EXTENDING YOUR LINE-OF-SIGHT & RADIO HORIZON

>> **RF SENSOR PAYLOAD**

>> **VARIABLE HEIGHT ANTENNA**

>> **TETHERED DRONE BY ELISTAIR**

An easily deployable tool to extend capabilities for air, maritime, and land operations. This compact, lightweight RF sensor and high-performance tethered drone will enhance spectrum monitoring, tactical surveillance, geolocation, signals intelligence, and over-the-hill reconnaissance to enable rapid decision-making.

Elistair Orion tethered drone

IN BRIEF

- Proven new generation RF sensor
- Less weight extends mission time
- Enhances RF superiority: air-to-air, air-to-ground, ground-to-ground
- Signal detection, monitoring, and geolocation
- High fidelity (I/Q data) record, capture, stream
- Enhances 2D TDoA and 3D TDoA networks
- Deployed in 8-minutes
- Airborne (100 m / 328 ft) in 60 seconds
- Cost-effective solution for tactical deployments
- Payload integration kit
- Supports rapid decision-making
- Reduced training burden and logistical footprint

ıllı CRFS | EXTRAORDINARY RF TECHNOLOGY

OVERVIEW

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Supplied by CRFS the RFeye Node 100 LW (lightweight) RF sensor is an advanced real-time spectrum monitoring, geolocation, and I/Q record system. It uses high technology readiness level (TRL) government off-the-shelf and commercial off-the-shelf (GOTS and COTS) components and open architecture to provide a robust communications and situational awareness capability for military and commercial operators.

The benefits of integrating an RF sensor as a payload onto a tethered UAS:

- Improved line-of-sight (LOS)
- Increased observation radius
- Variable height antenna that can be used anytime and anywhere
- Large information collection cone
- Zero RF emissions from drone (owing to tether) Note: there are emissions from the operator
- Additional data receive / process and storage capacity
- Standalone or networkable (C2 or sub-system connectivity)
- Reduced training compared to complex UAS systems

Supplied by Elistair (elistair.com) the Orion 2.2 TE is a ruggedized and automated ISR drone designed for autonomous flight in difficult-to-access areas and challenging weather environments. Deployed across many NATO countries, the platform offers important operational features:

- 8-minute set-up and 60-second launch
- Automated take-off and altitude control
- Maximum altitude of 100m (328 ft), overcoming TDoA blind spots
- Variable Height Antenna (VHA) quickly extends ground-based networks
- Maintains precise static position or fixed altitude operation
- Transport with truck / trailer combination
- Operates in GNSS-disrupted environments

Operators can also integrate the lightweight RF sensor and tethered drone with CRFS' V-Track (fully autonomous COMINT system) or as part of a COMINT and EW network.

Using a tethered drone removes common interference and signal emitter challenges.

Elistair Orion tethered drone

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ELISTAIR EXISTING CUSTOMERS INCLUDE:

MoD: Finland, France, Greece, Italy, Netherlands, New Zealand, Norway, Qatar, Spain, Sweden, Switzerland, Thailand, UAE, UK, Ukraine, US (DoD)

Police & border guard: Australia, Austria, Brazil, Canada, Finland, France, Ireland, Lithuania, Nigeria, Senegal, UK, US

CRFS RF SENSOR PAYLOAD BUNDLE

1) PAS 12 Nylon (SLS) integration kit cowling and Standard Elistair PDK **2)** RFeye Node 100-18 LW sensor
3) LW Node wire-ended integration connector **4)** LW Node main breakout loom **5)** CRPA Anti-jam antenna
6) Omni passive antenna to 18 GHz **7)** V / UHF passive blade antenna to 512 MHz **8)** 1TB SSD data drive

1

Integrated payload
Total weight 4kg

2

RFeye Node 100-18 LW sensor

3

LW Node wire-ended integration connector

4

LW Node main breakout loom
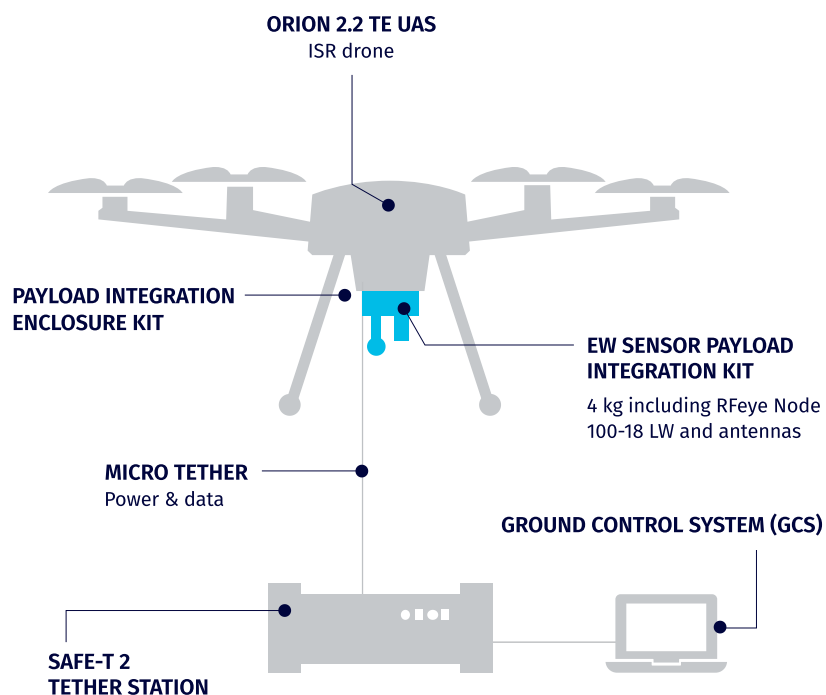DC power, RJ 45 Ethernet, USB 3.1, Expansion port, Fan Header

5

CRPA Anti-jam antenna

6

Compact wideband omni passive antenna
108g (500 MHz – 18 GHz)

7

V/UHF blade antenna
450g (30 MHz – 512 MHz)

8

External 1TB SSD 2.5 inch data drive
W x H x D (88x153x12mm)
Weight (130g)

ORION 2.2 TE UAS
ISR drone

PAYLOAD INTEGRATION ENCLOSURE KIT

EW SENSOR PAYLOAD INTEGRATION KIT
4 kg including RFeye Node 100-18 LW and antennas

MICRO TETHER
Power & data

GROUND CONTROL SYSTEM (GCS)

SAFE-T 2 TETHER STATION

OPTIONAL

Operator training:

- RF sensor equipment and set-up (1-day) and RFeye Site (2-day introduction)

CRFS software bundle:

- RFeye Site – real-time spectrum monitoring, geolocation, detectors
- RFeye DeepView – forensic signal analysis and I/Q record, stream
- EMP (API) – non-synchronous tasks (single RF sensor)
- GMP (API) – synchronous tasks (network of RF sensors)

█ Elistair supplied equipment and T&Cs   █ CRFS supplied equipment and T&Cs

RFEYE NODE 100-18 LW SPECIFICATIONS

⑾⑾ CRFS | EXTRAORDINARY **RF TECHNOLOGY**

Single channel receiver

Switchable RF inputs	3 x SMA connectors

Frequency

Range	9 kHz to 18 GHz

Noise figures at maximum sensitivity (typical)

9 kHz to 83 MHz	11 dB
83 MHz to 1 GHz	9 dB
1 GHz to 2.9 GHz	8 dB
2.9 GHz to 5.9 GHz	7 dB
5.9 GHz to 10 GHz	9.5 dB
10 GHz to 15 GHz	12 dB
15 GHz to 16 GHz	13 dB
16 GHz to 17 GHz	18 dB
17 GHz to 18 GHz	21 dB

Phase noise at 20kHz offset (typical)

Receiver input at 1 GHz	-126 dBc/Hz
Receiver input at 5 GHz	-121 dBc/Hz
Receiver input at 18 GHz	-110 dBc/Hz

Signal analysis

Instantaneous bandwidth	100 MHz
Tuning resolution	1 Hz

Internal frequency reference

Initial accuracy @20°C	±0.1 ppm typ.
Stability over temperature	±0.3 ppm
Ageing over 1 day	±0.04 ppm

Programmable sweep modes

Sweep speed at 2 MHz RBW	390 GHz/s typ.
Sweep speed at 61 kHz RBW	320 GHz/s typ.
User programmable modes	free run continuous, single timed, user trigger, adaptive
Trigger-on-event modes	user defined masks, actions alarms

Sampling

Resolution	16 bits per channel (I&Q)
Rate	125 MS/s I&Q

Third order intercept points with AGC

≤ 1 GHz	+20 dBm typical
> 1 GHz to ≤ 6 GHz	+15 dBm typical
> 6 GHz to ≤ 18 GHz	+20 dBm typical

Local oscillator

Re-radiation	≤ -90 dBm typical

Timing & Frequency references

Selectable	Internal, GNSS or external
GNSS constellations	4
GNSS bands	L1/L2 and L1/L5
External input	10 MHz ±10 ppm

Processor sub-system

CPU	Intel E3845 quad core

I/O Multipin Connector

Network	1 x 1 GigE, with POnE
Universal Serial Bus	1 x USB3.0, 1 x USB2.0
1 x expansion port configurable as:	1 x SyncLinc with < 10 ns RMS accuracy typical, trigger input, external peripheral control
GNSS antenna input	1 x SMA passive or active (3.3 VDC)

Data storage (option)

External flash disk	via USB interfaces

Size, weight and power

Dimensions (w, h, d) (Node only)	222 x 52 x 187 mm (8.8 x 2.0 x 7.4 inches)
Weight (Node only)	1.95 kg (4.3 lbs)
DC power	12 VDC (limits 10-30V)
Power On Ethernet (POnE)	56 VDC

Power consumption

Typical	40 W
Maximum	55 W

Environmental

Operating temperature	-30 to +50 °C (-22 to 122 °F)
Storage temperature	-40 to +71 °C (-40 to 160° F)
Ingress protection	IP65 (minimum)

ELISTAIR TETHERED DRONE PLATFORM

PAYLOAD INTEGRATION ENCLOSURE KIT
- Integrated quick-release enclosure cradle

ORION 2.2 TE UAS
ISR AND COMINT PLATFORM
- 50 hours of uninterrupted flight time
- Automated flight profile
- Multi-level failsafe architecture
- Enhanced motorization & stability
- Micro-tether (power & data)
- High-speed secure data link
- Protection from interference & jamming
- Peli Protective Case

SAFE-T2 (GROUND) TETHER STATION
- 100 m (328 ft) + automated winch reel
- Power transmission
- Ruggedized (IP54)
- High-speed data transfer
- Peli Protective Case

GROUND CONTROL SYSTEM
- Push button command and control
- Ruggedized Toughbook
- USB Control Pad
- Secure close-loop system
- 30m ethernet cable

OPERATOR TRAINING
- Orion drone operator (3-day theory, in-field practice and maintenance)

ORION 2.2 TE SPECIFICATIONS

ELISTAIR

Flight

Micro tether length	100 m / 328 ft
Tether data transfer speed	100 MB/s
Max. flight time	50 hrs
Operating temperature (min/max)	-10°C / 45°C (14°F / 113°F)
Wind resistance	25km/h (15.5 mph)
Operation in gusts of wind	35 km/h (21.7 mph)
Accuracy of horizontal hover flight	1.5 m CEP
GNSS	GPS, Glonass, Beidou, Galileo
Flight operating altitude	0 - 2 000 m
Flight modes	Auto or manual

Payload limitations
(depending on weather conditions, power limited at 1800 W)

Up to 5 kg / 11 lbs	AGL 50 m / 164 ft

Physical characteristics

Enclosure rating	IP54
Drone dimensions (propeller folded)	163 cm
Empty weight (UAS body and arms)	11 kg (24.2l bs)
Maximum total take-off weight (with payload)	16 kg (35.2 lbs)
Maximum payload weight	5 kg (11 lbs)

Security

Smart emergency battery	Inflight charging and self-heating
Flight companion processor redundancy with failsafes	No single point of failure
Smart parachute	7 m² / 75 sqft parachute automatically deployed in case of critical failure
Emergency Wifi link (between GCS and Orion)	WiFi band 2.4 GHz
Radio remote control link (for manual control)	RF band 2.4 GHz

GCS – Ground Control Station

CPU	Intel E3845 quad core

I/O Multipin Connector

Screen	14" FHD
Protection	MIL-STD810H, IP53, aluminium magnesium alloy
Autonomy	Up to 20 hours

SAFE-T 2.3 TETHER STATION SPECIFICATIONS

SAFE-T 2.3

Dimensions (without feet)	414 x 670 x 261 mm (16 x 26 x 10 in)
Weight	22 kg (48.5 lbs)
Cable length	100 m (330 ft)
Power source requirements	1230 VAC, 50-60 Hz, 4 kW min for power source, 120 VAC, 50-60 Hz, 3 kW min for power source, 1,2 kW output limit, 30mA differential circuit breaker needed
Power supply cable	Type E
Micro-tether management	10 pre-sets, smart pre-programmed laws and reset function
Wi-Fi connectivity	Protocol 802.11 ac/a/b/g/n, Encryption AES 128, Security WPA/WPA2. 2412.0-2484.0MHz - / 5.150GHz-5.7250GHz / <20dBm (EIRP)
Ingress protection level	IP54

Data - data speed	80 Mb/s minimum (up to 200 Mb/s, depends on the packet size)
Data - data connectors	Ethernet RJ45 (Air Module and Safe-T), Compatible with MP002461 and MP002462 shielded, Field installed cable end screw for IP connexion
T-Manager - Remote control	Control power & torque and winch & alarm settings
T-Manager - Remote monitoring	Winch temperature, speed and length, power consumption, alarm values

Micro tether configuration (26g/m)

Total weight	2600 g (5,7 l bs)
Tensile strength	150 daN
Diameter	2.9 mm
230 V – Max continuous power	2200 W (128)
230 V – Peak power 3 s	2500W
120 V – Max continuous power	1850 W
120 V – Peak power 3 s	1850 W