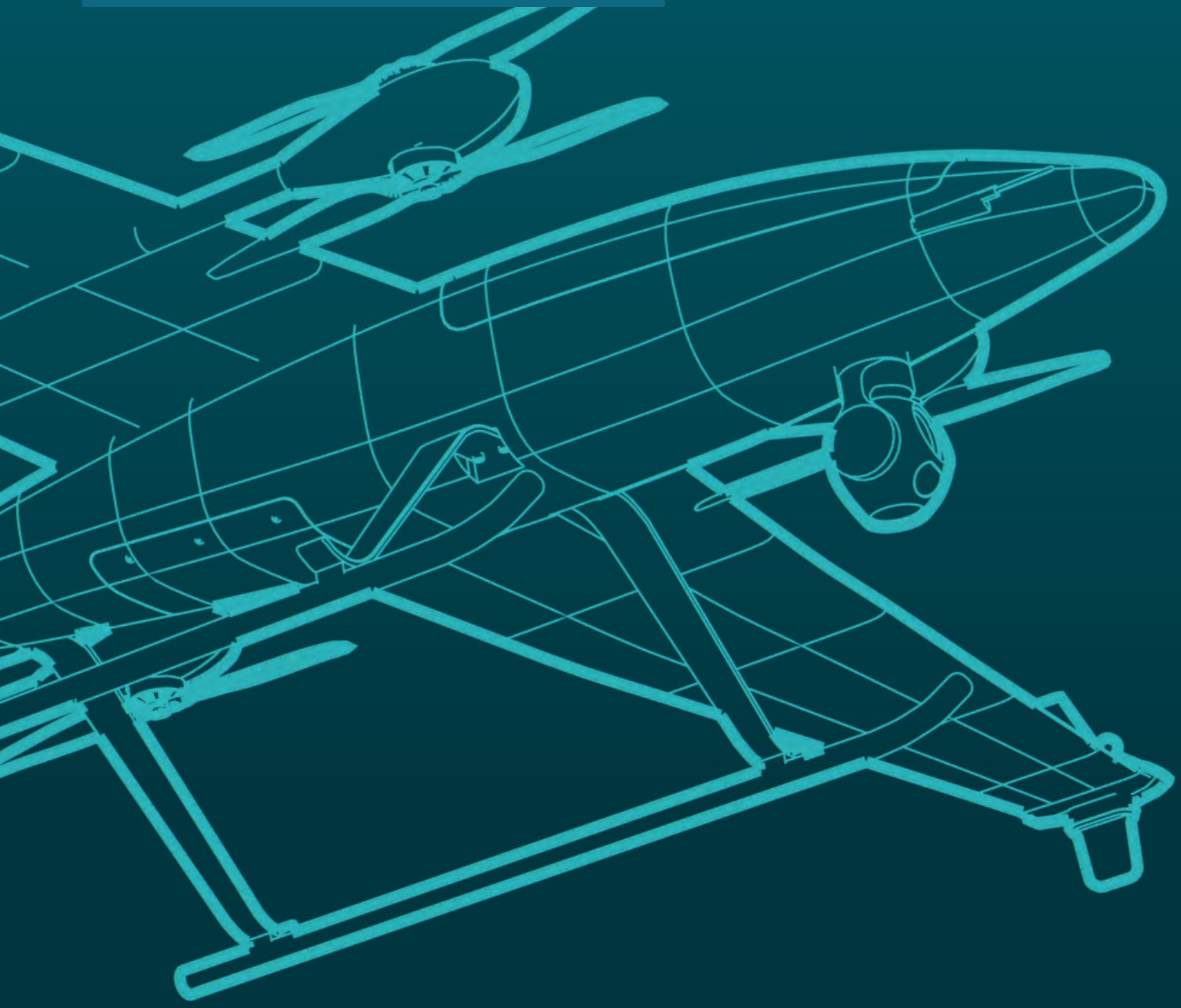
Callen-Lenz

FalconWorks®

Strategic ISR Uncrewed Aerial Systems (UAS)



Callen-Lenz

BAE SYSTEMS

BAE Systems FalconWorks®

As part of BAE Systems' Air sector, FalconWorks® is the agile, forward-leaning centre for advanced research and technology, leading the company's Uncrewed Aerial System (UAS) strategy. As one of the largest suppliers of UAS in the UK and Europe, FalconWorks offers a comprehensive and fast-evolving range of uncrewed capabilities working with SMEs (small and medium-sized enterprises) and specialist suppliers across the UK.

The FalconWorks UAS portfolio continues to evolve, benefitting from access to and application of wider BAE Systems expertise, Academic and Research and Development (R&D) partnerships. Our cutting edge UAS portfolio is deliberately constructed to provide a range of core vehicle categories that in turn offer customer choice and variability in payloads to meet desired end use case outcomes in a cost effective, agile and commodity-based way.

PRISMATIC

PHASA-35®

Callen-Lenz

Koios

MALLOY AERONAUTICS

T-150

Callen-Lenz

Acquired by BAE Systems in 2024, Callen-Lenz has over 18 years of experience establishing itself as a leader in the design and development of next-generation Unmanned Aerial Systems (UAS). Leveraging deep industry knowledge and disruptive technologies, Callen-Lenz embodies the innovative spirit of a dynamic SME, combining agility with the rigorous standards expected in the aerospace community. Their unwavering commitment to assured performance, system safety, airworthiness, customer responsiveness, and technical innovation sets them apart in the industry.

- Operationally proven capabilities
- Bespoke UAS platforms
- Rapid prototyping - full design, development & testing capability
- Advanced avionics and mission management systems
- Scalable manufacturing

With a dedicated team of over 230 professionals across four UK sites, Callen-Lenz specialises in the rapid design and high-rate manufacture of novel UAS. With platform experience that spans multi-rotor, fixed-wing, electric, hybrid, internal combustion, and jet engine, Callen-Lenz provide interoperable and reliable solutions across diverse mission requirements.

Manufactured in the UK, Callen-Lenz's systems are built with a large part of components sourced from british suppliers, reflecting a dedication to sustainability and local economic growth. Platforms such as the Koios VTOL UAS and Fregata CTOL UAS have achieved over 2,500 operational hours supporting frontline needs in austere and contested environments across civil and military domains worldwide.

Fregata

Koios

Tactical Vertical Take-Off and Landing (VTOL) ISR platform

Koios is a S2 class VTOL UAS, with a 4m wingspan, a payload of 7kg (including fuel) and a Maximum Take Off Weight (MTOW) of 35 kg. Koios is fully runway independent and will take off and land vertically using 8 brushless electric motors for redundancy, providing operational flexibility in remote locations. Transitioning to forward flight, Koios is powered by an efficient 4-stroke multi-fuel engine capable of running on most heavy fuels including Jet A1, Kerosene and even sustainable aviation fuel.

Koios can be operated by a crew of two personnel; the platform disassembles for storage in two packing boxes that allow for ease of transport. The two operators can unpack and assemble Koios, conduct pre-flight checks and launch in under 10 minutes.

Koios and Fregata share 90% commonality of components which eases the burden of training and maintenance.

VTOL
no runway required

7kg
max payload capacity (inc fuel)

Operation
Simplified launch and recovery

6-8hrs
endurance

10 mins
setup to launch

35kg
maximum take-off weight

45kts
cruise speed

4m
wingspan

2
crew members

Both platforms are payload agnostic, and Callen Lenz have the capability to integrate & test end-user ISR requirements for tailored decision advantage effect. Example Payloads include:

- EO/IR Sensor
- GPS anti-jamming system
- Communications system intercept
- Satellite Phone Locator
- Radio rebroadcaster
- Multi-spectral camera
- GPS Jamming detection
- Laser designator
- Laser range finder

Fregata

Long range Conventional Take-Off and Landing (CTOL) ISR platform

Fregata is a CTOL UAS with a 4m wingspan, a payload of 12kg (including fuel) and a MTOW of 35kg that can be launched using a pneumatic catapult or off the top of a vehicle. Fregata is tailored to suit long range missions where flight endurance and enhanced payload capacity is a priority with an extended endurance of 8-12 hours and a data link range of up to 190 km.

The platform is launched from a catapult by a team of three operators including a pilot, a launch commander, and an individual to load and monitor the catapult. The platform can be easily manoeuvred by two people, packed in lightweight carry cases and transported by a medium wheelbase van or truck.

Fregata is powered by an efficient 4-stroke multi-fuel engine which runs on most heavy fuels for safety and availability, including Jet A1, Kerosene and SAF.

CTOL
pneumatic launcher and level landing strip

12kg
max payload capacity (inc fuel)

Operation
Simple launch, traditional recovery

8-12hrs
endurance

10 mins
setup to launch

35kg
maximum take-off weight

50kts
cruise speed

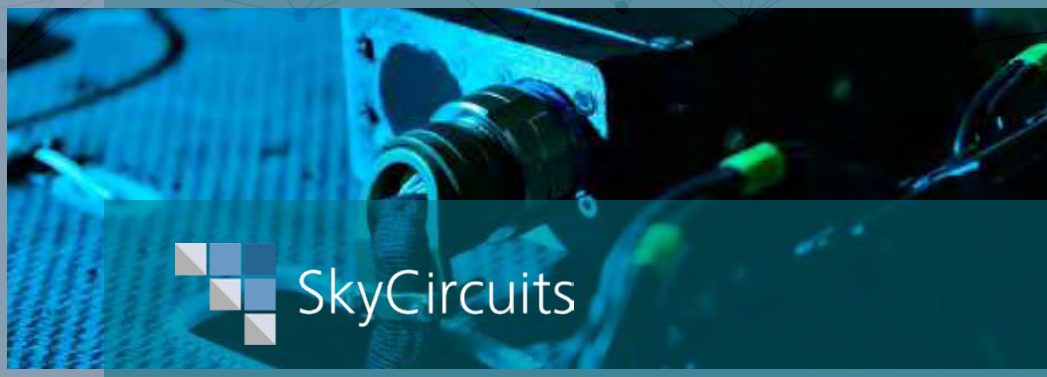
4m
wingspan

3
crew members

Key Platform Benefits

With over 18 years of experience, Callen-Lenz has firmly established itself as a leader in the design and development of next-generation UAS. Leveraging deep industry knowledge and disruptive technologies, Callen-Lenz embodies the innovative spirit of a dynamic small and medium sized enterprises, combining agility with the rigorous standards expected in the aerospace community.

- Payload agnostic
- Removable wings and tail
- Integrable with third party systems
- Secure interoperability
- Alternator powering aircraft systems
- Multi-fuel engine
- Low turnaround time
- Runway independent operation
- Limited training required



SkyCircuits

SC3 Mission Management

SC3 is the latest SkyCircuits autopilot and mission management system, owned and designed in-house by Callen-Lenz to deliver maximum capability with minimal pilot workload.

The cutting-edge architecture is designed to meet the complex demands of real-time flight control whilst also supporting mission management, navigation, communication, and data logging requirements during various mission profiles, including:

- Standalone missions
- Crewed/Uncrewed teaming
- Swarm capability
- Ultra-long-range operations

SC3 is found on multiple Callen-Lenz platforms and its flexibility is used whilst rapidly prototyping our portfolio of various UAS configurations. SC3 is the result of a culmination of years of continuous development and testing, and is constantly evolving as the industry moves forward to meet ever changing challenging operational environments.

Operational Applications

As the complexity of UAS missions continues to evolve, Callen-Lenz has consistently demonstrated the ability to quickly and efficiently develop and deploy a wide range of platforms tailored to meet diverse operational needs. Callen-Lenz's expertise, as a specialised UAS design house, allows it to stay at the forefront of technological advancements, delivering cutting-edge solutions to customers.

Strategic Surveillance – Eye in the Sky

Both Koios and Fregata serve as vital assets for military personnel on the ground, providing users with critical surveillance capabilities in real time. They operate discreetly, with low acoustic and visual signatures for extended endurance flights over contested environments. Koios and Fregata enable live video feeds and high-resolution imagery to be transmitted directly to ground forces. This provides enhanced situational awareness, the ability to identify threats and targets, and improves decision making in real time.

Force Protection – Tactical Shield

Small UAS Platforms are becoming the cornerstone of modern force protection. The persistent overwatch provided by Koios and Fregata significantly enhances the safety of military operations by offering real time, 360-degree views of the battlespace. This enables asymmetric threats to be identified before they pose a danger to ground forces. Flying ahead of convoys, the platforms can scan routes, buildings and potential hiding spots before alerting ground forces. The ability to monitor wide areas from safe altitude fundamentally makes operations safer and less unpredictable.

UAS Training Systems – Stepping Stone to the Skies

Beyond their direct operational utility, Koios and Fregata are the ultimate foundation for building comprehensive and efficient pilot training programs. A crucial first step, providing a safe, low-cost way to master flight fundamentals before moving onto larger, more expensive UAS platforms. By starting with Koios and Fregata, users can become familiar with interpreting advanced data, develop UAS pilot muscle memory and decision making for ISR missions.

Communication Relay – Communications Hub

Koios and Fregata can be part of a powerful communications hub, acting as a vital airborne relay to overcome the challenges if terrain and distance. In environments where radio signals are obstructed by hills, buildings or dense foliage both can be deployed to a strategic altitude to act as a flying antenna. When carrying communications payloads, both can receive signals from ground teams and relay back to command centres, extending the operational range of reliable communications. Critical for maintaining command and control, Koios and Fregata provide a persistent and mobile link, ensuring the free flow of secure information.

Operational Use Cases

Both Fregata and Koios are dual-use and are currently in active service for a wide range of civil and military operators. Callen-Lenz and its people pride themselves on supporting end-users, with experts being regularly deployed all over the world to rapidly adapt and modify capabilities to meet customer requirements.

Defence

Koios and Fregata can provide military forces with a low-cost, rapidly deployable 'eye in the sky', offering real time intelligence, surveillance and reconnaissance to enhance situational awareness and provide real-time decision advantage capability. Example use cases include:

Damage Assessment and Reconnaissance

Convoy Protection

Infrastructure Protection

ISR Collect

Early Intelligence and Warning

Crewed Uncrewed Teaming (CUC-T)

Target Acquisition

Civilian

Koios and Fregata offer a powerful solution for organisations seeking to enhance safety, efficiency and data accuracy across a range of civilian operations, from providing real time thermal and visual data to guiding search and rescue missions. Providing a cost effective, low risk alternative to traditional methods, Koios and Fregata assist in making informed decisions faster than ever before. Example use cases include:

Wildfire Monitoring

Search and Rescue

Surveillance

Mapping

Border Security

Agricultural Monitoring

Ground Control System Overview

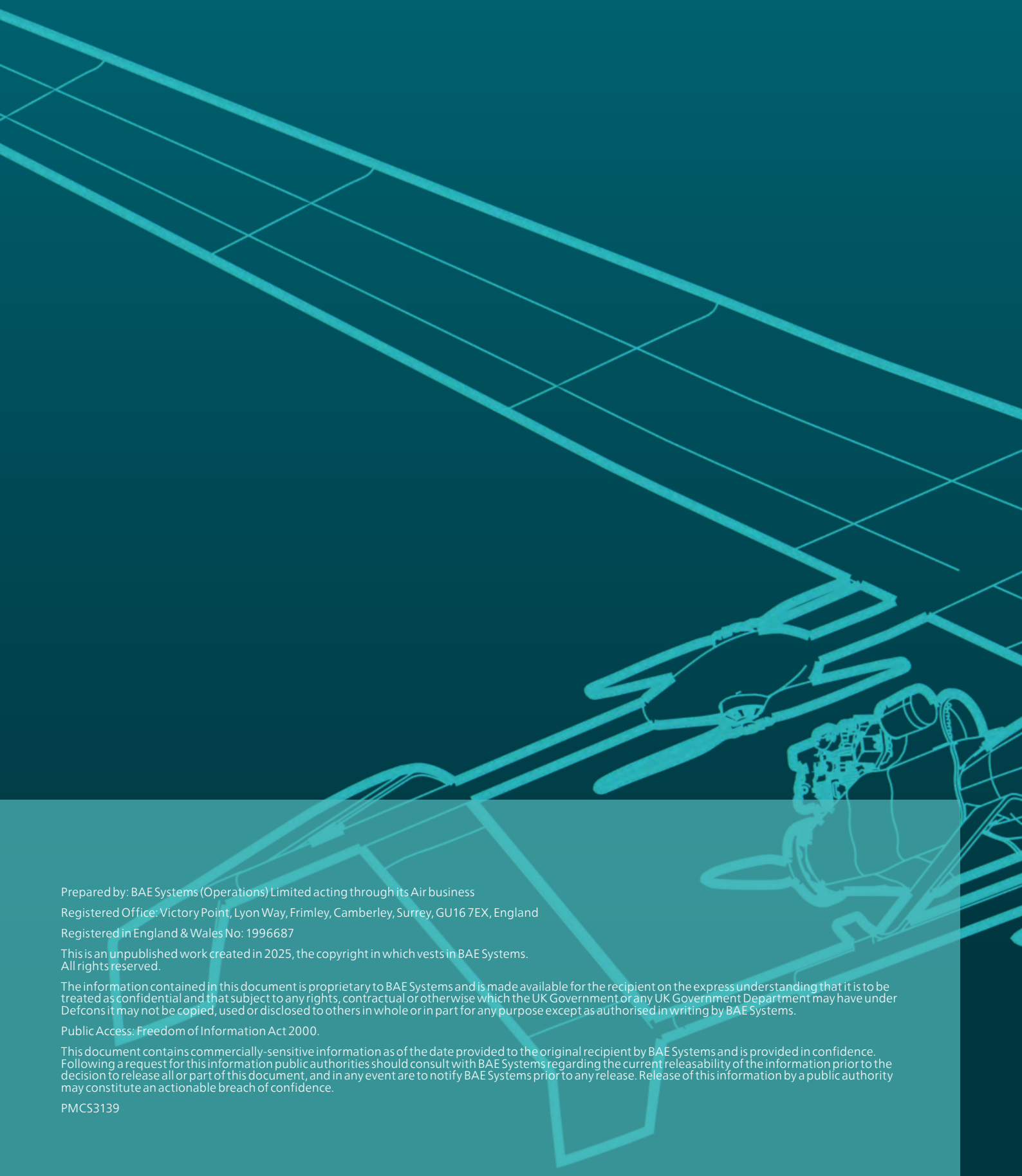
The Callen-Lenz designed Ground Control System is fully mobile for ease of operation. Two laptops provide a live feed from the UAS, operated by the main payload operator, and another live feed to the internal pilot in command of the UAS. The pilot has full authority over the aircraft using the user-friendly SkyCircuits Ltd graphical interface. This sends flight commands to the aircraft as well as receiving a live data feed of the heading, altitude, location, speed and avionics/engine status.

The pilot in command also receives a live feed and has full operation of the gimbal and electro-optical and infrared cameras. A 190km range Command and Control (C2) data link range is achieved through the utilisation of a CTRAES-256 encrypted mesh radio transceiver combined with a Long-Range Tracking Antenna.

Koios and Fregata can be configured across multiple radio frequency bands and has the capacity to be streamed to a number of visual displays.

Overview of Capabilities

Callen-Lenz's extensive uncrewed operational experience encompasses the design, manufacture, and testing of over 15 different platforms. These range from micro UAS and quadcopters to Medium Altitude Long Endurance (MALE) aircraft with a maximum take-off weight (MTOW) of over 800kg. Furthermore, Callen-Lenz has considerable experience in integrating a variety of systems, sensors, and payloads into our UAS fleet, as well as in testing and operating UAS for diverse remote sensing and research tasks. In addition, we offer aviation trial services, airframe and avionics design, research, and consultancy.



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