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arralis.com

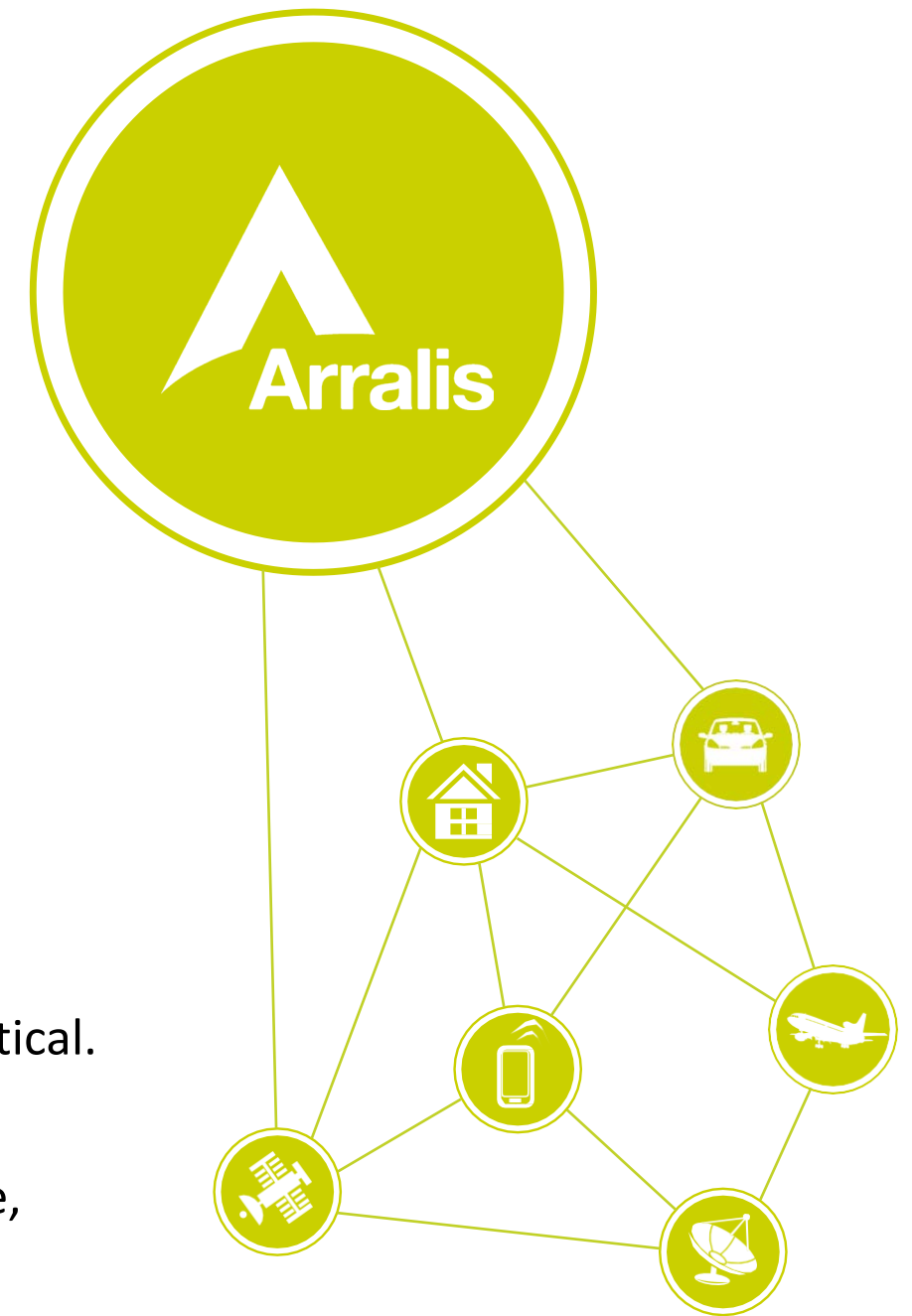
Technology **for a connected future**

Arralis provides world leading expertise in RF, Microwave, and MMwave technology. We have offices in Belfast and Swindon in the UK, Limerick Ireland and in Daytona Beach, Florida, USA.

Arralis excels in Monolithic Microwave Integrated Circuits (MMICs), packaged component modules, proprietary antenna technology and integrated radar and communications front-end platforms.

Arralis products are the ultimate in precision and innovation in both terrestrial and space environments where accuracy and reliability are critical.

Arralis works with some of the world's largest agencies in the aerospace, defence, and communications sectors.



Arralis Locations

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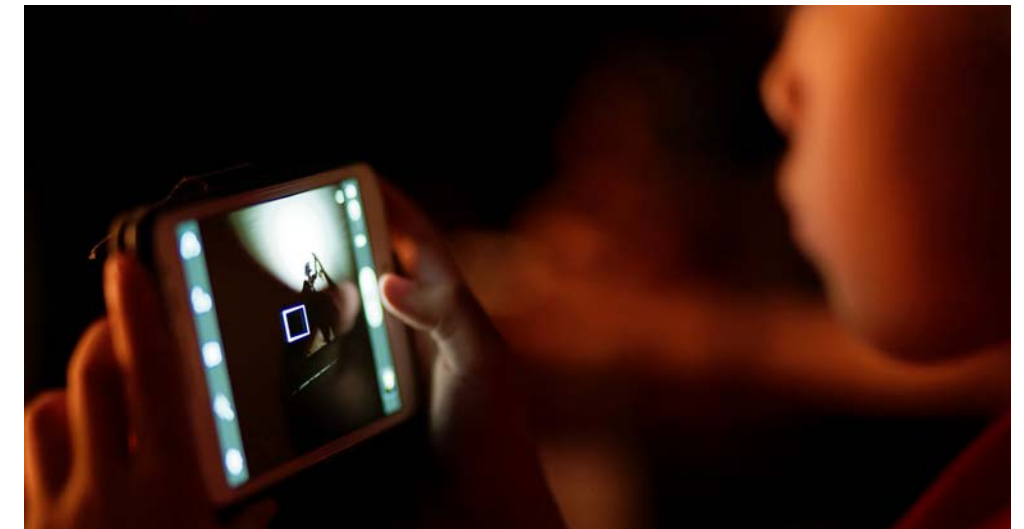


Why **Millimetre-waves**?

Millimetre-wave technology has many benefits, small size, wide bandwidths (high data rate) high resolution and antennas that can be barely seen!

Until now, millimetre wave has been the preserve of the military due to its cost and difficulty in manufacture.

Arralis brings millimetre wave to the masses, including commercial and non governmental organisations, with lower cost, high performance solutions that have multiple applications including radar for commercial and military vehicles, antennas and systems for satellite communications.



Accelerating the worldwide transition to **millimetre-waves technology**



W band

Our W band product portfolio is world leading and was developed under contract with the European Space Agency. The highly desirable attenuation window at 94GHz allows for the development of very high-resolution radar and massive data rate wireless communications with very small antenna and systems. Our W band precision radar applications enables Enhanced Flight Vision Systems for helicopter landing assistance in the presence of rotor down-wash and for precision surveillance.



Arralis - Connecting everyone and everything

Accelerating the worldwide transition to **millimetre-waves technology**

Ka band

Our Ka band product portfolio was also developed under contract with the European Space Agency and includes a packaged transceiver for satellite communications applications. As a result of this work our MMIC portfolio now includes multi-function chips, such as LNAs, PAs, mixers and frequency dividers, now designed in the 17-21GHz and 27-31GHz frequency bands. Our prestigious analogue phase shifters enable the design of flat, electronically steerable Ka band antennas.



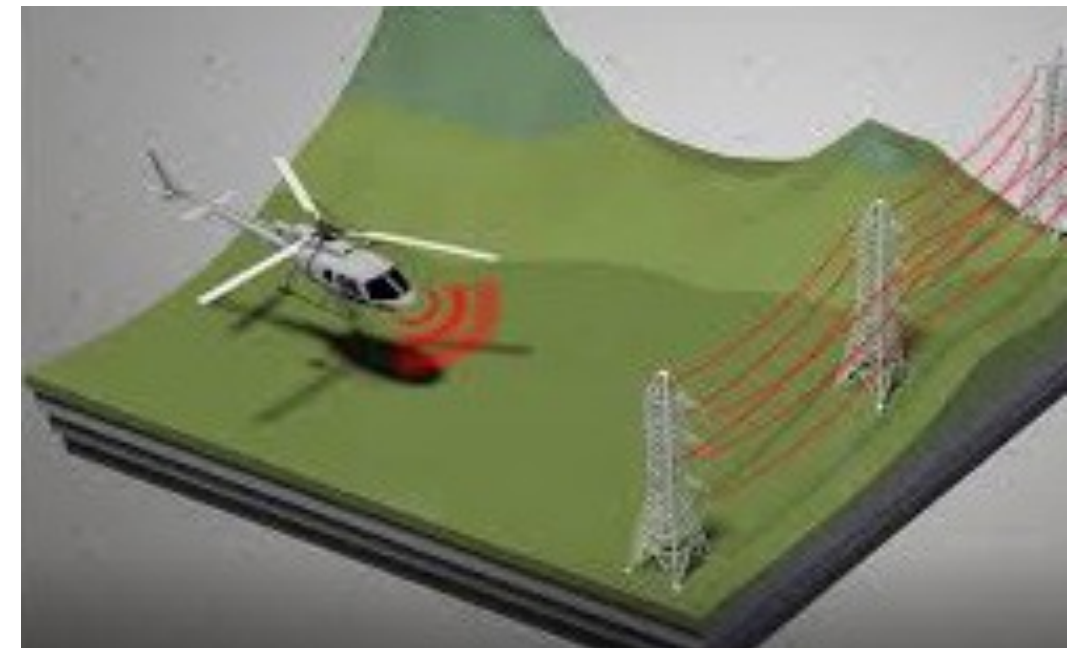
Accelerating the worldwide transition to **millimetre-waves technology**



E band

Our E band development is based on building a complete chipset and fully integrated E band radar system for use in vehicles and aircraft that require high resolution, high accuracy radar.

The radar is unique in offering wide angle azimuth and elevation 3D scanning and, unlike LIDAR, is all-weather. Enables synthetic vision for rotorcraft landings in poor visibility conditions and also enables detection of obstacles such as electricity pylon cables to assist safety of flight operations.



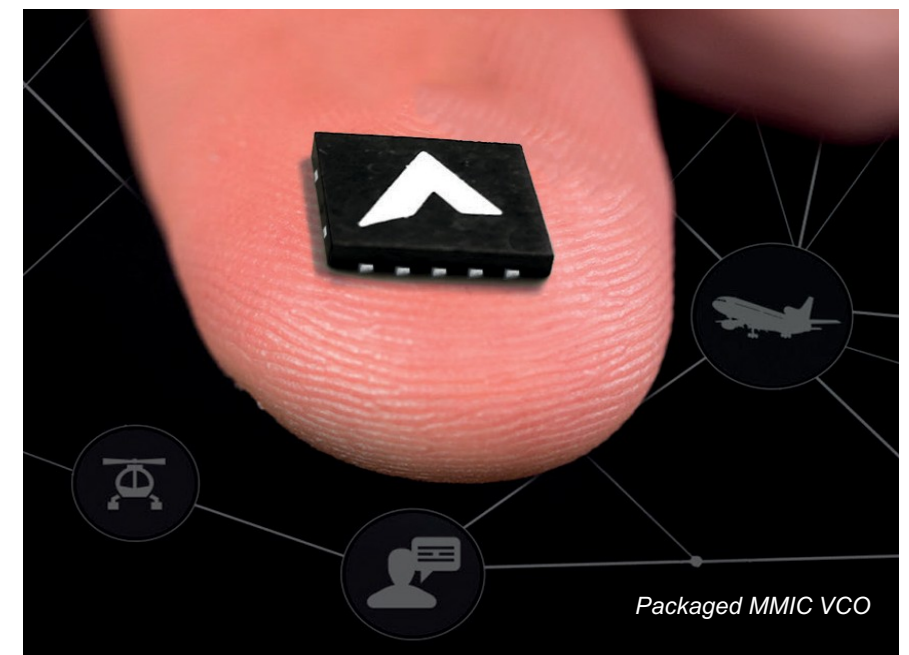
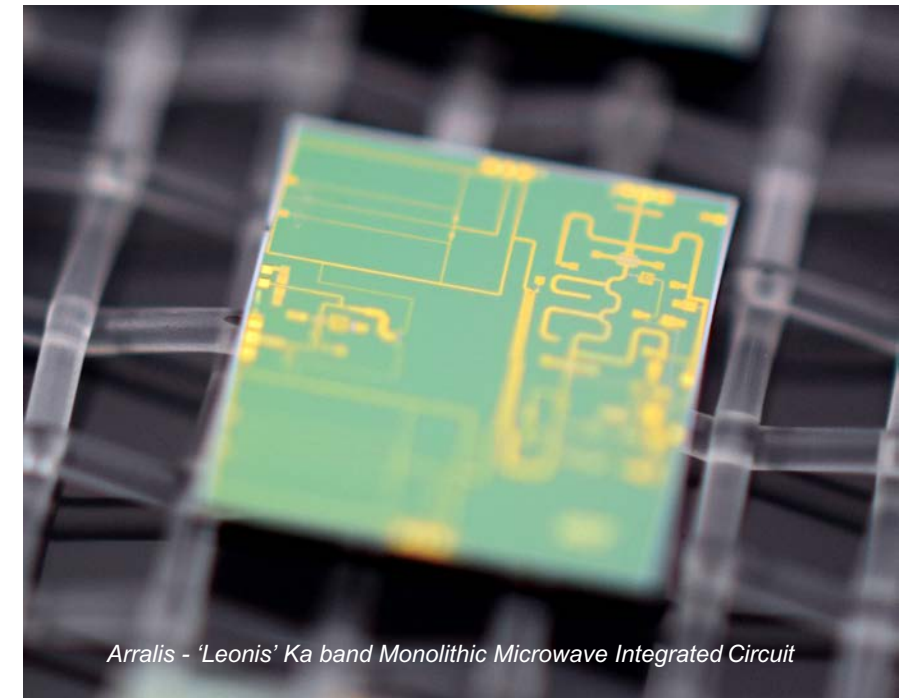
MMICs & MMw electronic components

Monolithic Microwave Integrated Circuit (MMIC)

Arralis design the world's widest range high frequency semiconductor chips (MMICs) up to 96GHz.

A MMIC (sometimes pronounced "mimic"), is a type of integrated circuit (IC) device that operates at microwave frequencies. These devices typically perform functions such as microwave mixing, power amplification, low-noise amplification, and high-frequency switching, are dimensionally small and can be mass-produced.

Our Chips are fabricated using gallium arsenide (GaAs) a III-V compound semiconductor. It has two fundamental advantages over silicon (Si), the traditional material for IC realisation: device (transistor) speed and a semi-insulating substrate. Both factors help with the design of high-frequency circuit functions giving high power and very low noise devices.

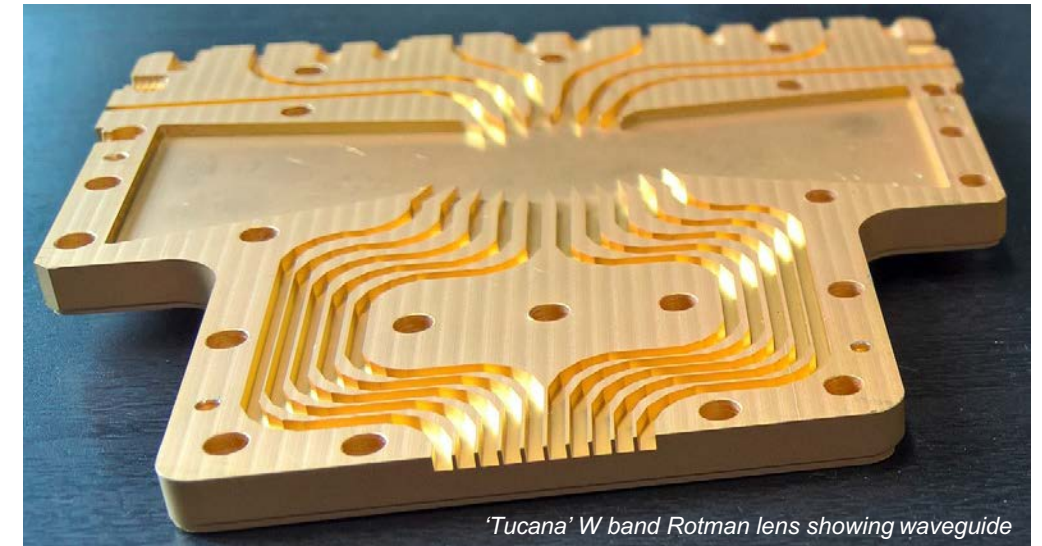


Packaged modules and **subsystems**

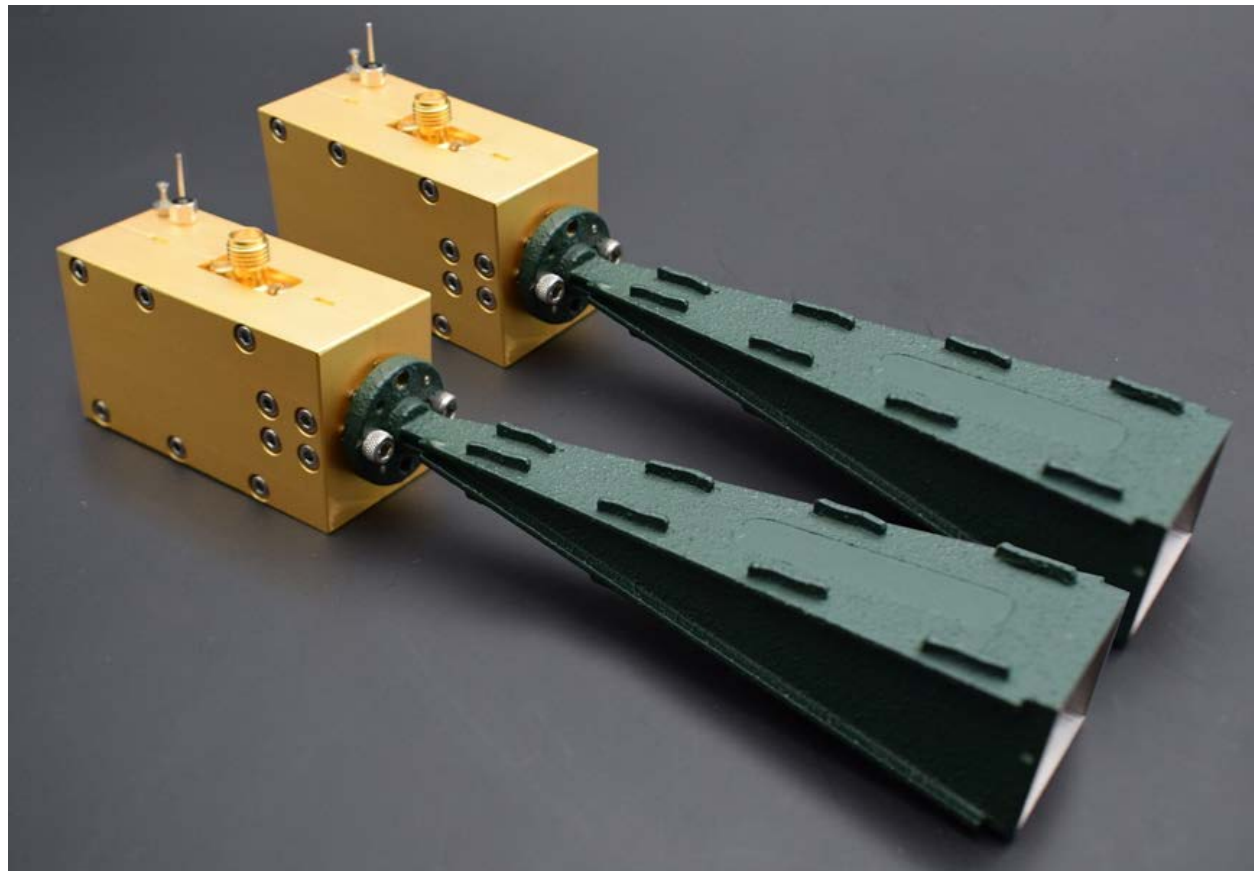
Developing leading edge MMICs means Arralis can offer cutting edge modules and subsystems.

Our range of sub-systems are complete transceiver units at millimetre-wave frequencies with built in phase array beam scanning or fixed antenna. There are two systems available; tailored for Gb/s communications or high definition radar. The systems have built-in millimetre-wave devices with frequency multipliers, modulation schemes and power conditioning boards.

Various antenna options are available, the beam scanning is done with a Rotman lens, tracking with a mono-pulse arrangement and high gain applications with a horn, where a secondary reflector can easily be accommodated.



Packaged modules and **subsystems**



Tucana W band Tx and Rx packaged module with horn antenna



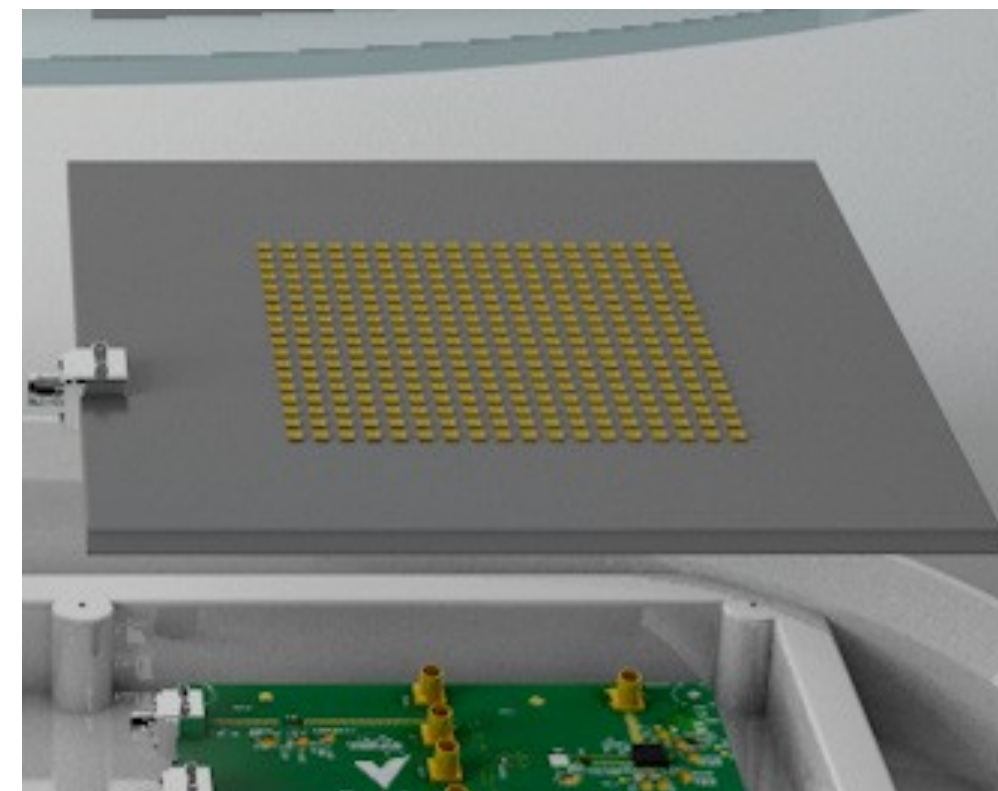
Tucana W band Tx packaged module

Flat **Antennas**

Arralis develop and manufacture a wide range of custom state of the art flat beam steering antennas.

A flat antenna has many advantages and benefits, for example, on an aircraft the antenna can fit in with the form and shape of the aircraft without affecting drag and therefore fuel consumption. For on the move solutions and connected autonomous vehicles, a flat antenna enables a low cost and high-speed satellite reception anywhere without the need for a mobile signal.

Arralis has developed a unique Ka band chipset that enables the realisation of flat and low-profile antennas from small short-range designs that can be scaled up to large high gain arrays. Moreover, the antennas are electronically beam steered with no moving parts and, in most circumstances, can replace a dish with its bulky electro-mechanical hardware.



'Leonis' Ka band beam steering antenna prototype

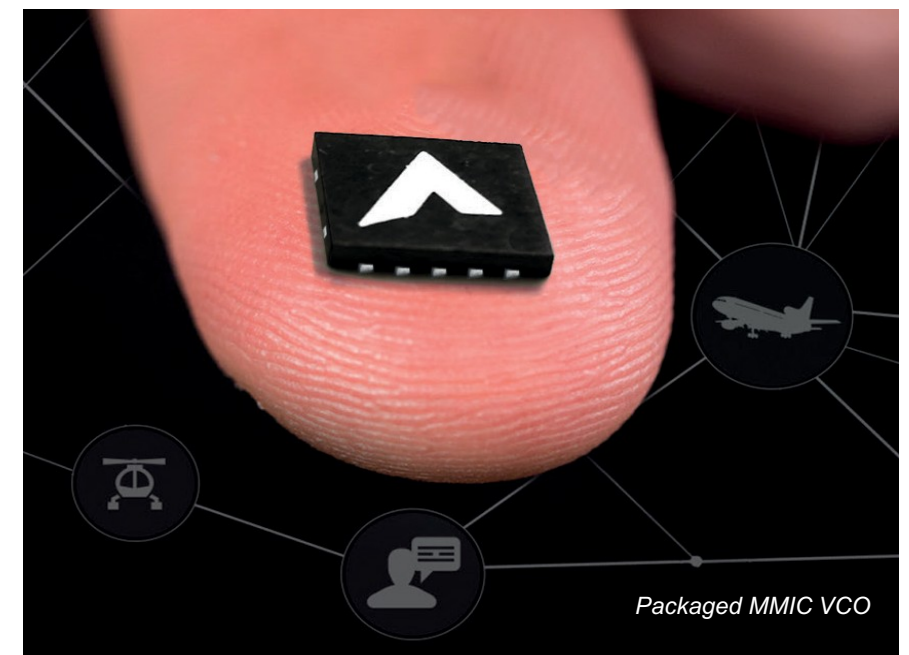
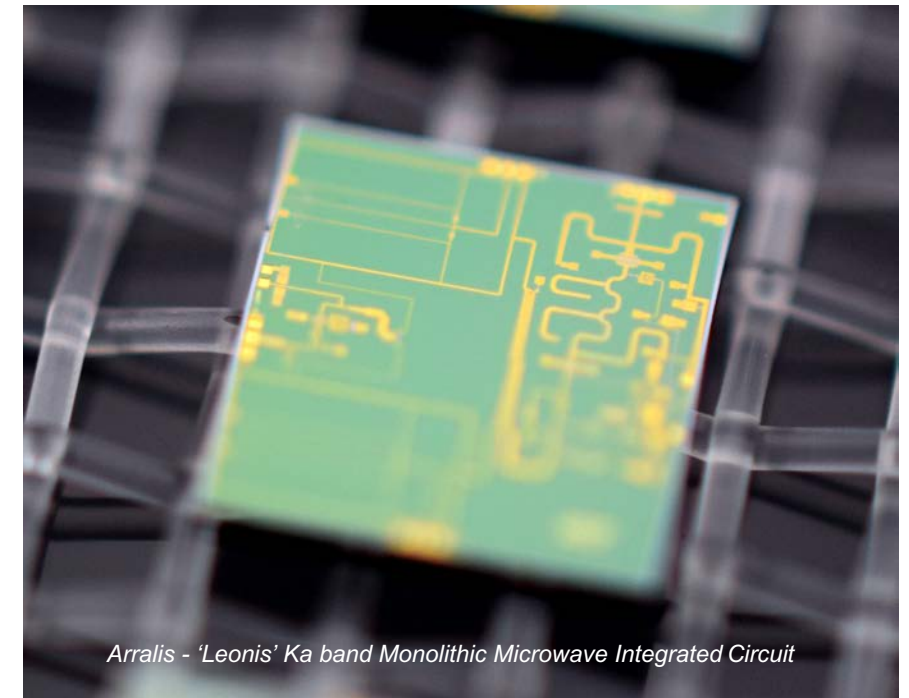
MMICs & MMw electronic components

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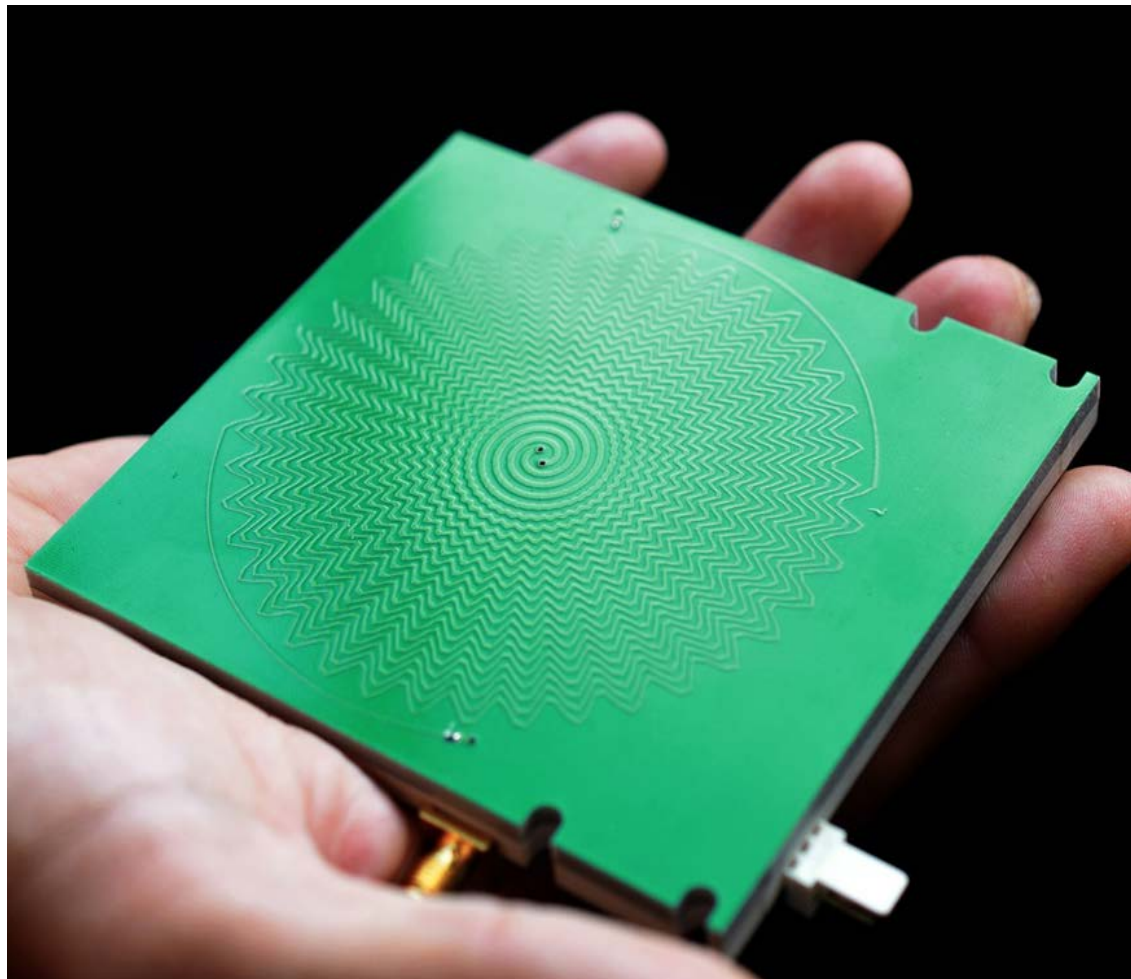
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Multiband GNSS **Antenna**

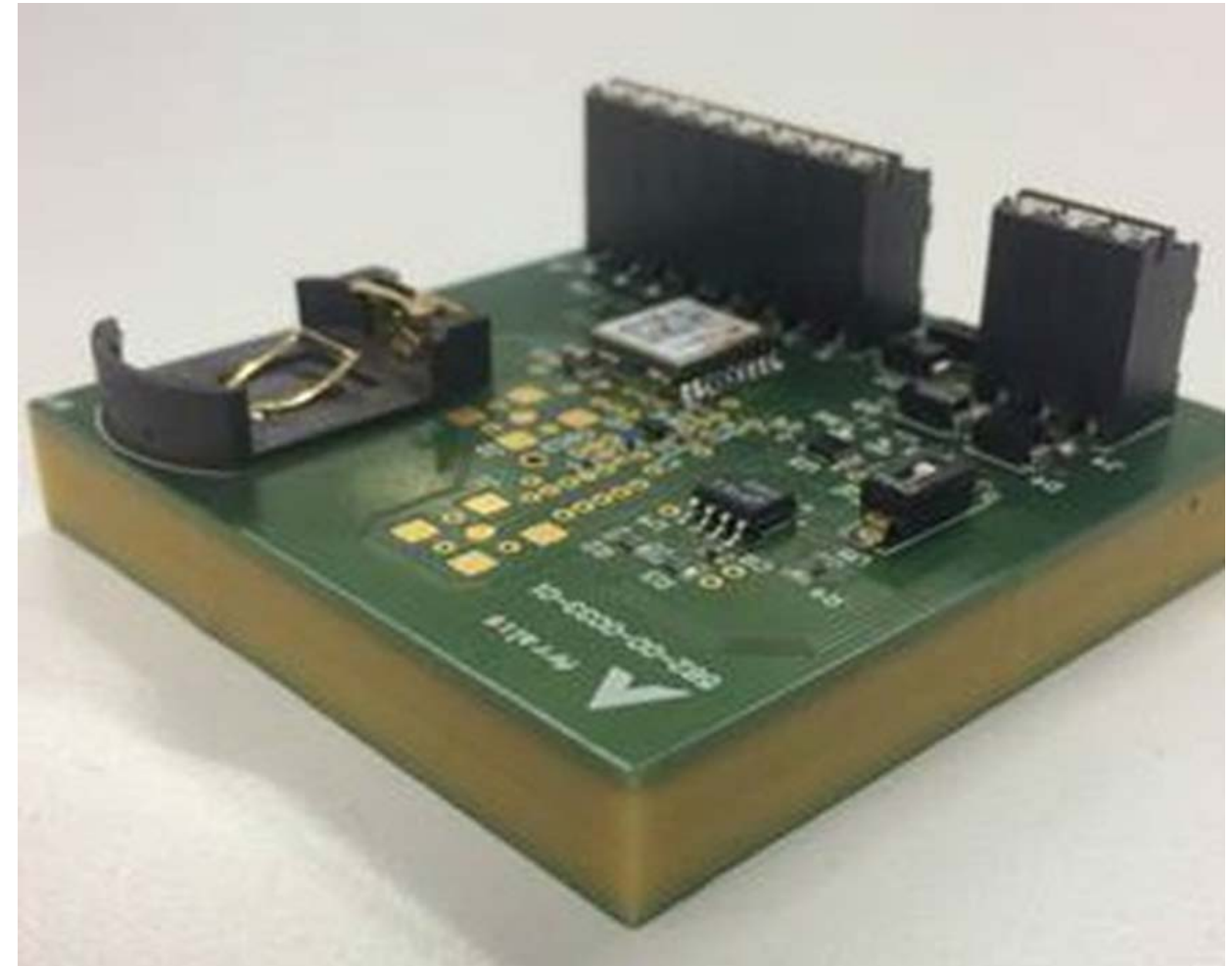
with integrated LNA option



'Sirius' multiband GNSS antenna

BeiDou GNSS **Antenna**

With improved DOP



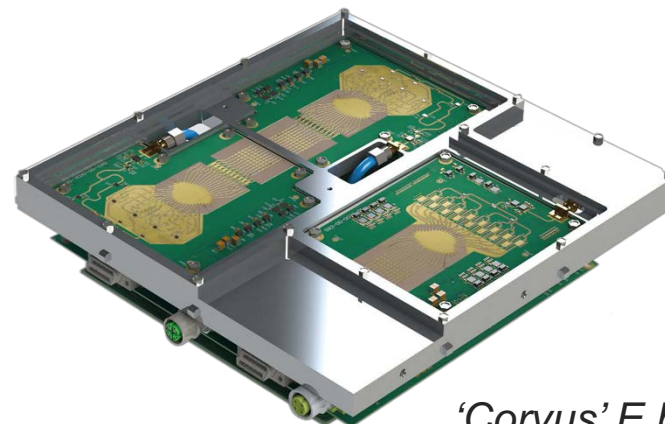
'Sirius' multiband GNSS BeiDou antenna with integrated Receiver

Fully Integrated **RF Frontends**

Arralis front ends take the pain out of developing millimetre wave products enabling fast to market solutions for system builders. The front ends are fully enclosed assemblies that have millimetre wave inputs and outputs but with connections to the balance of systems via low frequency IF's (in the case of radar), low frequency beat signals (in the case of FMCW systems) IQ inputs and outputs for high data rate communications. Even digital interfaces can be supplied to end users who have no RF skills at all.



'Tucana' W band FMCW radar (2019 Prototype)



*'Corvus' E band
3D Scanning radar*



'Leonis' Ka band transmitter

Ka band **Integrated transceiver for SmallSat**

Satellite to ground, ground to satellite communications solutions

System Highlights

- Waveguide Interface with 20W Solid State PA
- High performance, Low Noise Transceiver Core
- Low Noise Receive Front End
- Turn-key 'Plug and Play' System works with almost any Modem
- Covers the whole 17-21 and 27-31 GHz Band with user specified filtering as required
- Digital Pre-Distortion and Unmatched Linearity and Efficiency



Leonis' Ka band transceiver shown in an Arralis fully Integrated System

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