US Export Control Data: EAR99

FLEXROTOR

Land & Sea Expeditionary UAS

The VTOL UAS Shaping the Future of Autonomous Operations

Product Presentation -

11/21/2024

AIRBUS

Flexrotor

A unique design with unmatched capabilities

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HELICOPTERS

FLEXROTOR

A highly expeditionary Vertical Take-off and Landing (VTOL) small tactical aircraft system (STUAS).

Designed for land- and sea-based military and commercial operations, FLEXROTOR is the most agile and effective aircraft in its class.

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More Than 30 Years of Experience

1

1992

INSITU FOUNDED

Tad McGeer co-founds Insitu in Silicon Valley with the goal of developing long-endurance, autonomous UAVs.

2

1997

INSITU LAYS ROOTS

Insitu now headquartered in Columbia River Gorge.

3

1998

FIRST UNMANNED TRANSATLATNTIC FLIGHT

A small UAV called Aerosonde Laima, designed by McGeer and team successfully flies across the Atlantic Ocean.

4

1999

SEASCAN CONCEIVED

McGeer and Insitu develop SeaScan, a small, long-endurance UAV designed for commercial applications, particularly tuna fish-spotting for the fishing industry.

5

2002

SCANEAGLE DEVELOPMENT BEGINS

SEASCAN UAV MODIFIED FOR MILITARY ISR (INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE) MISSIONS AND RENAMED SCANEAGLE.

6

2004

SCANEAGLE OFFICIALLY LAUNCHED

THE U.S. MILITARY BEGINS DEPLOYING SCANEAGLE FOR RECONNAISSANCE MISSIONS IN IRAQ AND AFGHANISTAN.

7

2006

MCGEER LEAVES INSITU

MCGEER DEPARTS FROM INSITU, WHICH CONTINUES UAV DEVELOPMENT

8

2006

AEROVEL FOUNDED

Tad McGeer founded Aerovel, a new UAV company

9

2006-2007

AEROSONDE ACQUIRED BY AAI CORPORATION, AAI CORP ACQUIRED BY TEXTRON SYSTEMS

who further developed the Aerosonde HQ UAV for military(ISR) missions.

10

2007-2008

FLEXROTOR CONCEIVED

Initial design and conceptual development of Flexrotor began at Aerovel

11

2008

BOEING ACQUIRES INSITU

ScanEagle is integrated into Boeing's defense portfolio

12

2013

VTOL TRANSITION OCCURS

FLEXROTOR achieved its first full transition flight from vertical takeoff to fixed-wing cruise and back to vertical

13

2021

"GROUP 2" CREATED"

Tad McGeer created "Group 2" class of military aircraft; which remains most procured group in UAS sector

2024

AEROVEL ACQUIRED BY AIRBUS

Following Aerovel's acquisition by Airbus, the Flexrotor is now part of Airbus' UAS portfolio.

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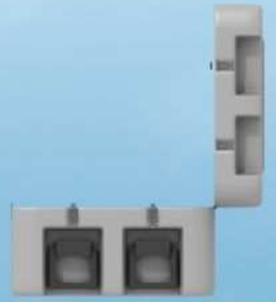
FLEXROTOR

Product Specifications



Storage box with internal assembly stand
50 kg loaded, 30 kg empty
205 x 56.9 x 38 cm

Nose payload
on quick-change mount

Imaging turret
(recofigurable up to 4 kg capacity)

Roll thruster

Optional backpack payload
Up to 4 kg capacity)

28 cc two stroke engine

Optional Belly Pod
Up to 2.5 kg Capacity

2 m / 6.6 ft

2.2 m diameter
Standard rotor

2.2 m

3 m / 9.8 ft

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FLEXROTOR

System Specifications

US Export Control Data: EAR99

Configuration	**Tail Sitter VTOL**
Wingspan	**9.8 ft (3 m)**
Length	**6.6 (L. (2m)**
Rotor Diameter	**...**
• Prop Blades	**7.2 ft. (2.2m)**
Max Takeoff Weight	**...**
• Standard Prop Blades	**25 kg**
Engine	**...**
• Standard	**28 cc. 2 Stroke**
• Heavy Fuel	**28 cc. 2 Stroke**
Fuel Type	**Gasoline (C 10) or Heavy Fuel (JP5)**
Wing-bore ceiling © 52.3 lb.	**...**
• Altitude	**21,000 ft**
Speed	**...**
• Cruise	**46 kt (85 kph)**
• Maximum	**77 kt (140 kph)**
Endurance	**...**
• Takeoff at 0m MSL	**> 15 hr.**
• Takeoff above 1,500 m MSL	**> 10 hr.**
Temperature	**-40 to 50 °C**
Wind	**...**
• Hover	**27 kts**
• Forward Flight	**> 40 kts**
Rain	**> 1.0 in/hr**
Operational Range	**165 km**
Payload Data Rate	**100 Mbps**
Payload Weight	**...**
• Nose	**4.0 kg**
• Backpack/Belly Mount	**3 kg**
• Optional Wing	**200 g**
Standard Payload	**...**
• EO	**09E03**
• EOIR	**09EIR3**

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KEY FEATURES 1/4

Expeditionary

- Vertical Take-Off and Landing
- Airborne in less than 30 minutes (includes fueling and CGS setup)
- Easily transported on patrol boats, pickups and special operations aerial insertions
- Requires zero Launch and Recovery Equipment (LRE)
- Superior performance with no break in contact
- Combines the thrust-borne capability of a helicopter with the wing-borne efficiency of a powered sailplane
- Packs down to 50kg box for transport

Safe

- No human contact during takeoff/landing

KEY FEATURES 2/4

Autonomous

- Fully autonomous during VTOL and wing-borne phases of flight

Compact Launch Zone

- Requires no more than 3.7m x 3.7m (12ft x 12ft) launch / landing area

Long Range

- Average endurance of 12 -14 hours, with payload and fuel tank

Efficient

- Dash speed of 77kts

KEY FEATURES 3/4

Covert

- Inaudible at 500m
- Engine can be shut-off at altitude for brief periods, enabling silent loiter above targets

Multi-Intelligence

- Delivers advanced multi-sensor intelligence, surveillance, reconnaissance, and target acquisition (ISTAR) services

ITAR-Free

- Commercial product in base configuraiton

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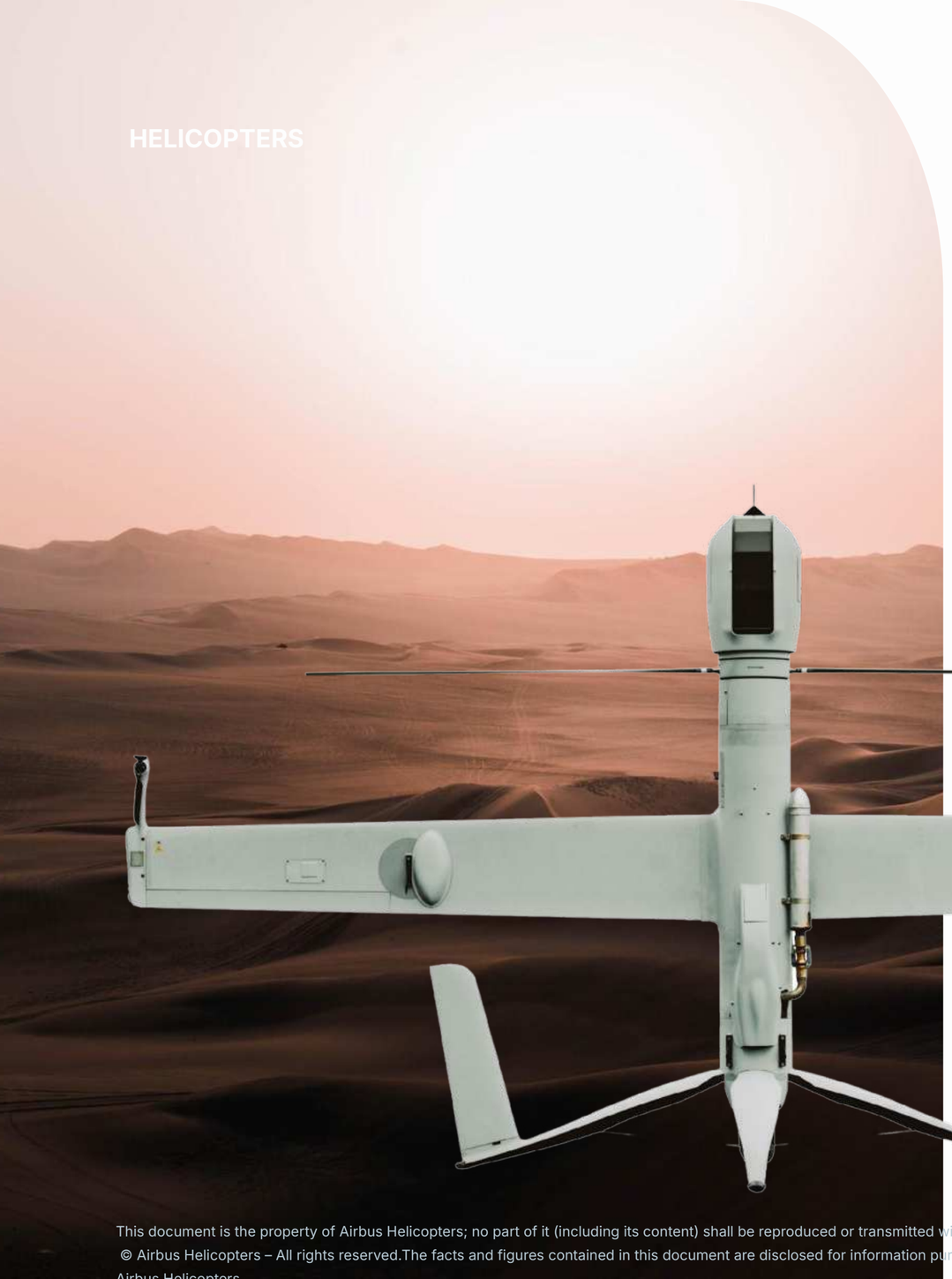

KEY FEATURES 4/4

Payload Agnostic

- Supports interchangeable payloads and digital turrets
- Seamless plug-and-play integration with sensors including: EO/MWIR/LWIR cameras, AIS, and Land/Maritime Wide Area Search

All-Weather

- Conducts day/night operations in challenging land and marine environments
- Can take -off and land in winds up to 27 knots
- Invariant to wind and magnetic north directions
- Operational in extreme heat and cold temperatures

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STANDARDS COMPLIANCE

- Fuel Compatibility: MIL-DTL-5624 grade JP-4/JP-5; MIL-DTL-83133 grade JP-8/JP-8+100
- Pursing certifications for: MIL-STD-461G & MIL-DTL-901E (Grade B)
- Sensors output: STANAG 4545, 4607, and 4676 messages

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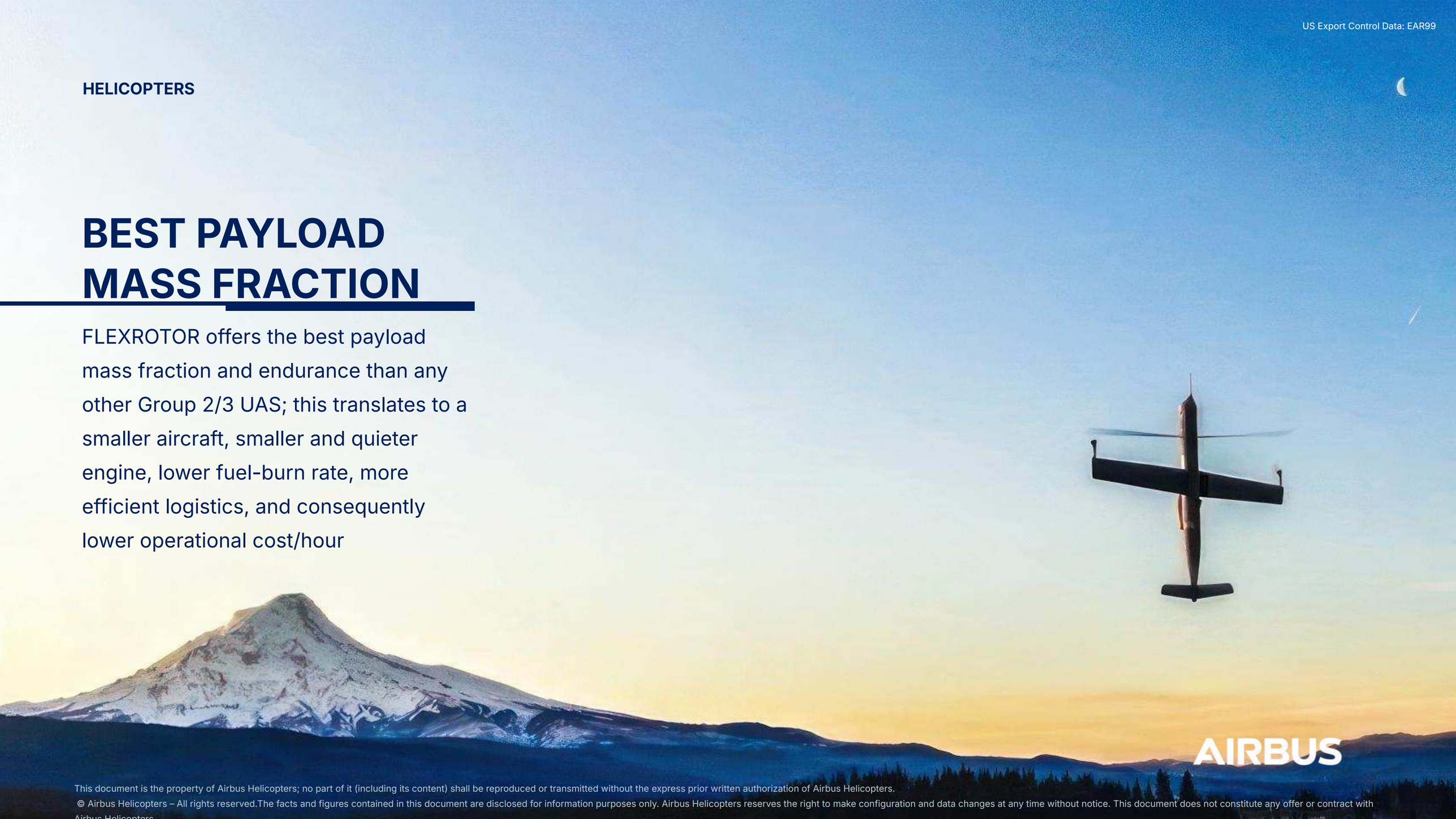
BEST PAYLOAD MASS FRACTION

FLEXROTOR offers the best payload mass fraction and endurance than any other Group 2/3 UAS; this translates to a smaller aircraft, smaller and quieter engine, lower fuel-burn rate, more efficient logistics, and consequently lower operational cost/hour



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Standard Payload/Sensor Integration

All listed payloads and sensors offer seamless plug-and-play integration with the Flexrotor. Integration with other payloads is also available upon request.

Primary Payloads

HoodTech Alticam 06E0IR
Mid-wave infrared (MWIR), HD electro optical (EO) imaging

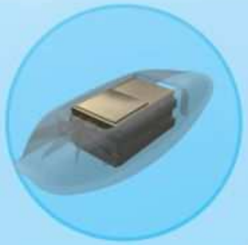
HoodTech Alticam 09E0IR3 (MWIR3.6)
Mid-wave infrared (MWIR), HD electro optical (EO) imaging

Legacy Analog Turrets

Auxiliary Payloads

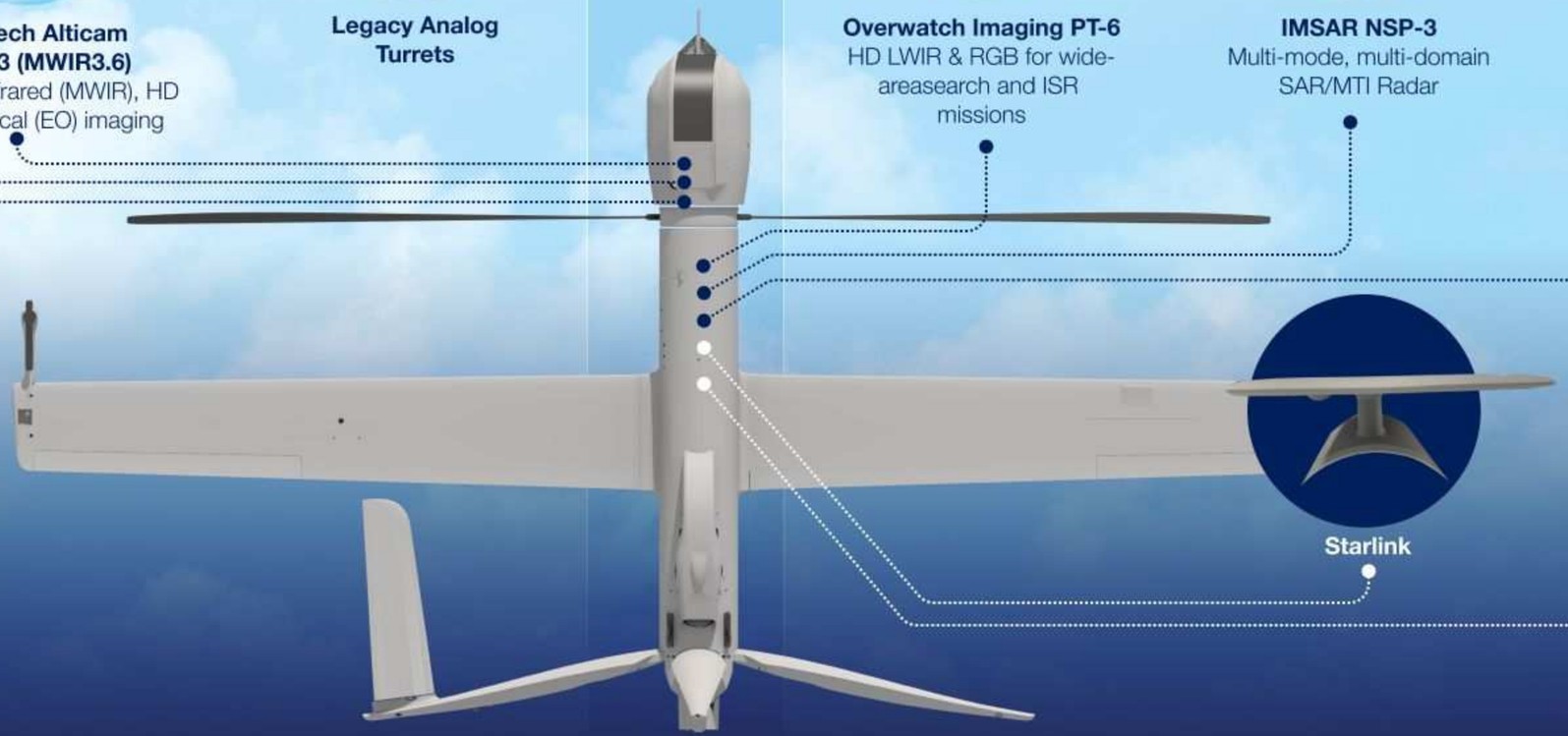
Overwatch Imaging PT-6
HD LWIR & RGB for wide-areasearch and ISR missions

IMSAR NSP-3
Multi-mode, multi-domain SAR/MTI Radar



Avionics Payload Bay

HoodTech Alticam 09E03 (E0960)
HD electro-optical (EO) imaging



Starlink

AUX Fuel Tank

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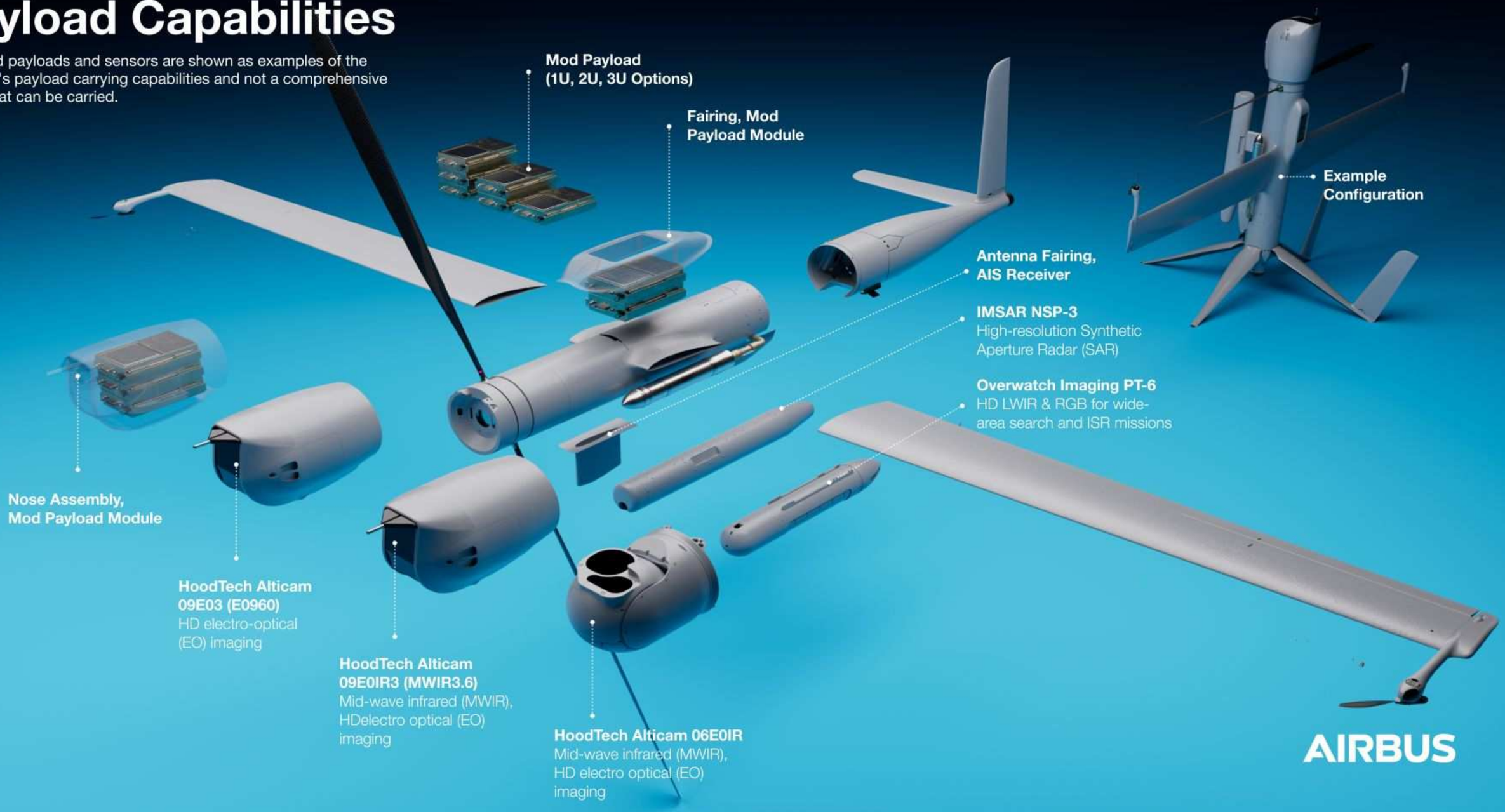
Payload Capabilities

The listed payloads and sensors are shown as examples of the Flexrotor's payload carrying capabilities and not a comprehensive list of what can be carried.



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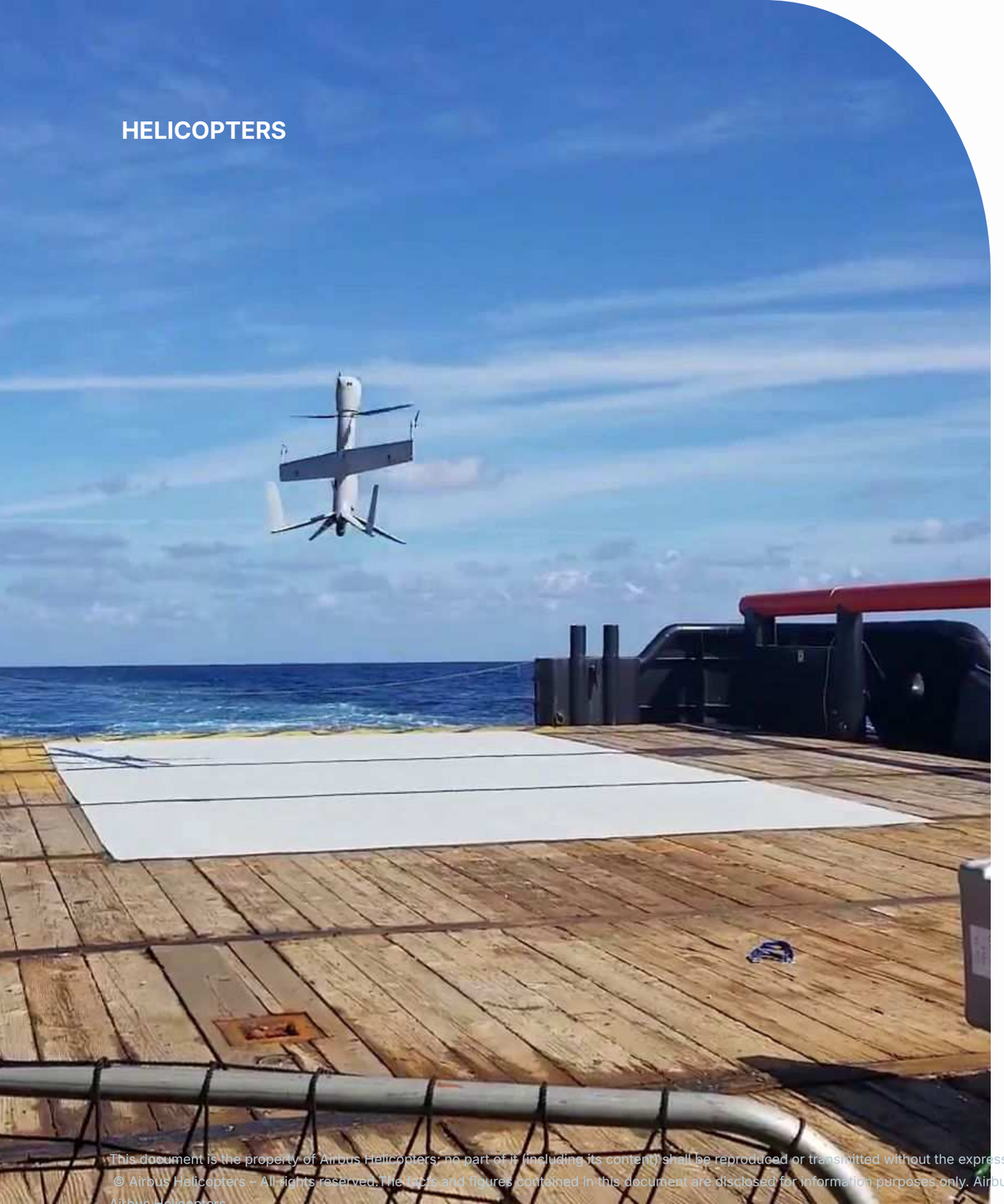

FIELD EXPERIENCE

FLEXROTOR is field-proven with thousands of flight hours, including operational missions in extreme environmental conditions such as desert heat, and arctic cold, and shipboard operations in winds/gusts conditions up to 27 knots.

In addition, turnkey, contractor-owned, contractor-operated (COCO) services, have accommodated global deployment of FLEXROTOR, on multiple US Government ISR missions.

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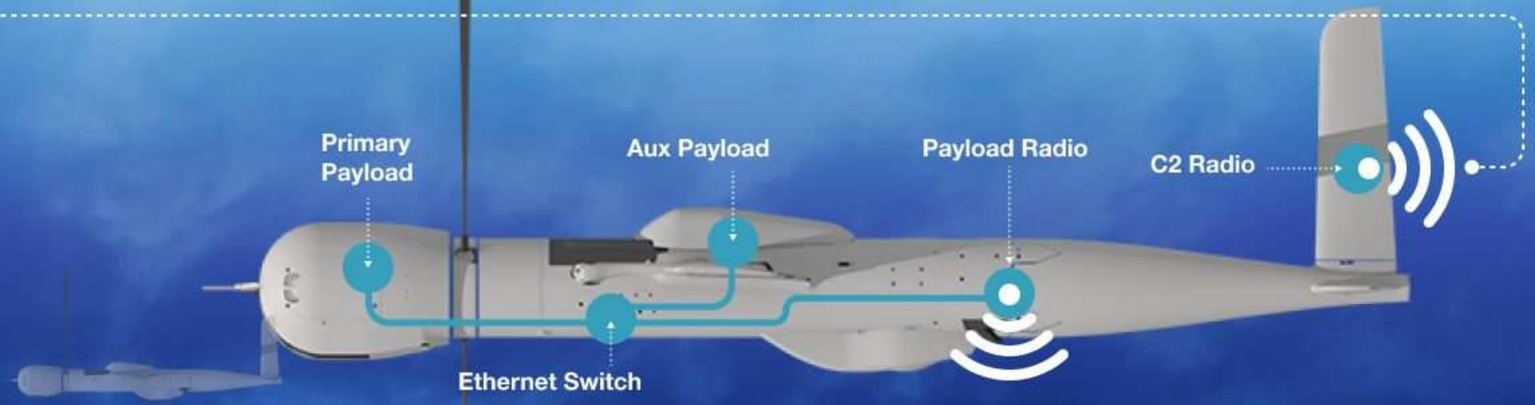
FLEXROTOR

Communication Architecture



Tracking Antenna

Payload Radio

C2 Radio

Second Aircraft (option)

Link to Primary Aircraft

or

Link to Tracking or Link to Omni

Omni Antenna

C2 GPS GPS

Payoad Payoad

Weather Station

Operator Station

C2 Radio | Base GPS & Compass | Payload Radio | Battery Backup

Ground Control Station

Observers

Ethernet Connection

RF Connection

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UAS COMMAND & CONTROL

In case of both links lost:

- UAV will initiate, automatically, lost link logic to recover datalink.

Should none of the links be recovered:

- An autonomous preplanned lost link route is engaged.
- RTB to facilitate autonomous aircraft lost link landing.

GPS denied environment:

- Internal IMU can provide navigation via dead reckoning (magnetometer and speed/time) to perform a return to base.

- Two independent, dissimilar & redundant LOS DL
- Each includes an airborne part (integrated into the UAV) and a ground/ship part:
  - LSDL: Low-Speed Data Link Freewave 900Mhz
  - HSDL: High-Speed Data Link Silvus Streamcaster 2,4 GHz
- Several solutions can be provided for operation in GPS-challenged conditions.
- STANAG 4586 and MIL-STD compliant

Ground Control Station

- Ruggedized Laptop: used throughout the entire mission phase (preparation, ground/deck operations, take-off, and (deck) landing, flight, and mission)
- Extended Display: To operate aircraft and payload during flight

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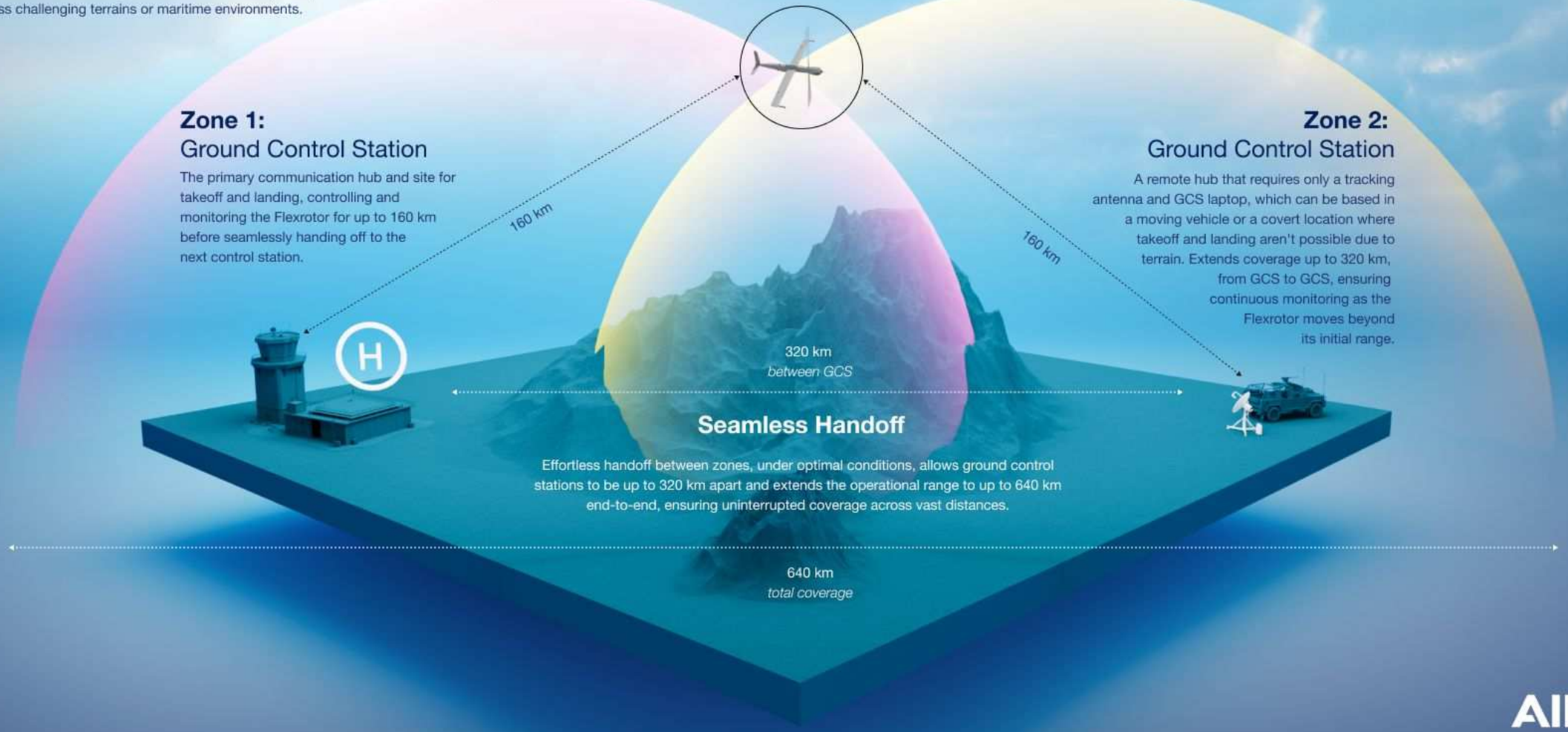
Hub-And-Spoke Model

In this model, Ground Station 1 serves as the central hub for takeoff and landing, maintaining control during the initial phase of flight. As the Flexrotor extends beyond line of sight, control is seamlessly transferred to Ground Station 2, the remote spoke that ensures continuous monitoring and command. This system enables uninterrupted operations over vast distances, whether across challenging terrains or maritime environments.



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MISSION CAPABILITIES

FLEXROTOR delivers intelligence, surveillance, reconnaissance, and target acquisition (ISTAR) services in various tactical, maritime, and civil applications. Whether it’s finding threats, providing intelligence, securing borders, hunting drugs, or mapping fires, this agile VTOL UAS delivers.

Multi-Mission Capable

- ISTAR Maritime
- ISTAR Land
- Commercial
- SIGINT

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ISTAR MARITIME

FLEXROTOR offers superior performance in over-water missions, delivering real-time intelligence for naval reconnaissance, maritime surveillance, and coastal monitoring.

Its extended endurance ensures continuous coverage and enhances mission effectiveness across large water areas.

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ISTAR LAND

FLEXROTOR’s advanced ISTAR capabilities give a tactical edge for military and border operations, providing precise intelligence that enhances decision-making and boosts mission success.

With the ability to take off from austere land sites, FLEXROTOR can be deployed in challenging environments.

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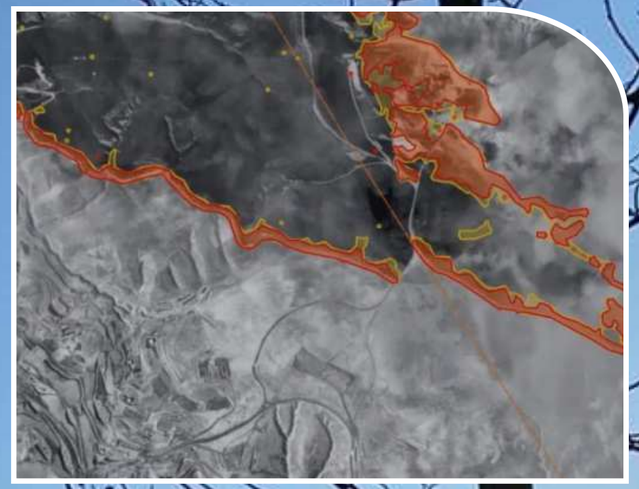
COMMERCIAL

FLEXROTOR supports various commercial uses, such as firefighting, infrastructure monitoring, search and rescue, environmental assessments, and agricultural surveillance. Its advanced features ensure reliable intelligence, boosting safety, efficiency, and effectiveness.



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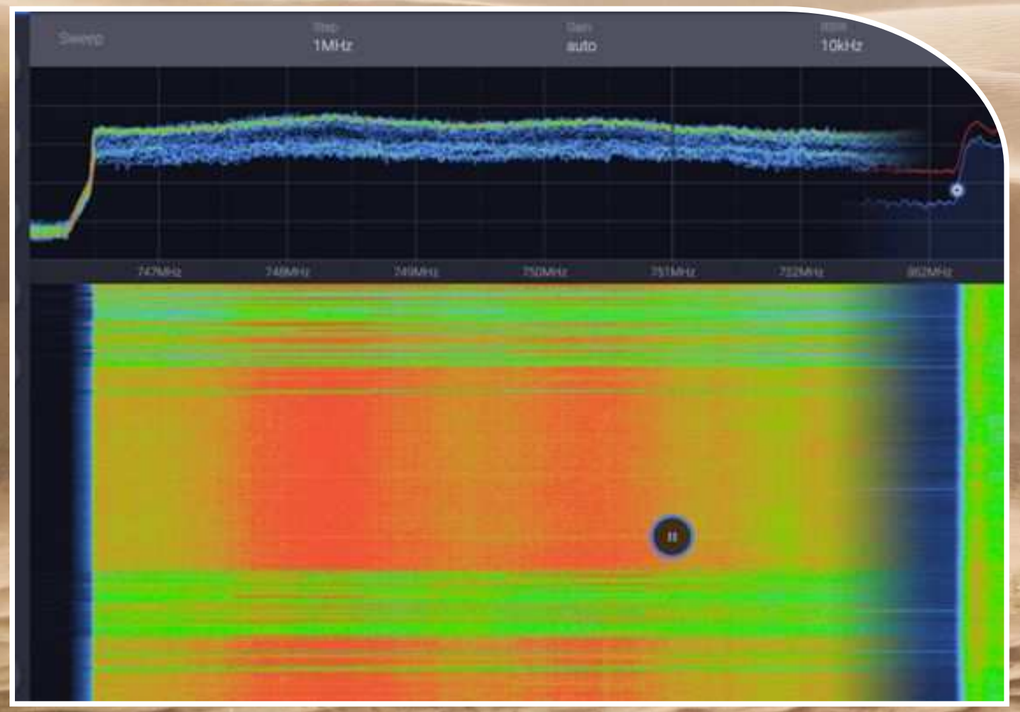
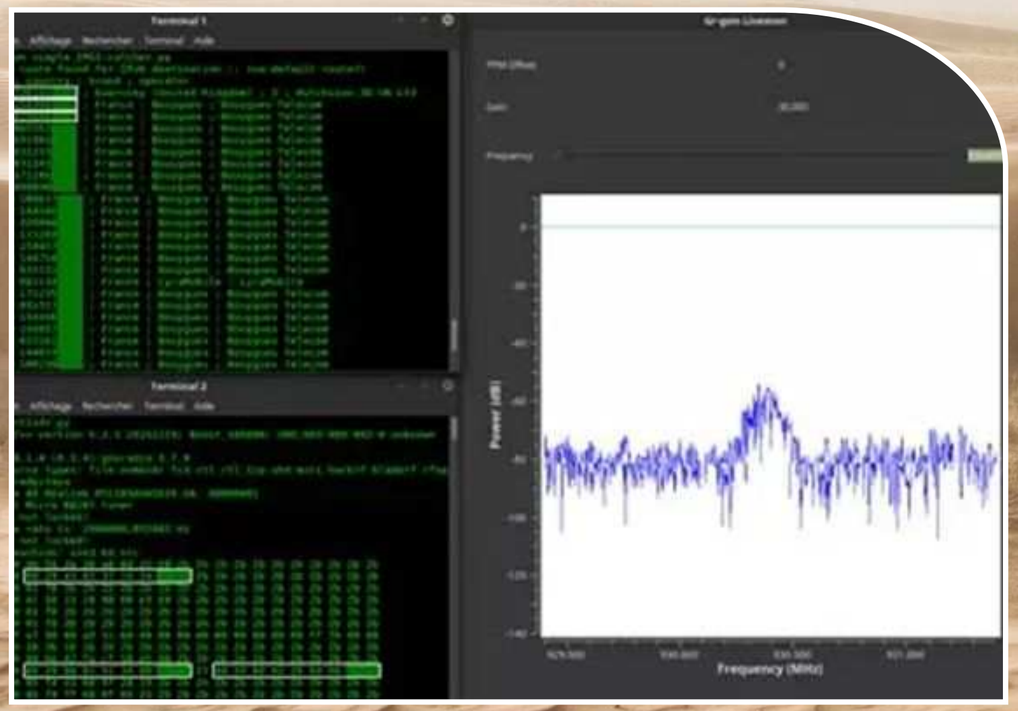
ELINT & SIGINT

FLEXROTOR can accommodate electronic and signal intelligence payloads, offering accurate, discreet data collection. It detects and tracks electronic emissions and communications, providing vital insights for intelligence, electronic warfare, and situational awareness.





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GLOBAL DEPLOYMENTS

- First time at sea in 2015 aboard the expedition yacht Umbra in the tropical eastern Pacific. Later, to the Beaufort in Alaska aboard the Aiviq icebreaker, and the equatorial mid-Pacific aboard the tuna seiner Cape Horn.

- Through an ISR services provider to US DoD, contracted with Aerovel for a SOCOM project leading to evaluation at Dugway, Utah in 2017, and eventually being awarded an IDIQ contract for SOCOM's MEUAS-IV program.

- Deployment of FLEXROTOR to Afghanistan with USMC in 2018, and on ship in the eastern Pacific with SouthComm in 2019.

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GLOBAL DEPLOYMENTS CONTINUED

- First Group 2 VTOL UAS to autonomously take-off and land from a US Coast Guard Fast Response Cutter (FRC)
- Participated in successful deployments in Digital Horizon 2022 and International Maritime Exercises 2023
- Ongoing Company Owned Company Operated (COCO) ISR services for the US Navy 5th Fleet Task Force 59 & 55 in the Middle East
- Over 4000 flight hours accumulated to date, including over 1400 hrs. in Afghanistan and many shipboard and land take-offs and landings

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CREWED-UNCREWED TEAMING AT AIRBUS

2018-2022

H145M Demos

Multi-UAS capability demonstrated in complex

2024

MUSHER Demo : H130 with VSR700 in cooperation with Leonardo and Thales

Common European exchange protocol

SHORT TERM

Teaming Capabilities Step 1

Tasking 1 UAV from 1 H/C with a safety pilot in the loop and light cockpit integration

MID TERM

Teaming Capabilities Step 2

Tasking multiple UAVs/ALEs from H/Cs, no remote pilot required and solution integrated in cockpit

LONG TERM

Future Combat Air System

FUTURE OBJECTIVES

Develop Crewed-Uncrewed Teaming capabilities to connect our H/C fleet with UAV and perform missions incontested

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CREW CONCEPT

A scalable solution for different levels of cockpit integration

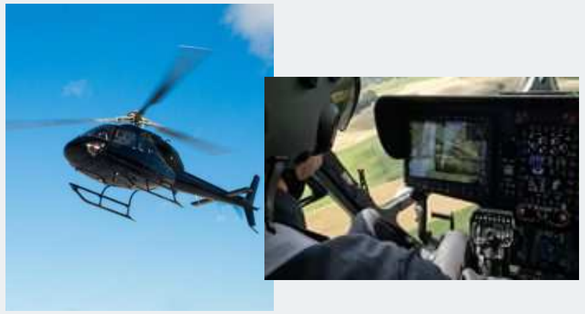
OPTION 1

LEGACY AIRCRAFTS | 3 CREWS

- MuMT functions operate from cabin either from the mission station or tablet
- No cockpit connection required

OPTION 2

LEGACY AIRCRAFTS | 2 CREWS



- MuMT functions operated from a tablet or integrated cockpit display
- High level of automation required to optimize crew workload

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END-TO-END SERVICE SOLUTIONS

Airbus provides end-to-end service solutions with Airbus/ non-Airbus assets and has the flexibility to provide a capability through any desired contractual setup.

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SERVICE LEVEL

From full mission ownership, to the delivery of select capabilities, Airbus accommodates customer needs.

FULL CUSTOMER OWNERSHIP

Customer has full control with Airbus support and service

SHARED OWNERSHIP

Airbus can operate any customer-owned or leased asset

Airbus can offer all services and handover in-flight for customers to operate only the mission

Airbus delivers data and services to customers for improved decision-making

FULL SERVICE BY AIRBUS & PARTNERS

Airbus or Partner operates full mission based on a range of assets

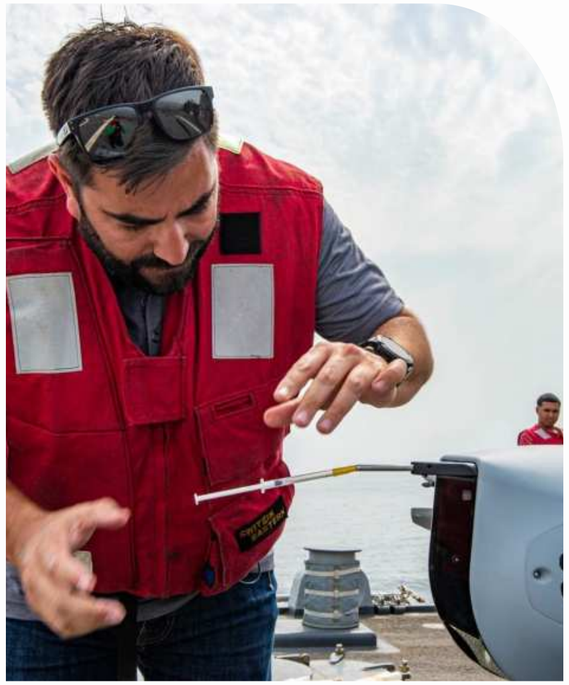
Customer relieved of capex & operational burden

Local partners as service providers offer regional expertise

Increased service flexibility and reach

Complete turnkey solution & minimal management for customer

ASSEMBLY



Simplified design accommodates rapid assembly of proven components

- Out-of-the-box assembly is done in less than 30 min
- The only tool used is a nut driver to secure the nose payload
- Opportunities for additional payload integration

EASY TRANSPORT

FLEXROTOR is the only Group 2 UAS with 12-14 hours of endurance, capable of transporting a 6-month pack-out that fits neatly on a 463L pallet, ensuring efficient and reliable transport.

LOGISTICS

6-Month Pack-Out (2000 Flt hrs.)

- 3 FLEXROTOR aircraft
- 2 Ground Control Systems
- Long Range Antenna
- Consumables
- 2m3 – 385 kg

FLEXROTOR’s small footprint expands UAS industry areas of operations

TRANSPORTABILITY

Flexrotor is the only Group 2 UAS with >14 hours endurance capable of transporting a 6-month pack-out via:

- Single 463L pallet
- Type V Airdrop platform
- Hilux pickup
- H-145 Helicopter

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FLEXROTOR TRAINING

The training curriculum for the FLEXROTOR system is 80 hours of instruction, covered over six weeks, including theoretical knowledge and practical skills taught to the trainees through carefully crafted training modules, hands-on experience, and live flight.

Dual certification of operations and maintenance.

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FLEXROTOR TRAINING

1	OPERATING THE AIRCRAFT	takeoff, transitions and landing
2	PAYLOAD OPERATIONS	payload-specific operations and use.
3	AIRCRAFT MAINTENANCE	complete field level aircraft maintenance
4	CERTIFICATION	operator/payload/maintenance certification will be issued upon completion of the FLEXROTOR training course
5	MAINTAIN CURRENCY	annual one-week re-currency training is required to maintain valid Operator/Maintainer certification and proficiency

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SUMMARY

Flexrotor is the longest endurance, lowest cost, smallest footprint, and optimized VTOL aircraft

Proven legacy of design combined with 30 years of small- aircraft experience

Smallest pack-out on the market – truly expeditionary

Available to address both commercial and defense mission sets – ITAR-free

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Thank you

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