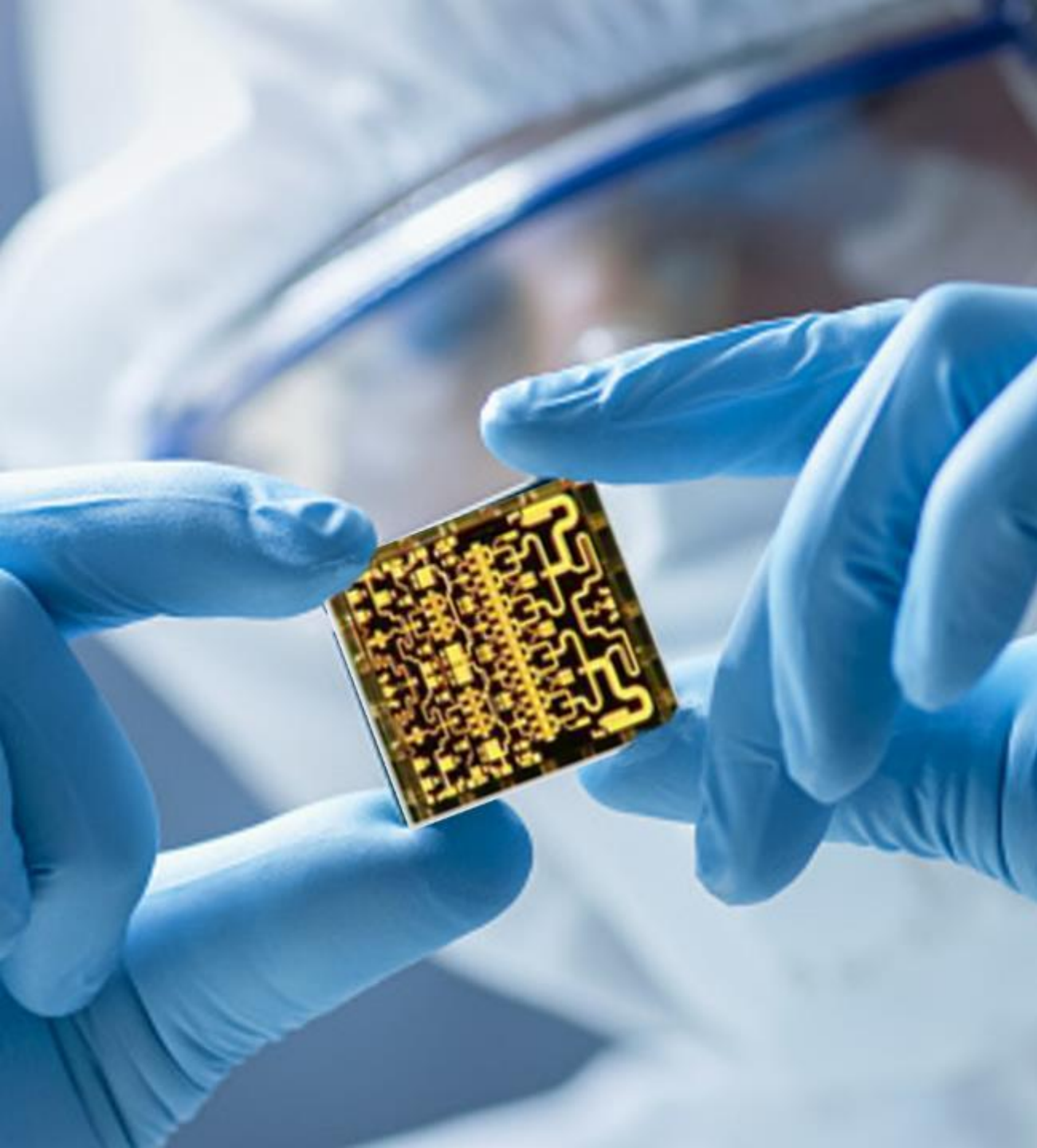




VectraWave

Corporate Presentation

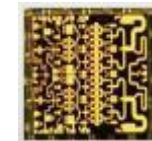


Company Profile

Company Profile

History

- **2006** Company Creation
« Innovative Technology Company » Award from the French Research Ministry (ANR/OSEO)
- **2007-2008** First run of GaAs 150nm
2 European PIDEA programs
- **2009-2012** 12W GaAs 250nm HPA MMIC
BiCMOS/SiGe High Speed coders
R&D Contracts with French MoD (DGA, ONERA)
Development of ORX via Thales Alenia Space for CNES and ESA
- **2013-2014** ISO 9001 Certification (3 year renewals in 2016, 2019 to ISO 9001:2015 by Intertek)
Opening R&D site in Lannion (French Brittany)
Ka band SSPA for SATCOM (within ESA program)
Start of International Sales – Representative network Setup
- **2017-2018** QFN GaAs Digital Attenuator (DC-18GHz) and Phase Shifter (X band)
High Speed Adaptive Network Development European Program (with Nokia, Orange, Thales, ...)
- **2019** 40W GaN/SiC HPA (X band)
RF over Fiber Link (DC-6GHz)
Ultra Wide Band Amplifier (DC-70GHz)



Company Profile

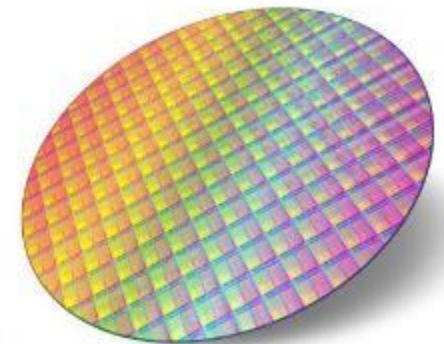
Company Product Expertise

- DC to 100GHz frequency range: L, S, C, X, Ku, Ka, Q bands
- MMIC, RFIC, EOIC: dies and packaged (QFN, Flanged, ...): Amplifiers (LNA, PA, MPA, HPA, TIA), Attenuators, Phase Shifters, MFC
- Optical products: Integrated Components, Modules and full link RFoF
- Custom Single and Multifunction Modules and Subsystems



Industrial Business Model

- Design House: Dies and packaged dies
- Modules and Systems
- Mechanical housing for modules
- Foundry partners: WIN Semiconductors, OMMIC, Tower Jazz, IHP



Company Profile

Markets and Applications

- Active Antennas
- Radars
- EW, ECM
- 5G
- Wireless backhaul – Microwave link
- Vsat / Satcom terminals
- 400G Optical communications
- Space
- Test & Measurements

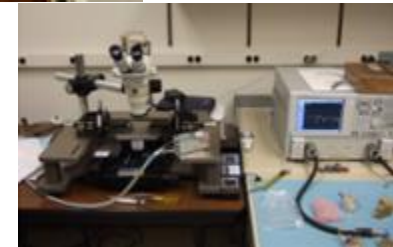
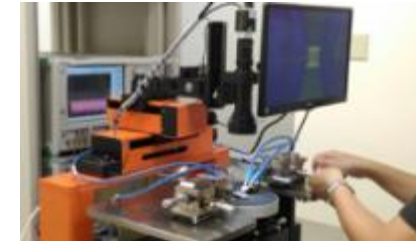


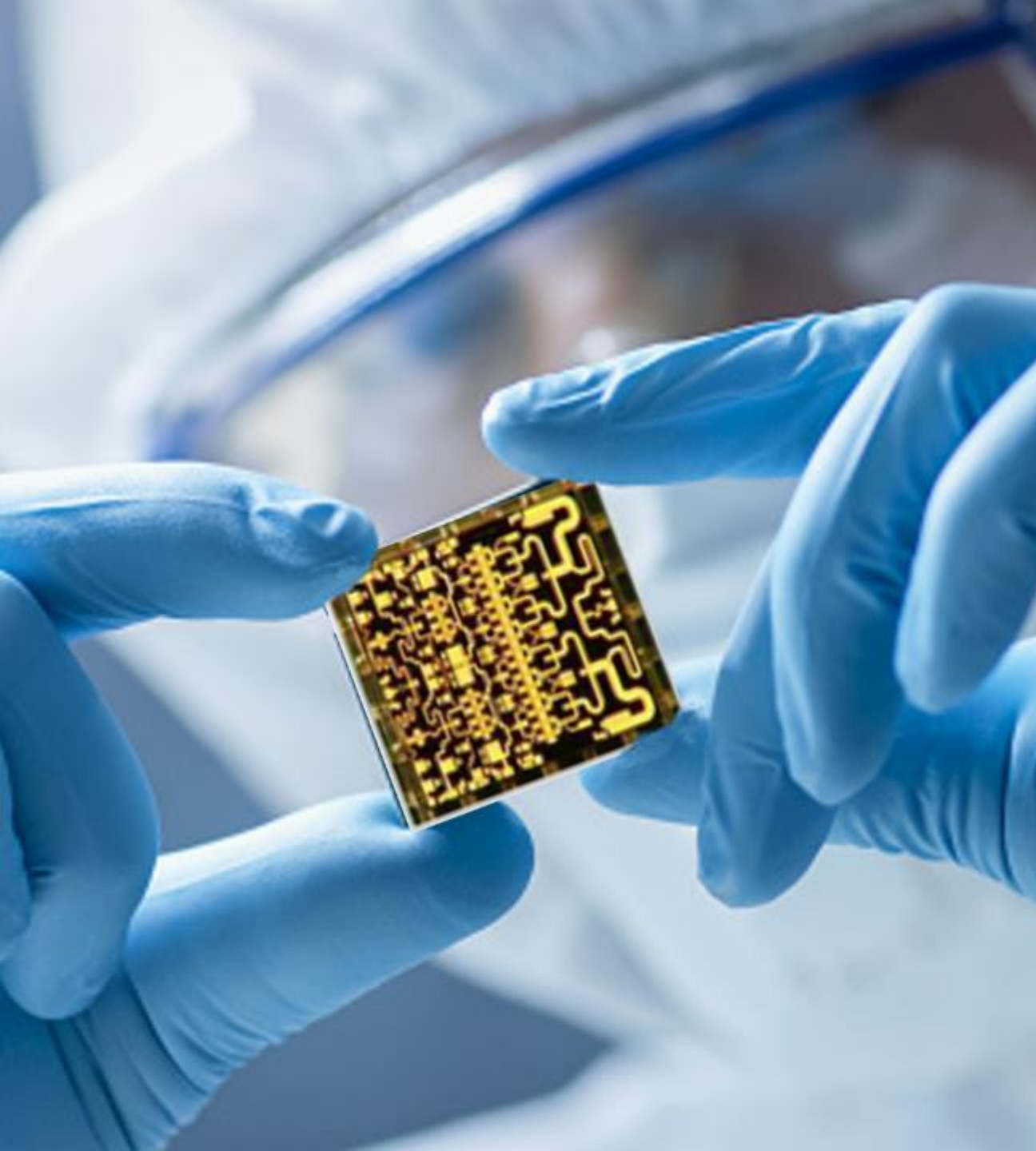
VectraWave is a European Expert in MMIC, RFIC, & Modules

VectraWave

RF, Microwave and Optical Expertises

- 14 years of expertise in RF, Microwave and Optical design
- Engineers and PhD experts in simulation and design of MMIC, RFIC, EOIC & MCM
- In-house testing equipments (VNA and Power Probe Measurements, Assembly toolings as Wire Bonder)
- Strong Design Expertise
 - Various semiconductor technologies: GaN/SiC, GaN/Si, GaAs, SOI, SiGe
 - MMIC, RFIC, EOIC
 - High performance packaging techniques (from component QFN, Flange, to connectorized Multichip Modules MCM)
 - Optical fiber products: Connectorized or coplanar housings with optimized TIA option: RFoF link, TOSA, ROSA, ORX...
 - Subsystems and MCMs (Power, Thermal, Communications ...etc.)





Sales organization and Customers

VectraWave International Market

Worldwide Customers Locations

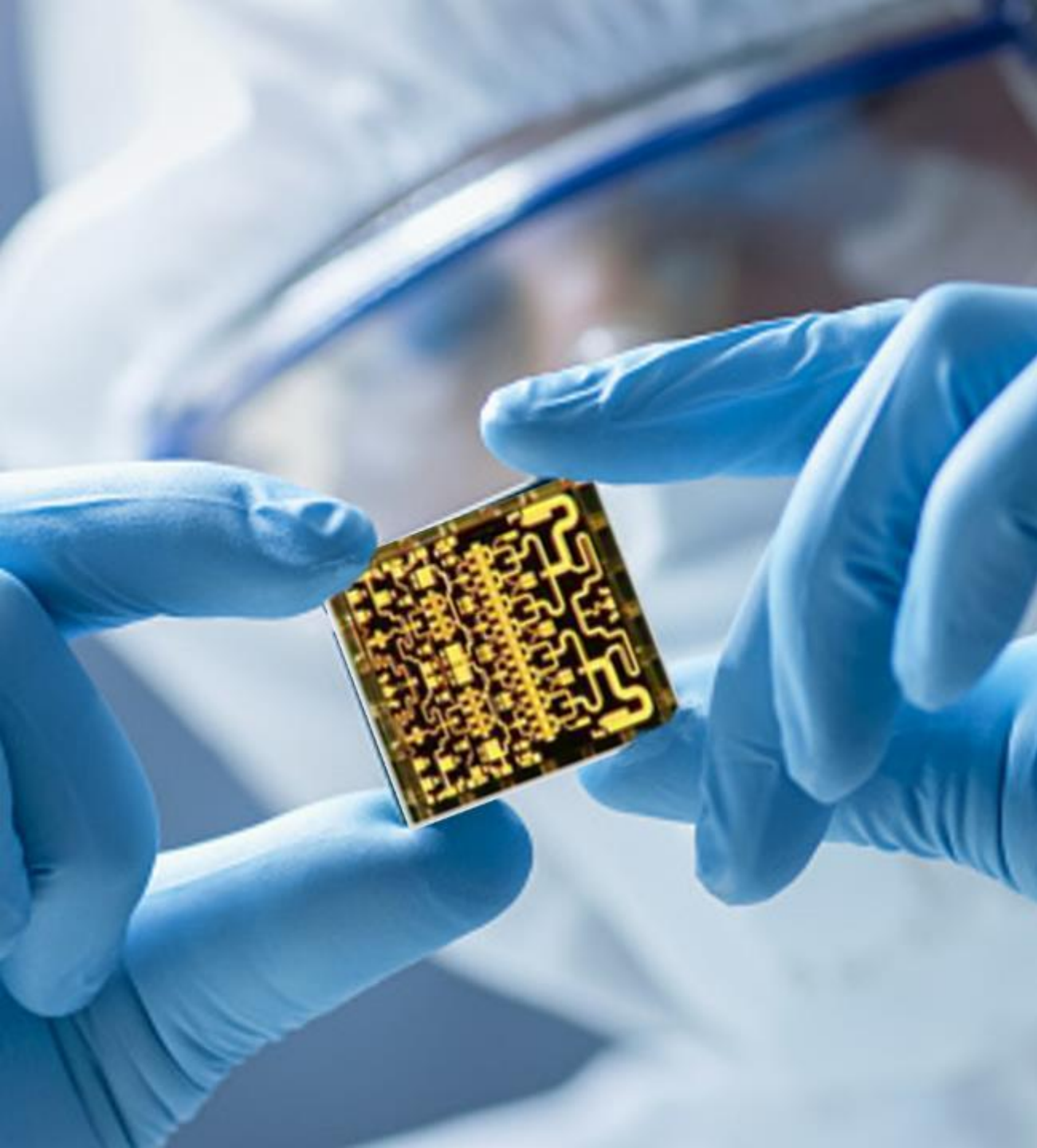
- Europe
- USA
- China
- India
- Russia
- Singapore
- Taiwan

Established Sales Network on 3 zones: Europe, USA, Asia

- Local Sales Directors
 - Europe
 - USA
 - Taiwan
- Worldwide Partners for Sales & Distribution Channels
 - Europe: France, Italy, Israel, Scandinavia, Spain, Turkey, UK, ...
 - USA
 - Asia: China, India, Japan, Singapore, Taiwan

Some Customers





Products

MMIC Products

Amplifier

- Low Noise Amplifier
- Medium Power Amplifier
- High Power Amplifier (Power range up to 40W X band)
- Gain Block Amplifier
- Ultra Wide Band Amplifier (Up to DC - 70GHz band)
- Trans-Impedance Amplifier

MFC (Multi Function Chip)

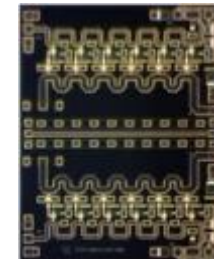
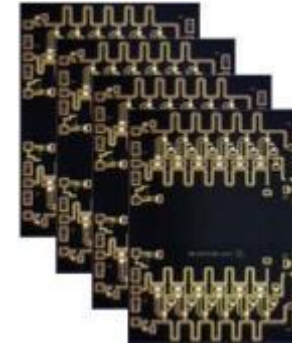
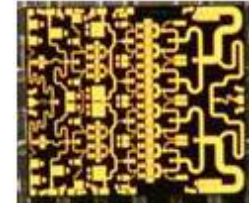
- X band
- Integrates:
 - Tx & Rx Switches
 - LNA, PA, MPA, HPA
 - Digital Attenuator
 - Digital Phase shifter
 - Digital Control Logic

Attenuator

- DC-18GHz, 5 bit control

Phase Shifter

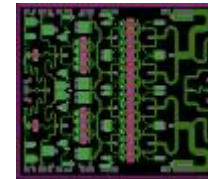
- X band , 6 bit control
- X band with analog control



MMIC Products

MMIC and RFIC Configurations

- Dies
- Packaged Dies:
 - QFN
 - Flanged
 - SMD
 - Module (see MCM)



Support

- Application Notes
- S2P files
- Evaluation Boards



MCM Products

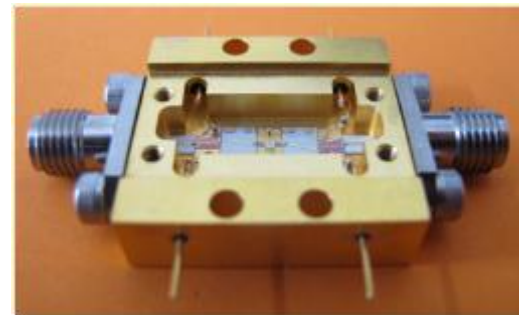
Amplifier Modules

- Medium Power Amplifiers (Up to +27dBm)
- Ultra Wide band Amplifier (Up to 40kHz – 65GHz band)



Frequency Doublers

- 20 – 30GHz and 50 – 65GHz output frequency band



Optical Products

RF over Optical Link (RFoF)

- 5 – 6GHz IDO/ODU transceiver
- 50kHz – 6GHz TOSA – ROSA full link



Optical Receiver ORX

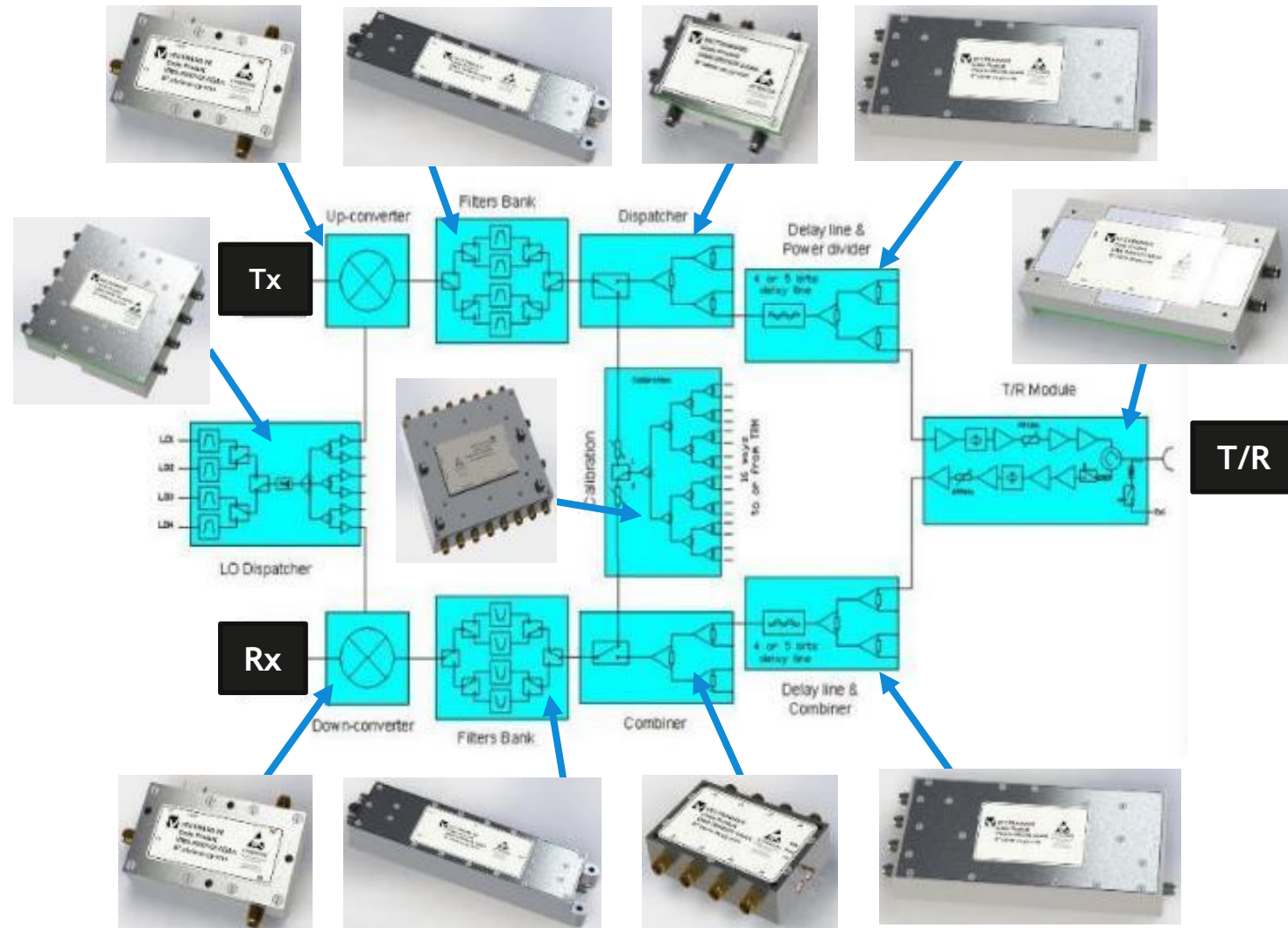
- S and C narrow band ORX
- Wide band ORX (0.1 – 35GHz) and up to 50GHz
- Possible TIA Integration
- Various output connections and housings: Coaxial, Coplanar, etc...



Custom Subsystems

Single Function Modules or Subsystems

- T/R Power Module
- SSPA
- Up/Down Converter
- Filter Bank
- Delay Line
- Combiner / Splitter





Thank you!



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