of multiple ground receiver sites, which may be controlled and monitored over a wide area network by ECS **NVS Control Software**.

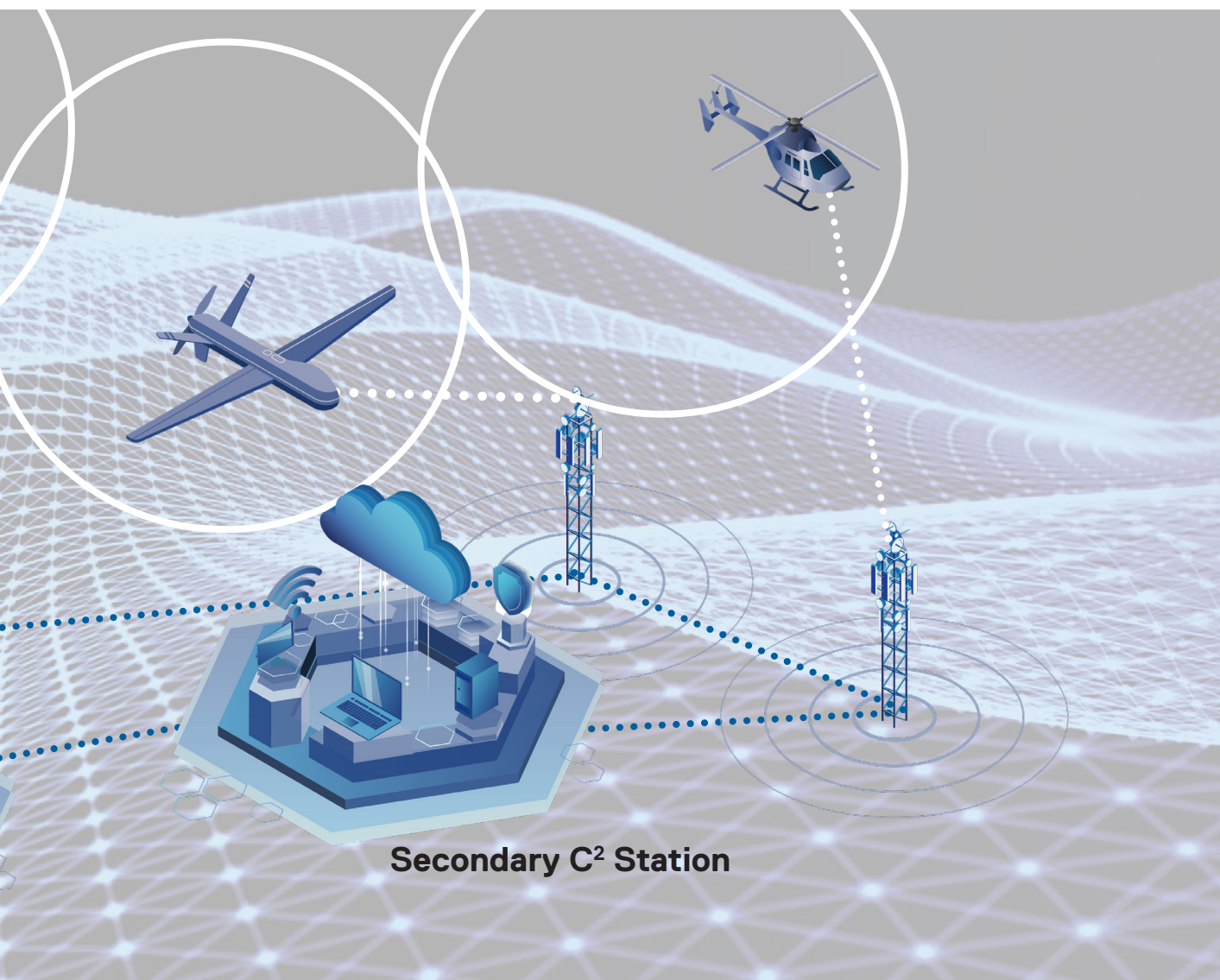
The **NVS** incorporates multiple **ground receiver sites** to provide downlink reception beyond the capabilities of a single fixed site, where appropriate wide area network infrastructure exists. The exact placement of the receiver sites and the antenna configuration at each site, is designed by **ECS** to provide **optimal coverage**, according to the customer's bespoke operational requirements, siting arrangements and terrain.



Simultaneous downlinks from **multiple platforms** may be distributed to monitoring sites across the network. The downlink signal is converted to **IP** data before being delivered securely and bandwidth efficiently, across the customer's own wide area network, to a monitoring point or multiple points of the customer's choosing.

A voting technique is used to select the best real time downlink signal available, from the multiple deployed receiving sites. The system uses signal quality and packet error data to select the most consistently reliable downlink feed for each channel. It incorporates a hysteresis effect to minimise unnecessary switching while remaining responsive to sudden data losses. Control of the system is via a **NVS Control Software**, which may be located anywhere on the network.

The control software includes selection of the receiver channel, video encoder mode and encryption keys. The control software can also provide manual control of tracking or switched antenna systems at the receiver sites and manual over-ride of the receiver site for each downlink channel. **The NVS Control Software** includes a comprehensive Built in Test (BiT) function and allows system monitoring.



Evenlode Product Family

The Evenlode product family is designed and manufactured with modularity in mind.

The Air Data Terminals and the Ground Receiver Equipment are optimised to deliver high performance Data Links in complex RF and harsh climatic environments. Advanced engineering techniques deliver FMV and IP data over ranges of greater than 120 miles from rotary, fixed wing, or other air assets.

In addition, all our Data Links are fully secure with a proprietary encryption, optimised for long range performance. The Ground Receiver Equipment can be designed to meet our customer's operational requirement and budget.

Each unique design of Evenlode Receiver Equipment builds a comprehensive infrastructure, that will enhance the operational effectiveness of any defence, security, or policing organisation.

The Evenlode Video/Audio and Data Encoder

The low latency dual Video/Audio encoder Module is capable of encoding two video signals up to 4K (option dependant) using Advanced Video Coding (H.264) and High Efficiency Video Coding (H.265). The user is able to control which video inputs are encoded from up to four High Definition and two Standard Definition inputs via the Evenlode control functionality.

The next generation improved **Evenlode Video/Audio Encoder Module** is a **low latency, lightweight, low power** unit which is **ruggedised** purposely for installation on to air platforms.

The Evenlode Video/Audio and Data Encoder has been designed to be used in conjunction with the Evenlode Air Data Terminal. The Encoder has **6 separate video inputs**, 4 HD and 2 SD, with the capability to **encode two videos simultaneously**. This gives the user the ability to select the latest mission critical information required with no disruption to the operation.

The Evenlode Video/Audio and Data Encoder provides either a single Asynchronous Serial Interface signal, or an Internet Protocol stream containing an MPEG-2 Transport Stream. This combines the mission data for onward transmission by the Evenlode Air Data Terminal.

With 12G/3G/6G-SDI/HD/SD/-SDI, CVBS and Y/C inputs, The Encoder is compatible with new and legacy sensor systems.

The Encoder Module can auto detect between different HD formats, thus ensuring that the users can focus on the current task.

The low latency H.264, **H.265** video encoders provide superior compression, allowing for reduction in channel bandwidth without compromising on video quality, increasing efficiency, allowing the user greater flexibility to use the bandwidth available.

The Module is controlled and monitored via a serial interface, when used with the Evenlode Air Data Terminal. This interface can be accessed using either the ECS on board Control Unit or the custom Evenlode Graphical User Interface.

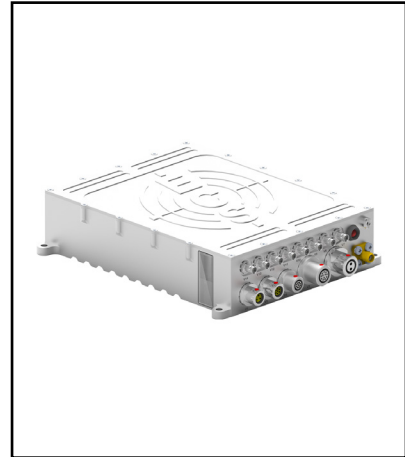
Evenlode Product Family



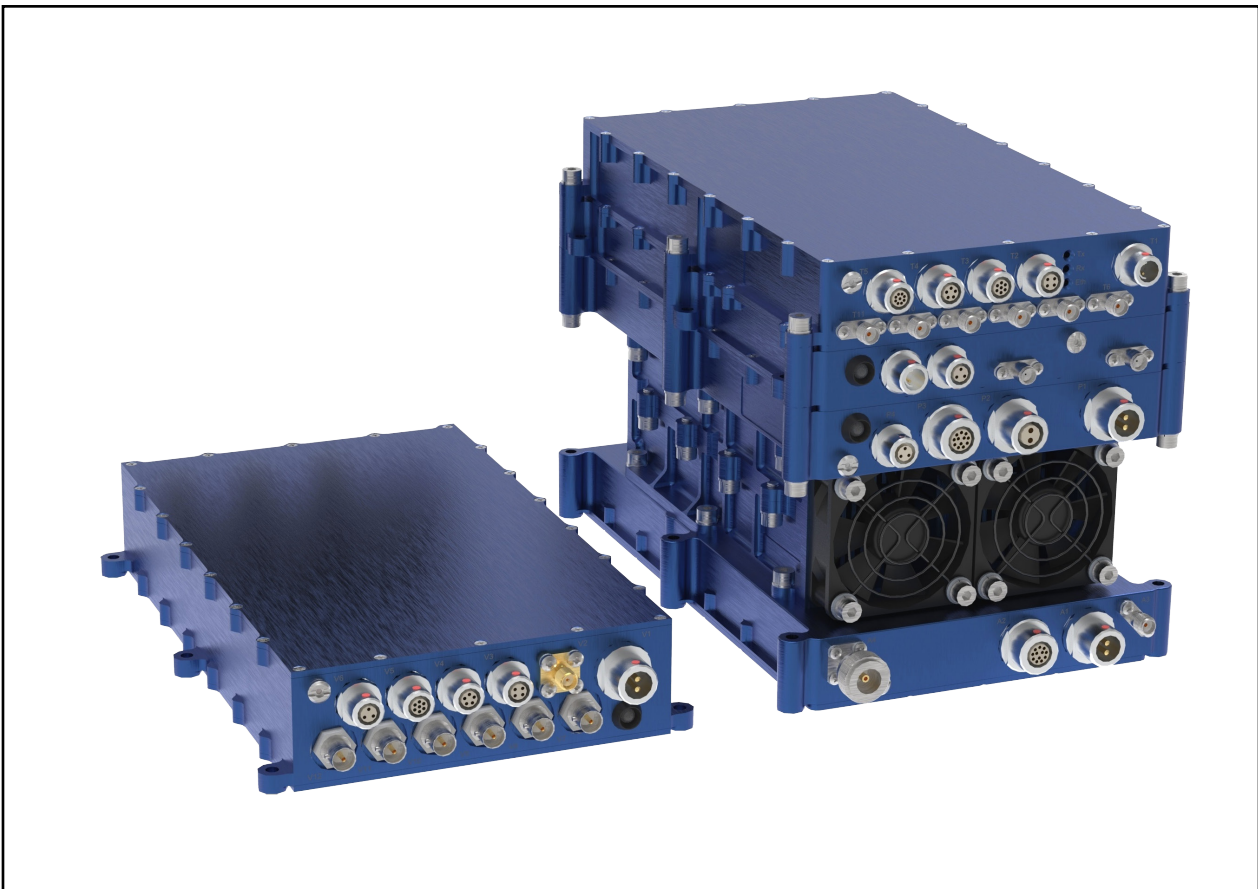
Handyview



**Ground Test
Transceiver**



**Video/Audio and
Data Encoder**



**Evenlode Air Data
Terminal**



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