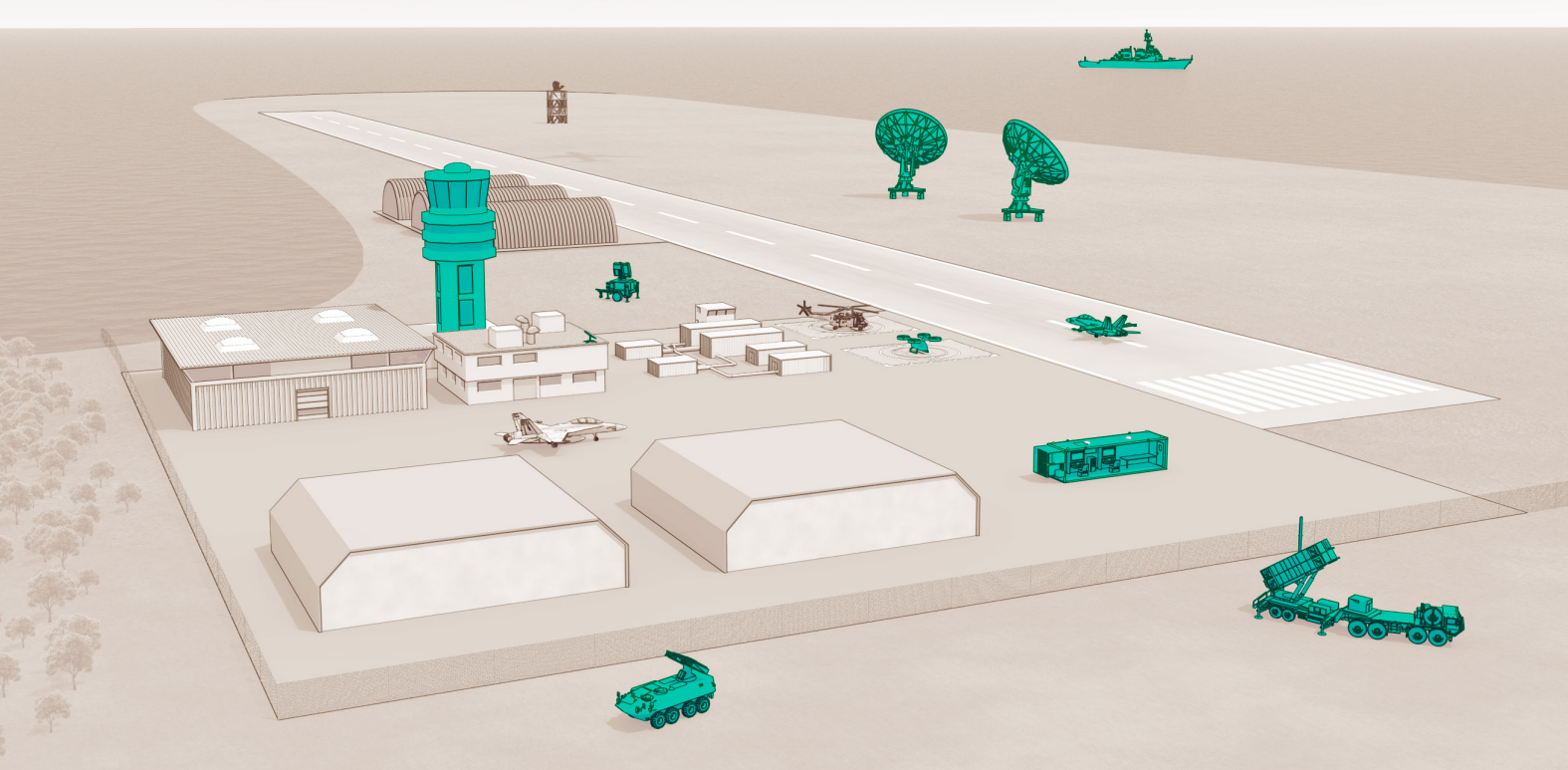


RF-over-Fiber for Defense Applications

Edition 2025/09





RF-over-Fiber (RFoF) is a technology for transmission of analogue radio frequency signals by light using conversion modules at either end of the link and fiber optics in between. HUBER+SUHNER is one of very few firms in the world that has the expertise and experience to fuse radio frequency and fiber optics into a single solution.

Key Features and Benefits

Exceeds coaxial link performance

RFoF permits for vastly longer distances: 100 km without amplification. Much lighter weight due to use of fiber optics and the option to multiplex tens of channels into a single fiber.

Superior reliability

Intrinsically immune to EMI & RFI, EMP and notoriously difficult to intercept ("tap").

Unparalleled electrical performance

The combination of low NF, gain flatness and SFDR makes this product family unique in the market.

Breadth of product family

Frequencies from 20 MHz to 40 GHz available, specialized units for wide bandwidth, low phase noise, high linearity, GNSS-over-fiber, and power-over-fiber-fed GNSSoF.

Rugged design

Our compact and durable converter modules come in various embodiments, e.g. chassis-, panel and DIN mountable units or as customized form factors. We guarantee functionality across extreme operating environments including high shock and vibration resistance.

Connectivity solutions

Regularly we combine our products into connectivity network architectures tuned to precisely meet the specificities of our customers.

The Defense sector is increasingly relying on RFoF when long distances and EMI-prone environments must be bridged with RF signals – a scenario that deems conventional coaxial links unsuitable. As the applied frequencies are increasing to accommodate greater data loads, the limitations of coaxial links become even more accentuated making RFoF an indispensable technology for contemporary and future-proof connectivity.



Command & Control Shelters

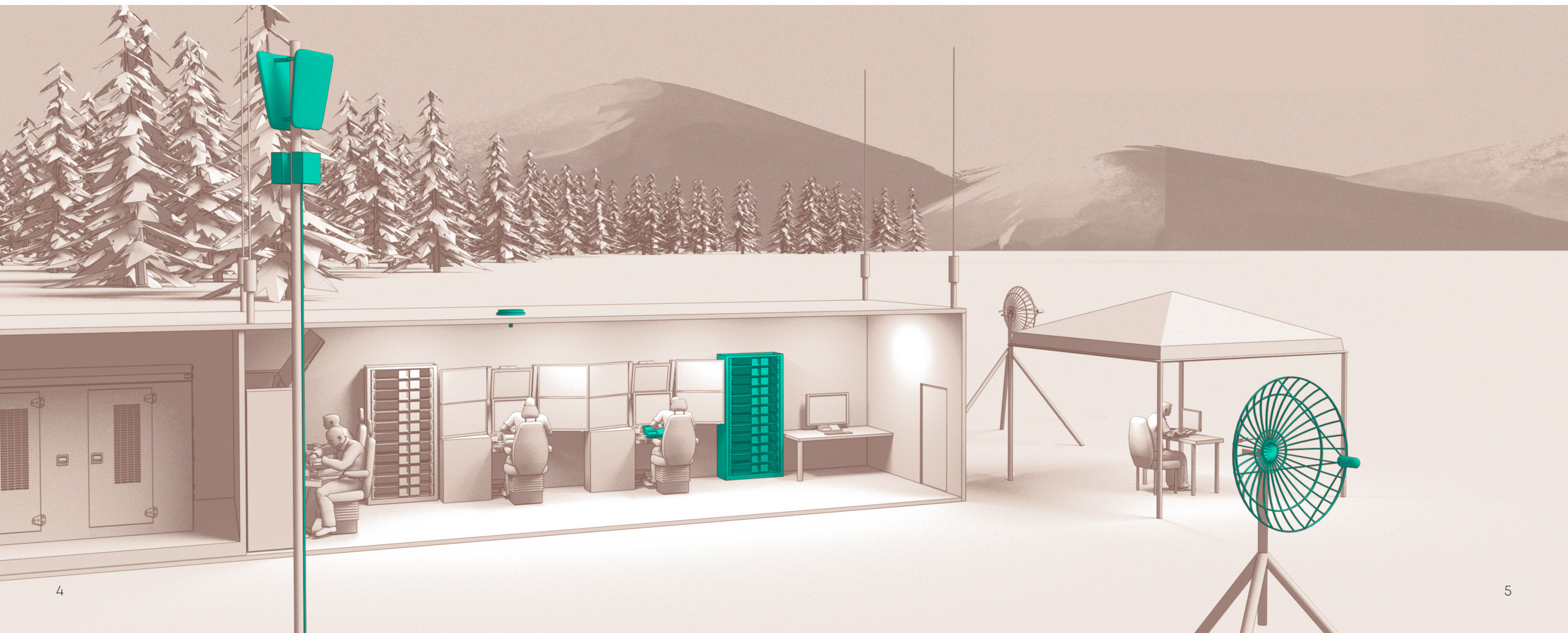
Light-weighting and reduction of cable footprint enable rapid deployment.

Shelter connectivity illustrates perfectly the benefits of an RFoF system. Highly mobile and deployed in harsh environments, connectivity as well as the safety of the Control Center are key elements of RFoF within an antenna remoting system. Its use within a traditional RF system, makes possible:

- to reduce intrusion of copper lines through the Faraday Cage
- to protect the operator from detection/geolocation by ELINT/SIGINT
- to make use of Power-over-Fiber (PoF) technology that enables remote installation where the elements are away from convenient power sources

Using our complementary and proprietary all-optical switches, WDM technology and fiber management solutions, HUBER+SUHNER covers the full ground station ecosystem.

	RF-over-Fiber transmitter, 7 GHz / 22 GHz / 40 GHz • 0.1...40 GHz broadband system with broad temperature range (-20°...65°C)
	All-optical switches • Available in 4x4 to 384x384 matrix sizes



Armored Vehicles

RFoF is creating new opportunities for cabled solutions within vehicle applications.

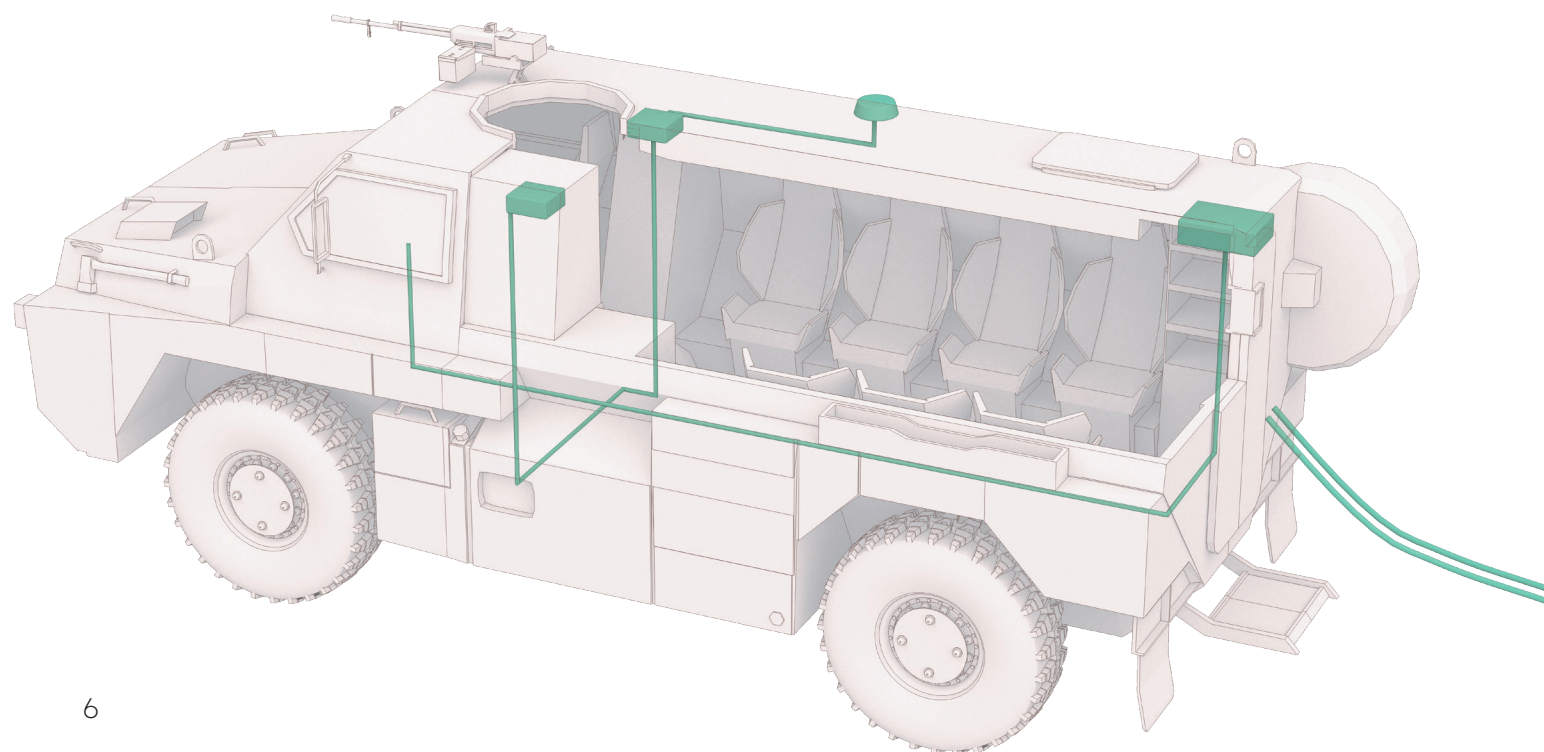
Highly mobile and exposed to challenging environments, the RFoF series is paving the way or the next generation of end-to-end connectivity solutions in this application landscape.

GPS-over-Fiber (GPSoF) enables a single GPS signal to be distributed into multiple receiver systems. The small form factor adds significant value within the vehicle with both the conversion modules and FO cable designed to use as little space as possible, whilst eliminating all forms of (EM & RF) interference. In combination with the PoF technology the GPSoF system offers a full galvanic isolation between the antenna and the internal modules.

In addition, the technology allows to design a modular payload network (PNT, comms, ISR, EW) on common, frequency-agnostic fiber infrastructure that corresponds to a minimal MRO downtime for mission reconfiguration and technology refresh.

G-GNSSPoF System Solution

- GPSoF and Power-over-Fiber for full galvanic isolation
- Working on L1, L2 and L5 bands
- Designed for harsh environments such as military, mining, tunnels, etc.
- More flexible connection cables with smaller diameter and less weight
- Galvanic isolation between remote and base unit
- Provides a highly secure tamper-proof connection between remote and base unit - Robust link
 - Immunity against EMP
- Greater distance between remote and base unit



Tethered Payloads

Tethered drones revolutionize aerospace and defense operations by distributing RF signals over fiber optics. This enhances signal bandwidth, integrity, and security while optimizing size, weight, and power (SWaP). The technology also allows operators to keep out of harm's way across a variety of military and commercial applications like UAS, ground, surface, subsurface systems, towed systems, and aerostats.

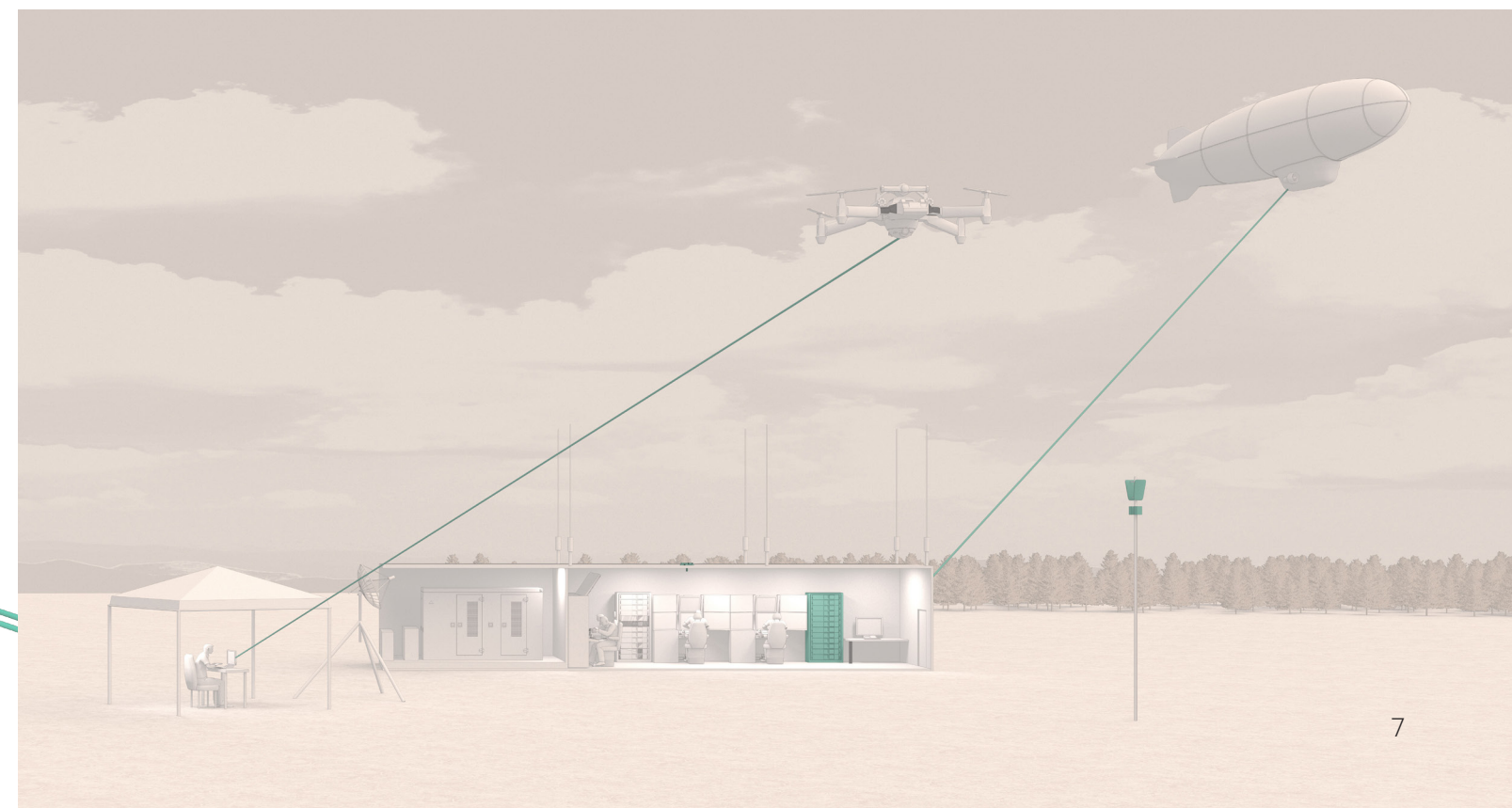
Robust, lightweight hybrid cables and spool solutions ensure reliable performance in harsh environments, providing tactical advantages in electronic warfare (EW), intelligence, surveillance, and reconnaissance (ISR) operations. Another major benefit is the possibility to remote heavy signal processing/conditioning equipment to the ground station to maximize payload capacity.

RF-over-Fiber transmitter and receiver, 40 GHz

- 0.1...40 GHz broadband system with wide temperature range (-20° ... 65°C)

RF-over-Fiber transmitter and receiver, 6 GHz

- 20 MHz...6 GHz Tx and Rx, 1310nm, DIN Rail, for single channel transmission



Electronic Warfare / RADAR Systems

RF-over-Fiber (RToF) technology is increasingly being utilized in military radar applications due to its numerous advantages like enabling the optimal placement of antennas, (which can be positioned away from personnel and in locations that maximize signal transmission and reception), allowing the transmission of large volumes of data at high speeds thanks to the high bandwidth capacity that optical fiber links can support, (which is essential for modern radar systems that require rapid data processing and transmission) and enhancing the security by making more difficult for adversaries to intercept or jam communications.

It enables as well mobile phased arrays to operate without onboard signal processing equipment.



RF-over-Fiber transmitter, 7 GHz / 22 GHz / 40 GHz

- 0.1...40 GHz broadband system with broad temperature range (-20°...65°C)

Naval Vessels

“A city on the sea”, naval applications have both a requirement for intra-vessel communication and networking systems; as well as mission relevant systems.

The density of connectivity as well as the distances between the RF equipment and the receiver systems, make the RF-over-Fiber Series ideal for naval applications. The easily scalable RToF products ensure that the RF density requirements are met, whilst at the same time, reducing the overall cable footprint on the vessel.

The broad frequency range also ensures that the RF-over-Fiber modules can be used for Navigation, INMARSAT, COMINT, ELINT, EW and other antenna systems. In addition, relocating signal processing equipment (i.e. downconverters, digitizers) from payloads toward ship center of gravity, improves significantly its stability.



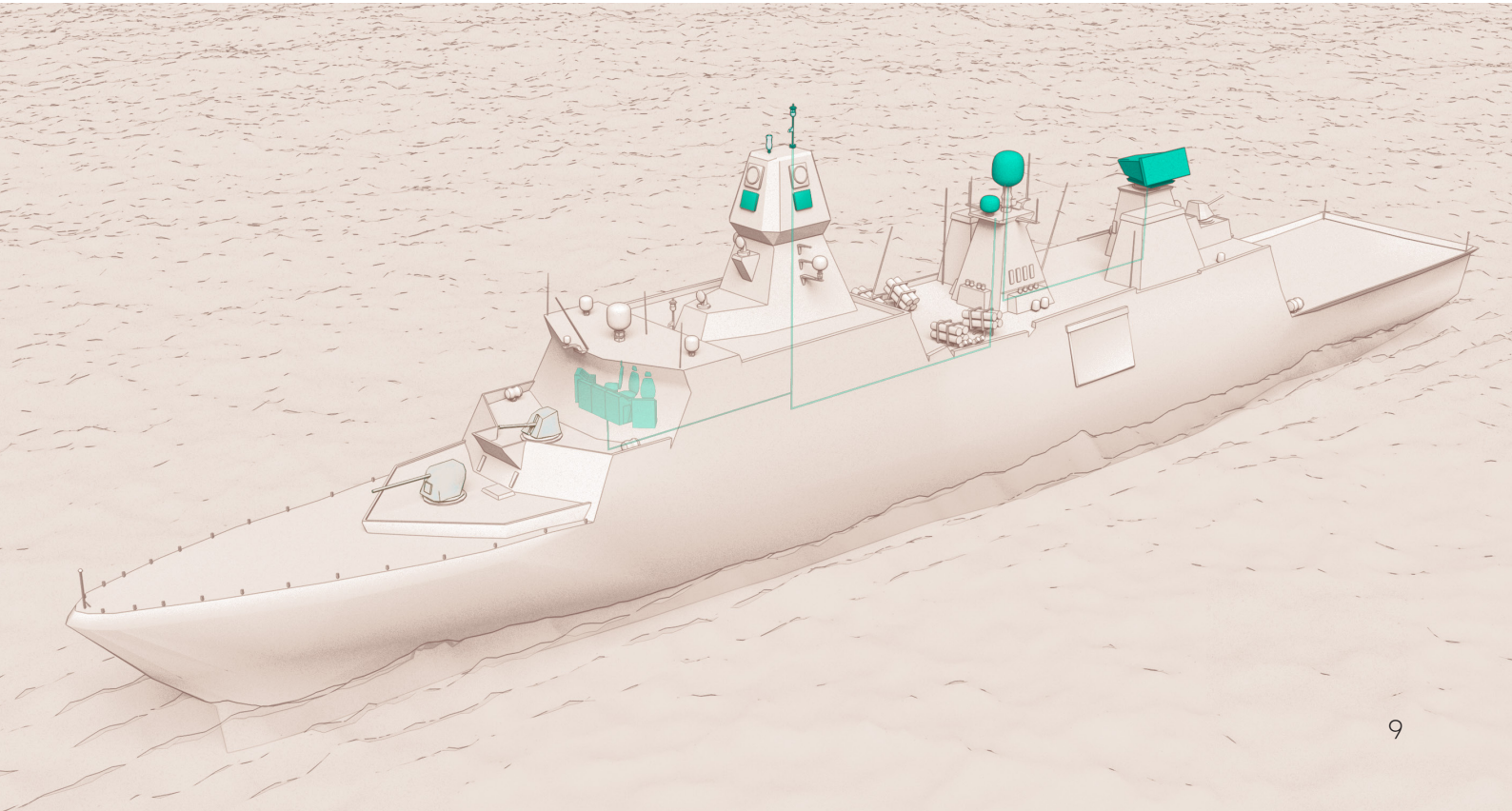
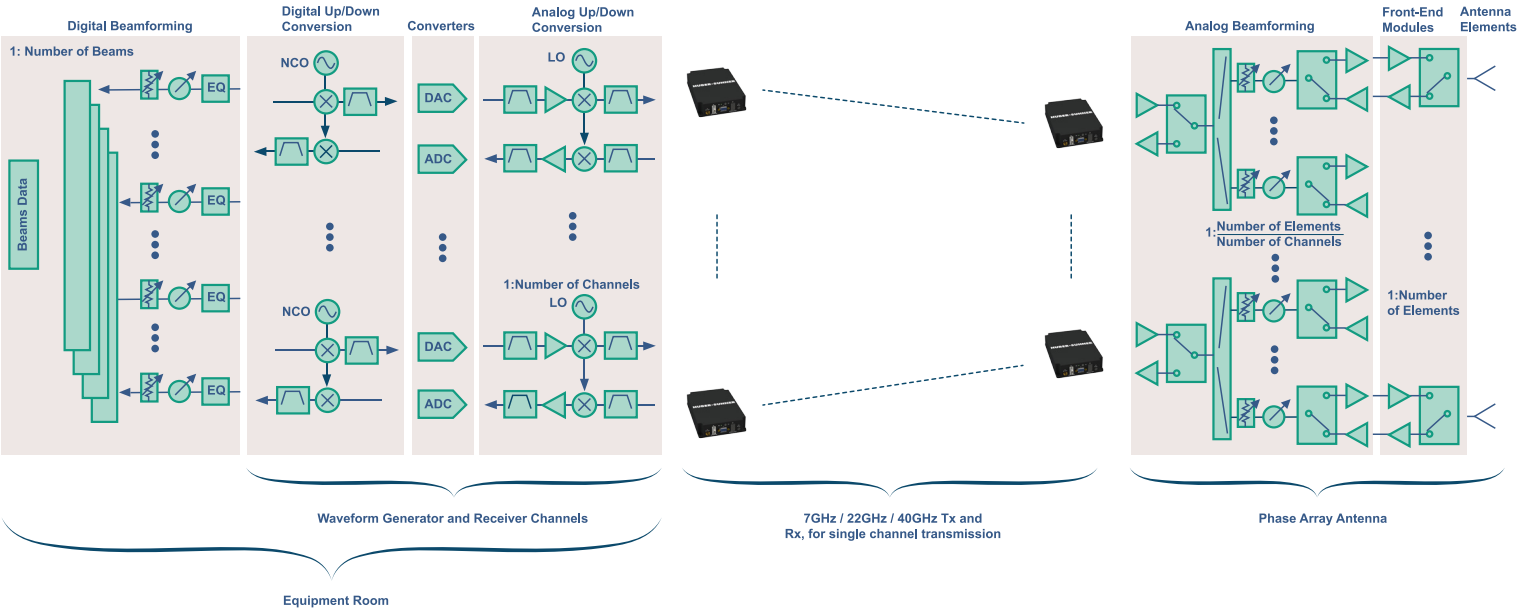
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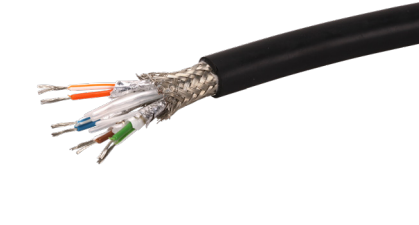
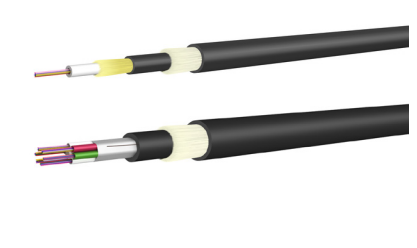
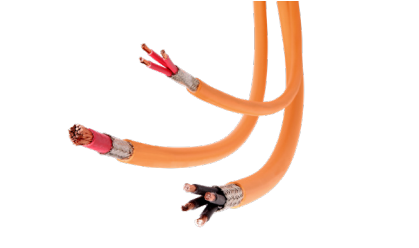
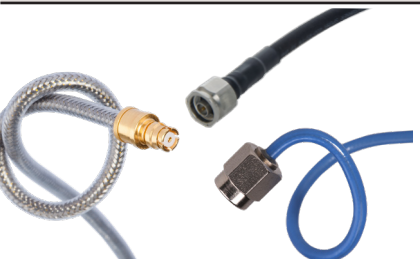
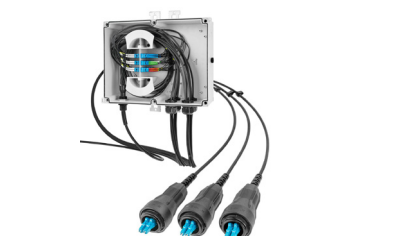
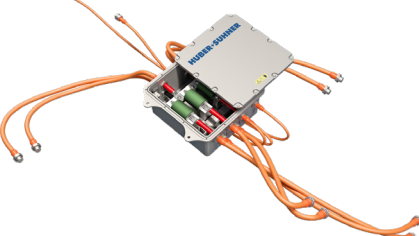
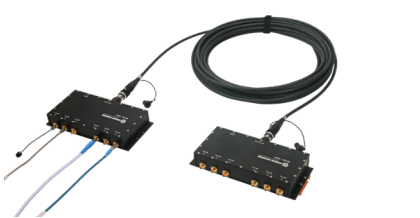
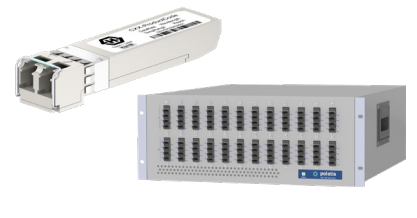
Modular RF-over-Fiber hub

- Hot swappable
- Up to 9 modules
- RToF / GNSSoF / Combiners modular functions
- Remote management



Beyond RFoF: Broad Cross-Technological Portfolio

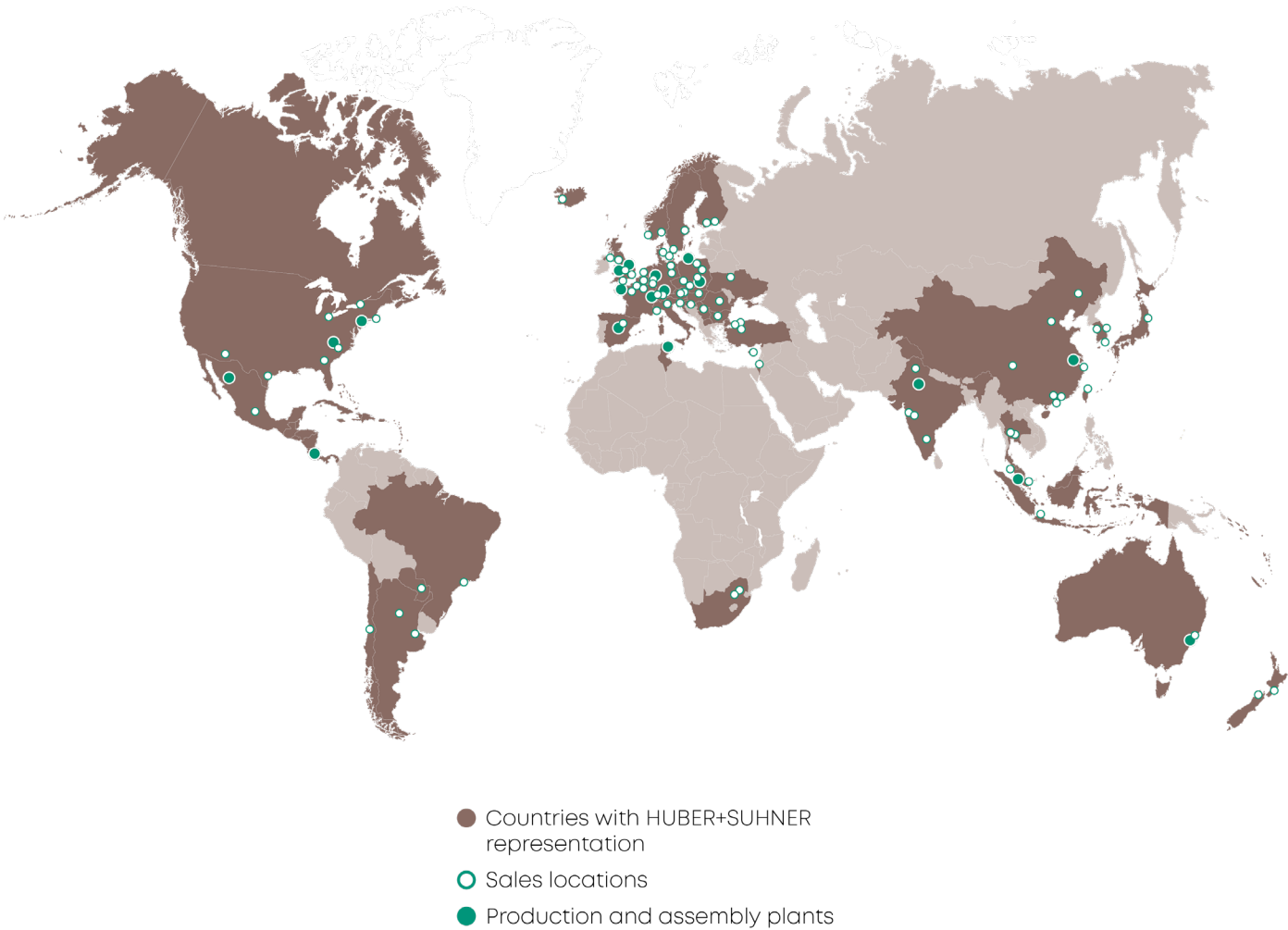
Deep vertical integration across RF, fiber optics and low-frequency components and systems.

Radio frequency	Fiber optics	Low frequency
Connectors	Connectors	Databus cables
		
Cables	Cables	High voltage cables
		
Cable assemblies	Cable assemblies	Cable harnesses
		
Antennas	Fiber distribution	Power & signal distribution
		
System solutions	Active equipment	Customized solutions
		

Heritage

With a proven track record in harsh environment applications, HUBER+SUHNER is a trusted partner, backed by extensive engineering and testing resources. We take pride in our extensive heritage providing rugged connectivity to the world's most recognized programs.

Headquartered in Herisau, Switzerland, we develop and produce products and solutions that excel in performance, quality, reliability and long service lives – even under the most demanding conditions. Through a global production network, combined with subsidiaries and representations in more than eighty countries, we are close to our customers worldwide.



HUBER+SUHNER AG
Degersheimerstrasse 14
CH-9100 Herisau
Switzerland
Phone +41 71 353 41 11
hubersuhner.com

HUBER+SUHNER is certified according to ISO 9001, ISO 14001, OHSAS 18001, EN(AS) 9100, IATF 16949 and ISO/TS 22163 – IRIS.

Waiver

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