

STATE OF THE ART COMPOSITE ENGINEERING

///SPACE

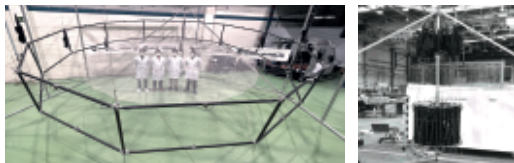
Modular deployable Structures

Modular Deployable Mast



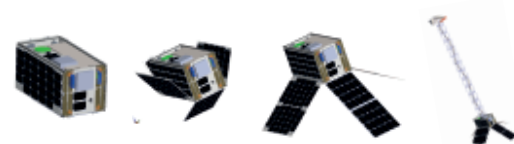
- 10 meters long
- Less than 5 Kg/m
- Stowed in 80x80x80 cm
- High stiffness, accuracy and stability
- Longest European mast deployed in 0g conditions
- Modular, Scalable

Modular Deployable Antenna Reflector



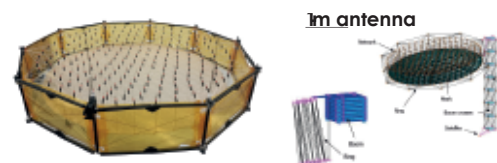
- 6 meter diameter demonstrator deployed in 0g conditions
- Stowed in 80 x 100 cm diameter cylinder
- Accuracy & stability ready for L-Band
- Scalable

Deployable Mast for small satellites



- Selected for ESA Scout mission Nanomagsat
- 3 meters long
- Modular, scalable
- Self-deploying mechanism

Deployable Antenna for small satellites



- 1-m aperture
- $f/D = 0.5 - 1.5$
- X to Ka-Band, >45 dBi
- Stowage in 3U
- Scalable up to 3-m diameter

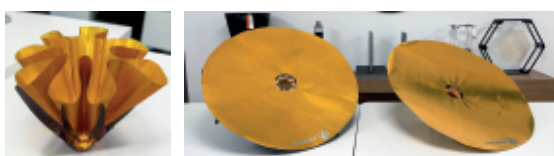
Flexible Deployable Structures

Innovative Large Foldable Reflectors



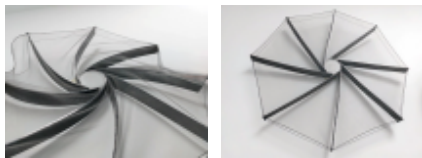
- Flexible reflector
- Ultra-thin CRFP laminate
- Roll-up, shelf-deploying mechanism
- Up to 5m diameter
- High accuracy & stability
- Suitable up to Ka Band

Flexible Membrane Reflector



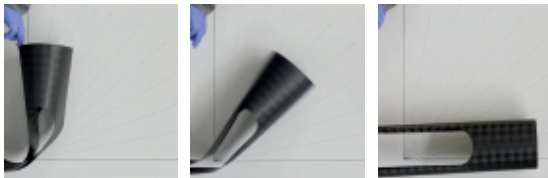
- Flexible reflector
- Continuous reflecting surface
- Bio-inspired folding system
- Band X to Ka

Spiral Reflector



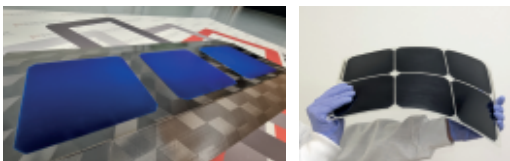
- Storage 1U
- X Band
- Simple deployment system without mechanisms

Damped Articulated Boom



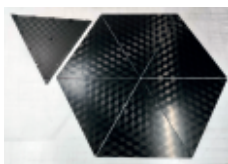
- Up to 28 m. Full CFRP deployable boom
- No metallic mechanisms needed
- Extremely light and accurate
- Carries tip masses such as reflectors or magnetometers
- Damped deployment

Flexible Composite Solar Arrays



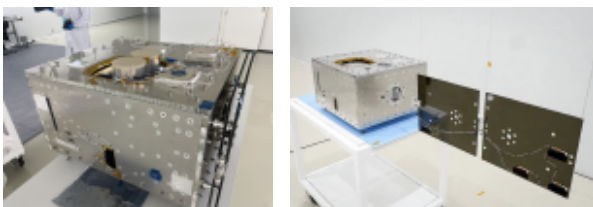
- Lightweight design
- Adaptative Surface
- Excellent storage ratio
- Voltage/m² tailored to requirements

In-orbit Manufacturing Modular Reflector



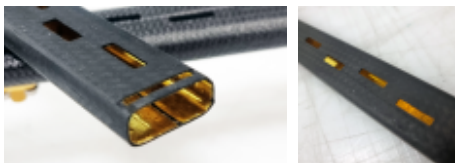
- OoE assembly manufactured reflector
- Modular/scalable tailored area
- CFRP RF characterized up to Ka Band
- Flexible reflective adaptative surface

Satellite Platforms



- Aluminium-Aluminium Panels
- Aluminium-CFRP Panels
- CFRP Panels
- Ad hoc customized inserts design and integration
- Serial platform production for constellations
- Advanced thermal insulation.
- Lightweight design

CFRP-Metallized Wave Guides



- Carbon fibre construction
- Lightweight
- High dimensional stability through a wide temperature range
- Metallized RF reflective surface

C-Band Corrugated Horn



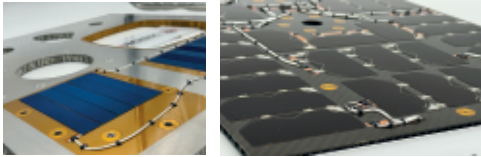
- Full Carbon Fiber C-Band Corrugated Horn
- Mass reduction up to 40% compared to Aluminum

Full Carbon Fiber Space Struts



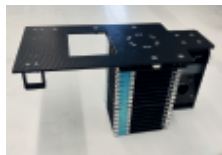
- Full carbon fiber struts including fittings
- Ultra stable from -180°C to $+180^{\circ}\text{C}$
- High dimensional accuracy

Composite Solar Arrays



- Light Weight
- Multi-hinge deployable arrays
- Cost-efficient designs
- High efficiency solar cells
- Energy efficiency of 30%

Optical Bench



- Ultra-stable structures
- Light weight
- Controlled Thermal Expansion (CTE)
- Controlled Moisture Expansion (CME)

//// AIRCRAFT

Morphing Skin



- Fully compliance Airbus A320 flight requirements
- 100% carbon fiber morphing skin
- Optimized fluid dynamics to achieve a perfect laminar flow
- Ideal for drones
- Reduced mechanisms/low weigh

Composite Printed Electronics



- Light weight panels
- Robustness
- Space and mass saving solution for nanosats and micro satellites
- Integrated sensors

High Impact Resistance Panels



- Light weight panels
- High impact resistance structures
- Damage control composite panels

HAPS - Pseudo Satellite



- Communication, observation and defense operations up to 1month at 20Km
- Payload 200Kg
- TRL4

CFRP Tanks for Liquid Gases



- H2 COPV tanks
- Liquid gasses storage 20°K
- Liquid gasses storage up to 700bar
- Tailored volume
- Advanced thermal insulation

////DEFENSE

High Performance Subsea Radomes



- Subsea radomes up to 70 bar pressure
- Suitable for radar, X, Ku or Ka communications bands
- Design capacity to minimize RF losses

Low Radar Signature Solutions



- Composite and ferrite Solutions lightweight
- Tailored to requirements
- Rigid and Flexible solutions

Morphing Wing



- Ideal for UAVs & drones
- Continuous aerodynamic surface
- Adaptative to different wing geometries

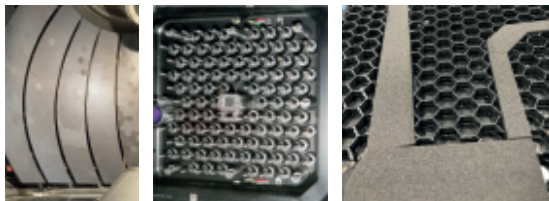
Aircraft Radomes



- Suitable for radar, X, Ku and Ka communications bands
- Integrated lightning protection
- Design capacity to minimize RF losses

////SCIENCE

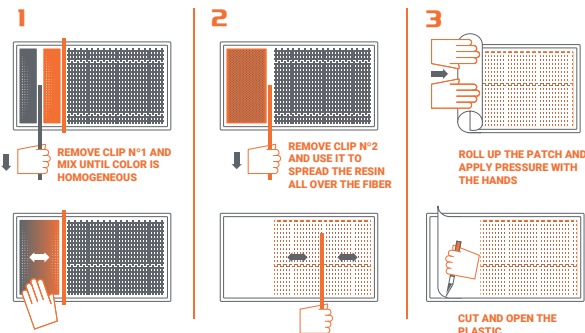
High Precision Science Instruments



- High accuracy CFRP neutron analyzer reflectors
- CFRP liquid Scintillation Detector
- Optical fiber based detector development and manufacturing for high-pressure neutron diffraction studies
- CFRP neutron vacuum guides and connectors
- Optical degree epoxy system for high vacuum and high radiation ambient
- Neutron colimators

////EMERGENCY REPAIRS

Emergency Repair Patches



- Less than 1 minute structural repairs
- Error-proof system
- All weather and underwater solution
- Available in all carbon reinforcements