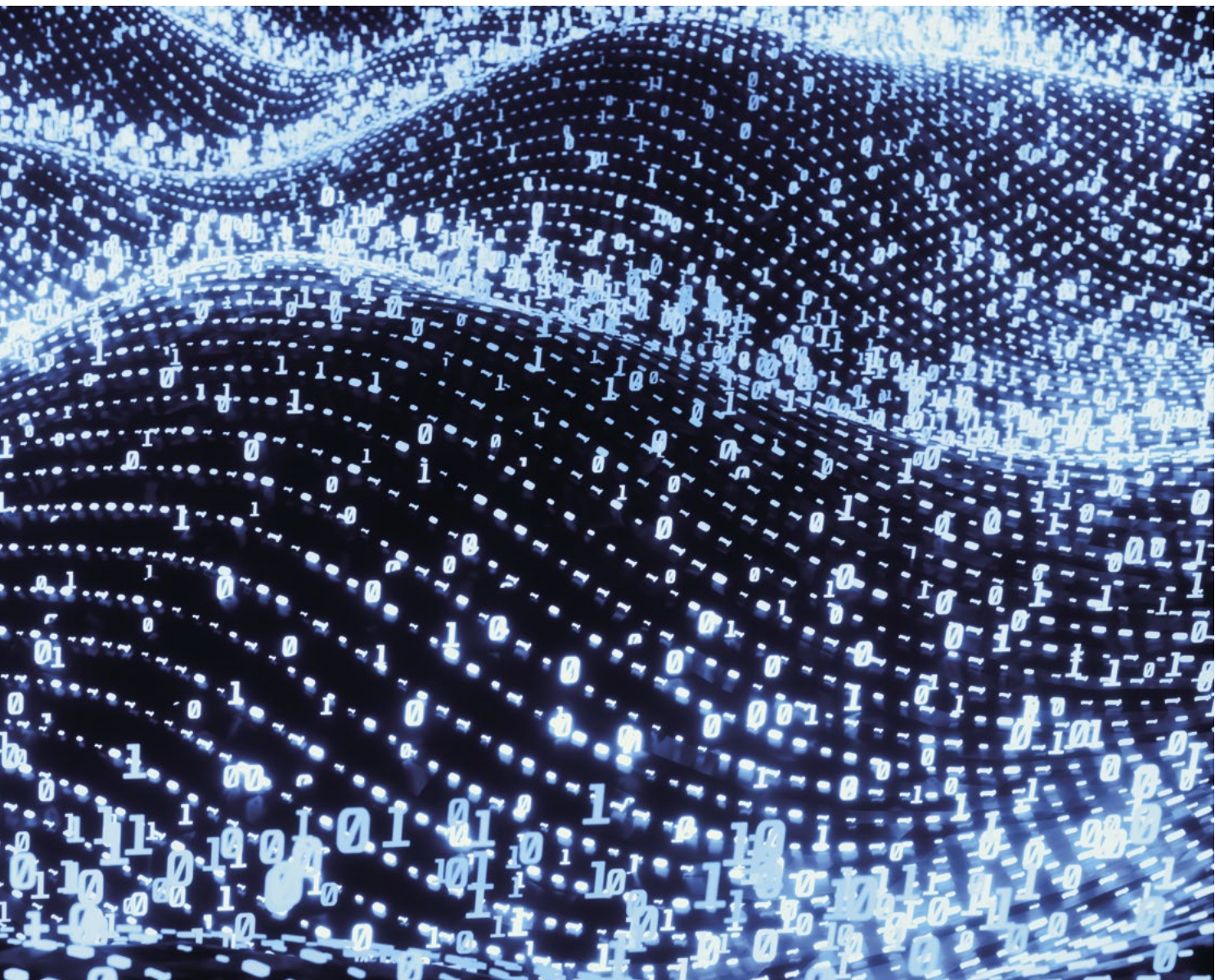


*Evenlode* 

# ECS RF Data Links



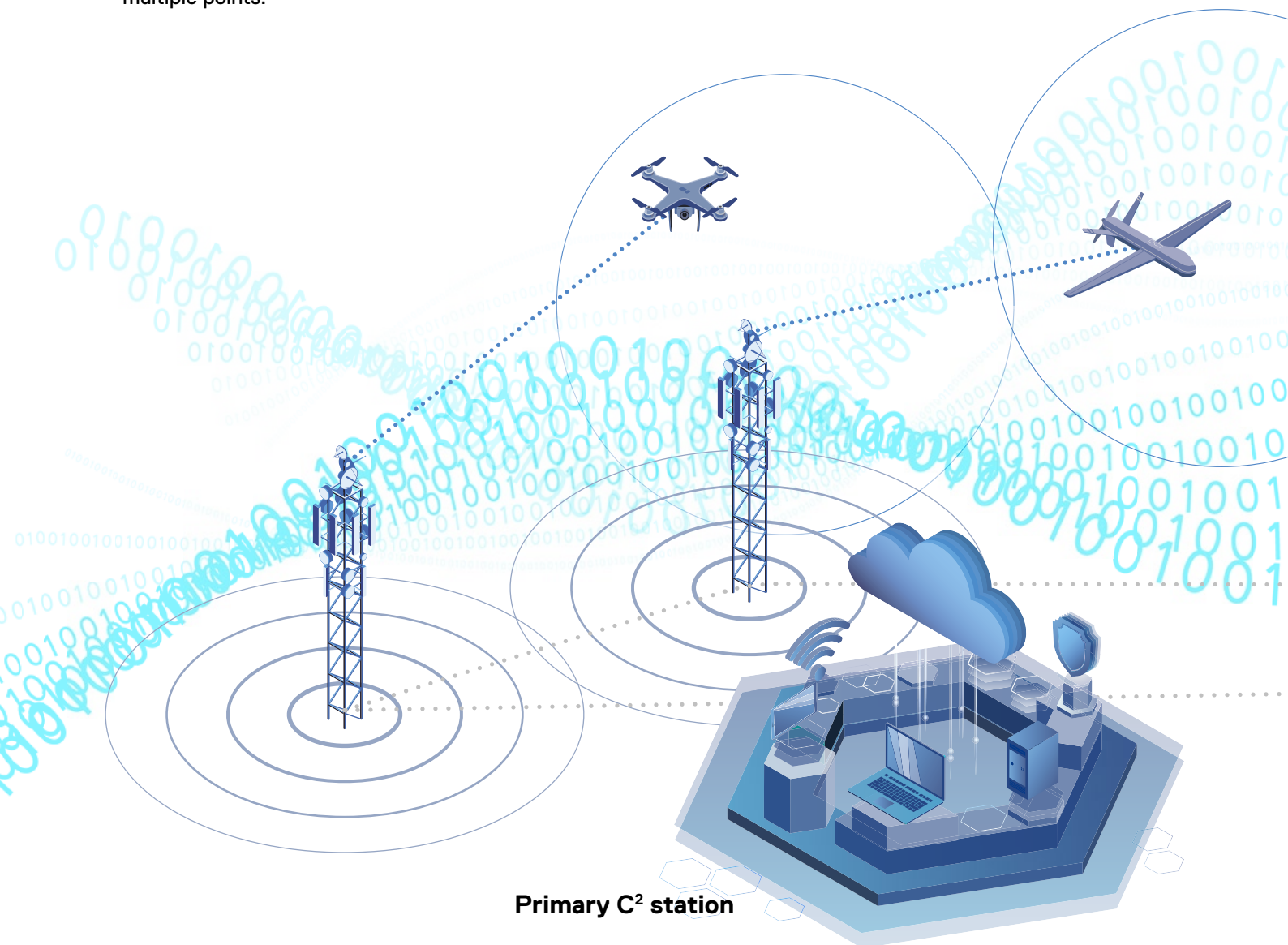
# ECS Tactical Data Link Technology

## 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.

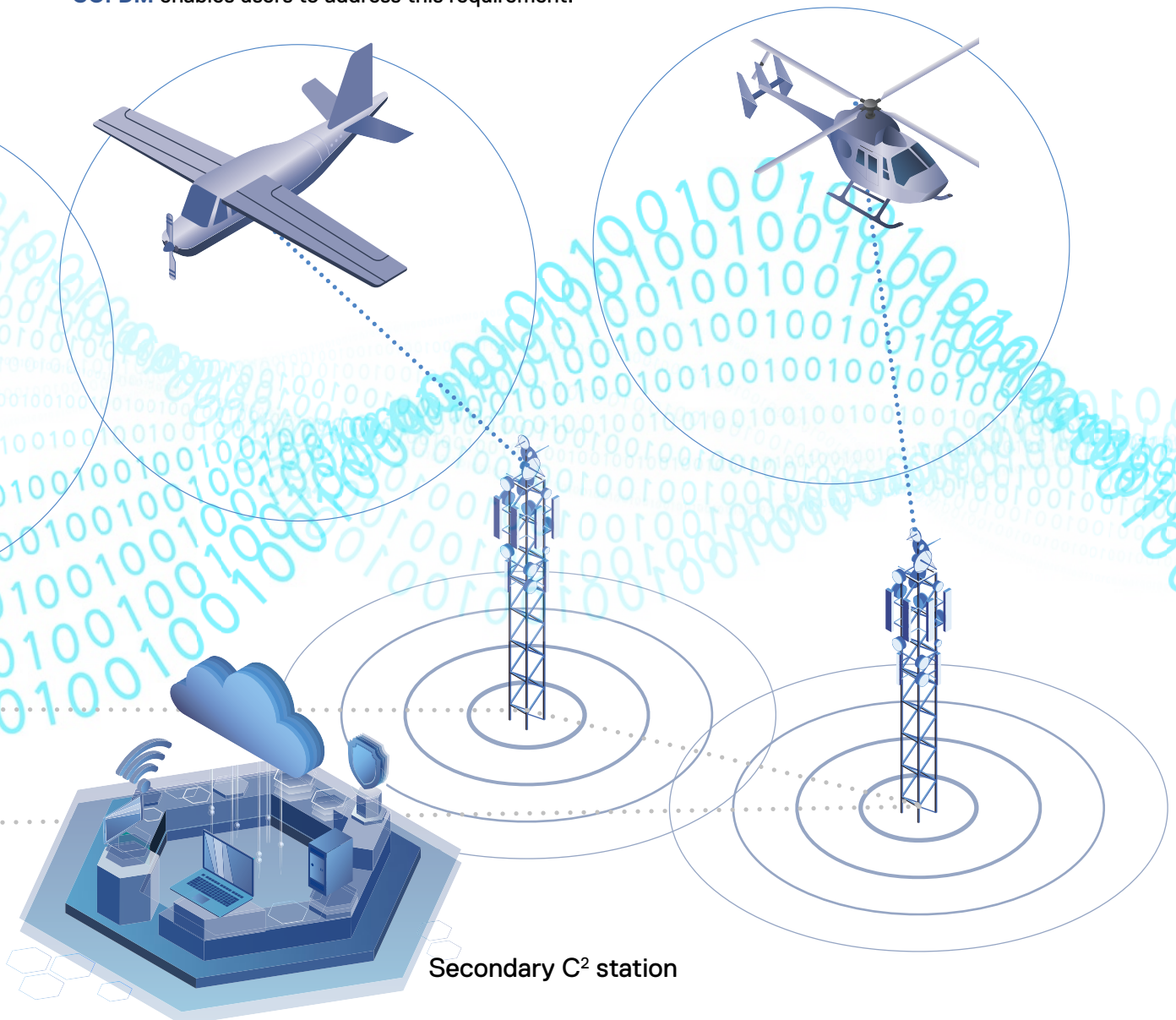


## COFDM Advantages

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.



# 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.

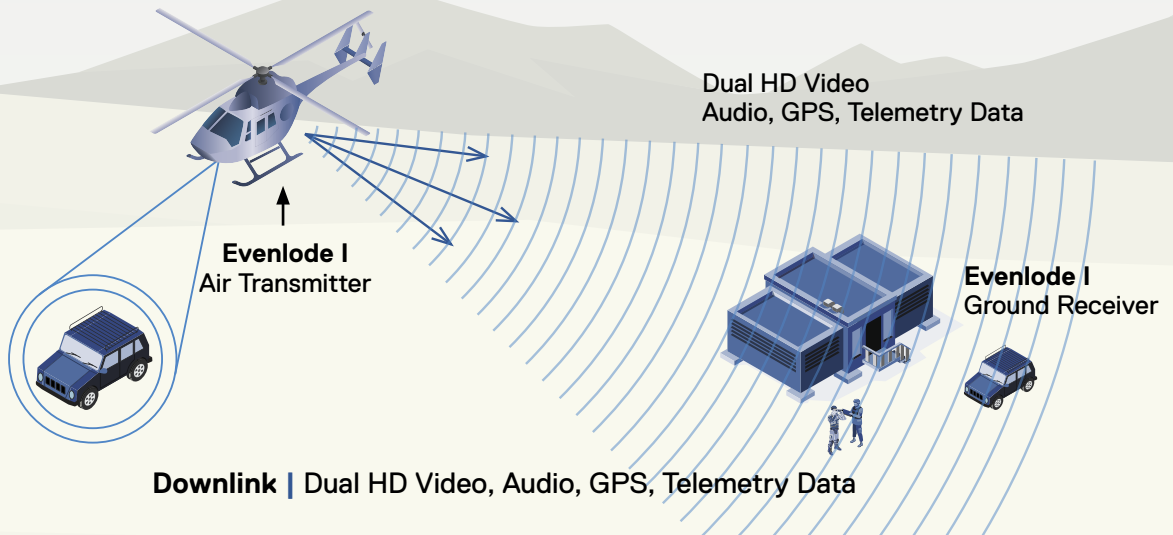
The customised **AES256 implementation** is based on an encryption process previously approved by UK Government, on an ECS legacy **TDL** for higher classification information transfer.

**Evenlode offers three levels of capability:**

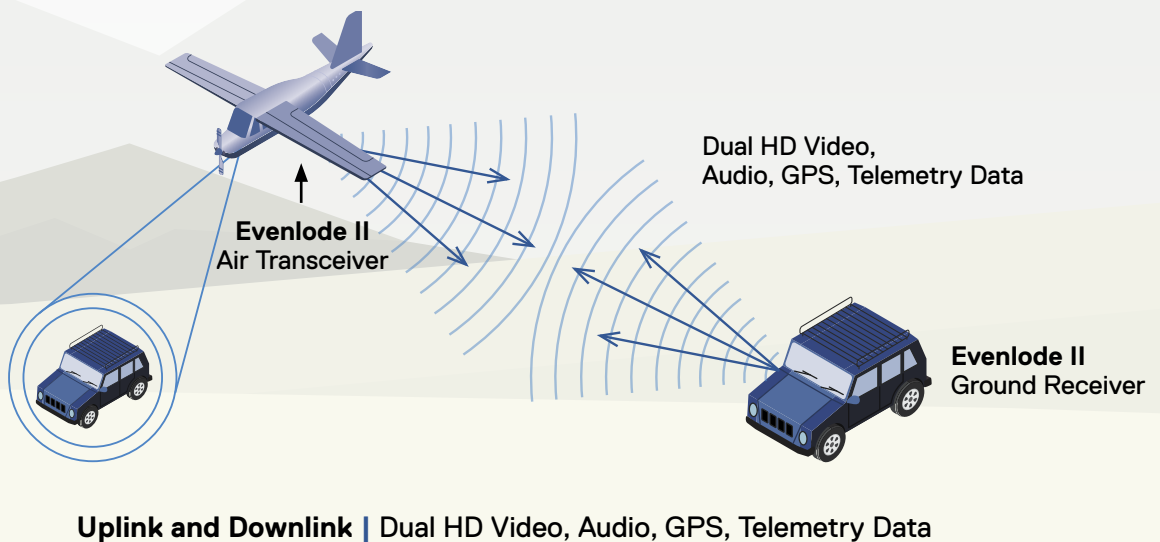
- |                     |   |
|---------------------|---|
| <b>Evenlode I</b>   | Data Terminal is a dual channel video and data downlink for HD Video, Audio, GPS data and telemetry data from the air-to-ground.            |
| <b>Evenlode II</b>  | Data Terminal is a transceiver with uplink/downlink capability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

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

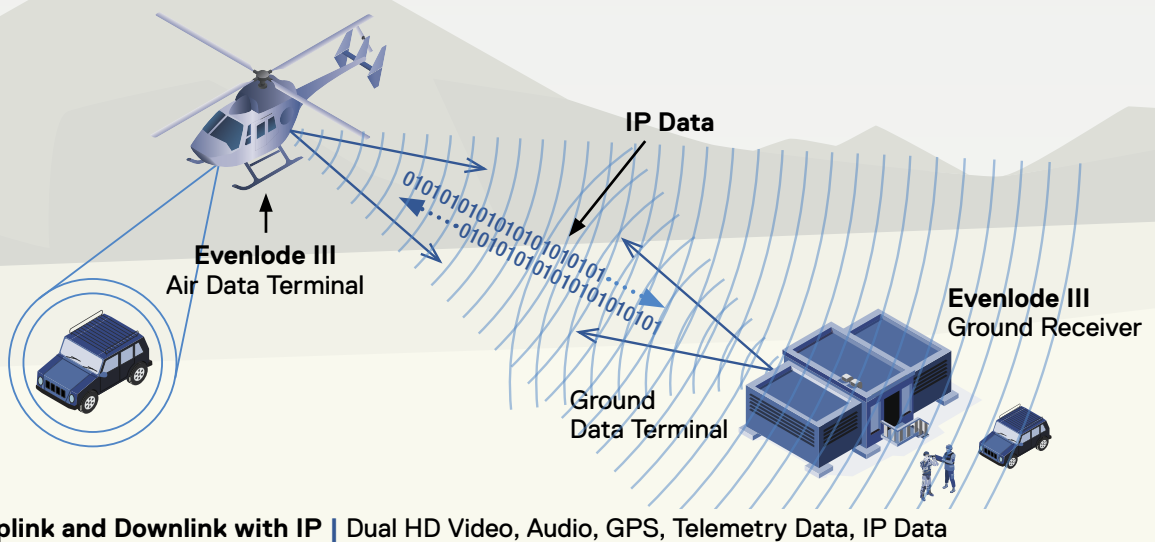
# Evenlode I



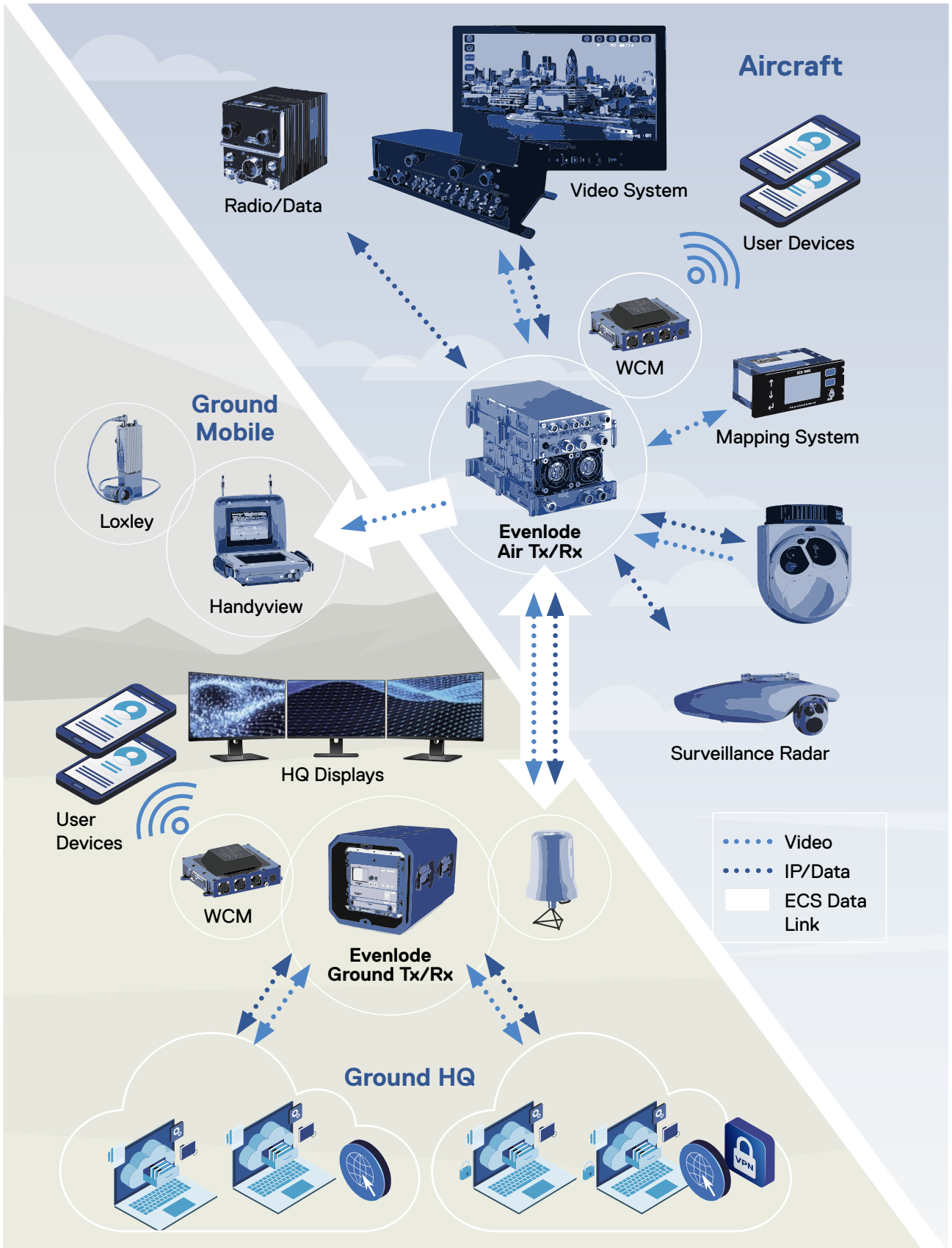
# Evenlode II



# 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.

### **Wireless Connectivity Module**

The **Wireless Connectivity Module (WCM)** allows wireless gateway interfacing to the Evenlode system. This may be used to control the Evenlode system remotely and to view sensor data live. The WCM, in conjunction with an Evenlode III bi-directional **IP Data Link**, allows wireless access in the air to connected ground data services via wireless enabled devices.

### **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.

### **Loxley**

Loxley is a lightweight, handheld Full Motion Video (FMV) **COFDM** receiver which is designed to be hand carried. Loxley is compatible with FMV Evenlode downlink equipment. The video output can be viewed via a discrete eye piece or remoted screen.

### **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.



DEFENCE



SECURITY



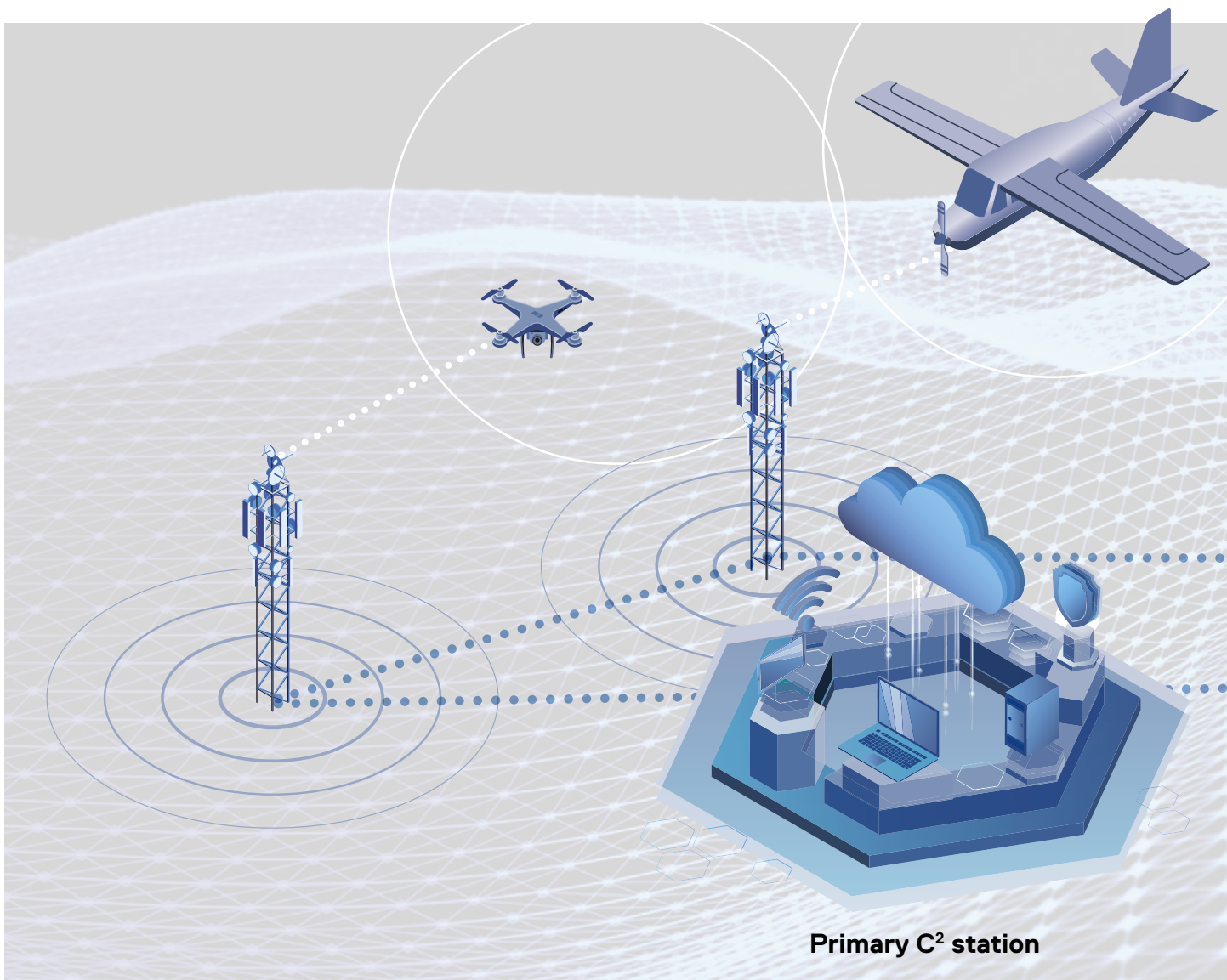
INTELLIGENCE

# 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.

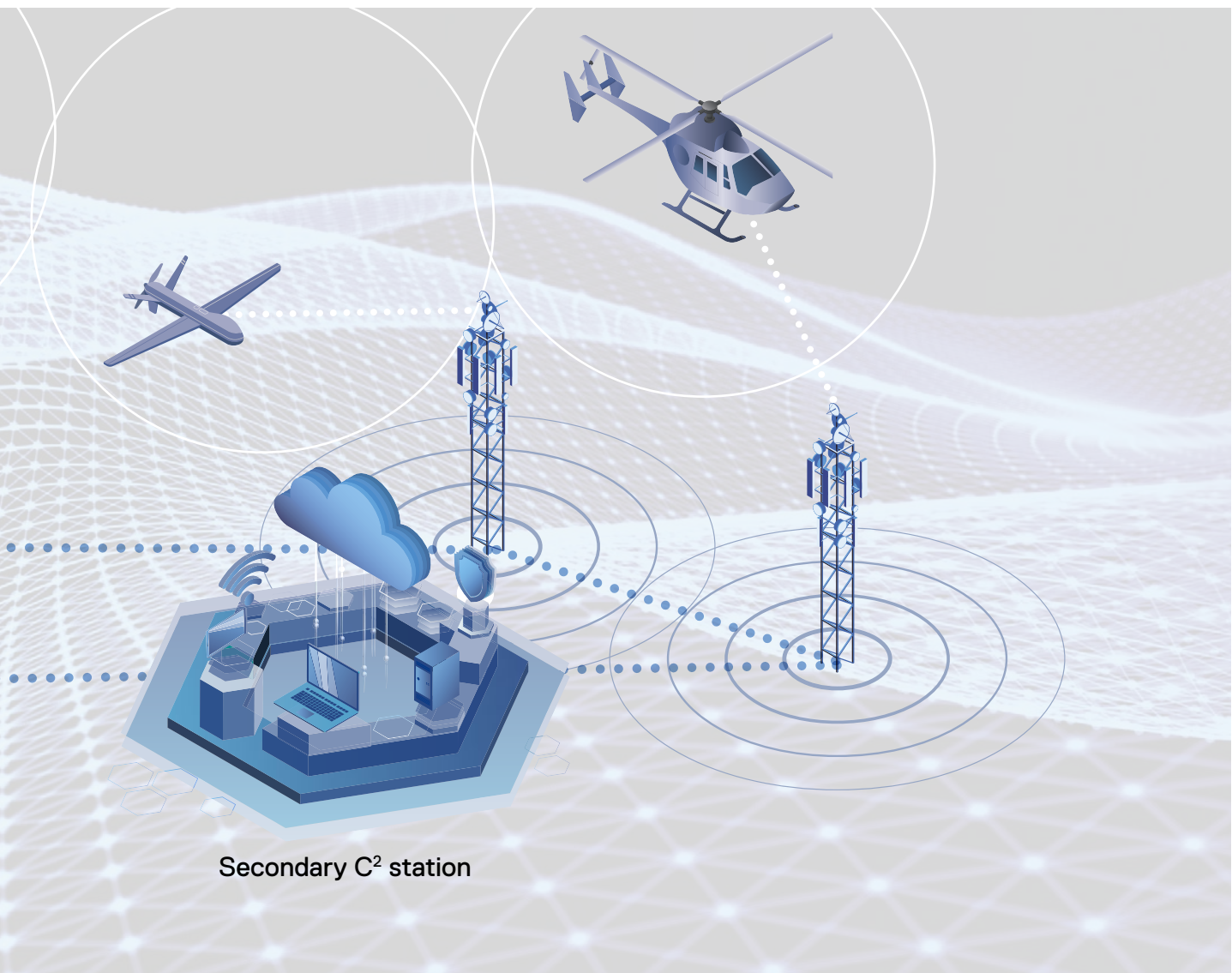




Simultaneous downlinks from **multiple platforms** may be distributed to monitoring sites across the network. The downlink signal is converted to **IP** data before being delivered securely and bandwidth efficiently, across the customer's own wide area network, to a monitoring point or multiple points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

# ECS RF Data Links





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