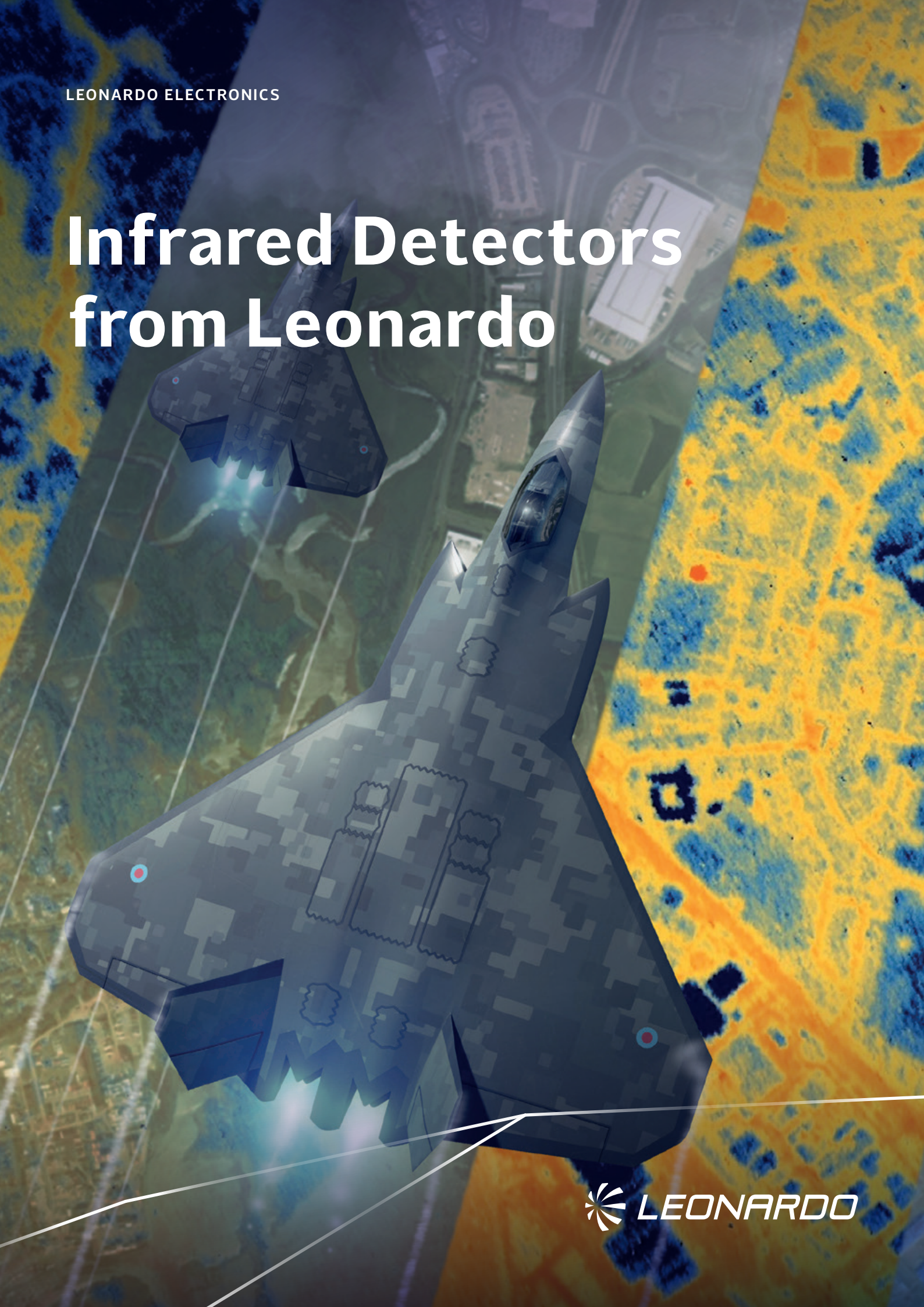
LEONARDO ELECTRONICS

Infrared Detectors from Leonardo



LEONARDO

LEONARDO

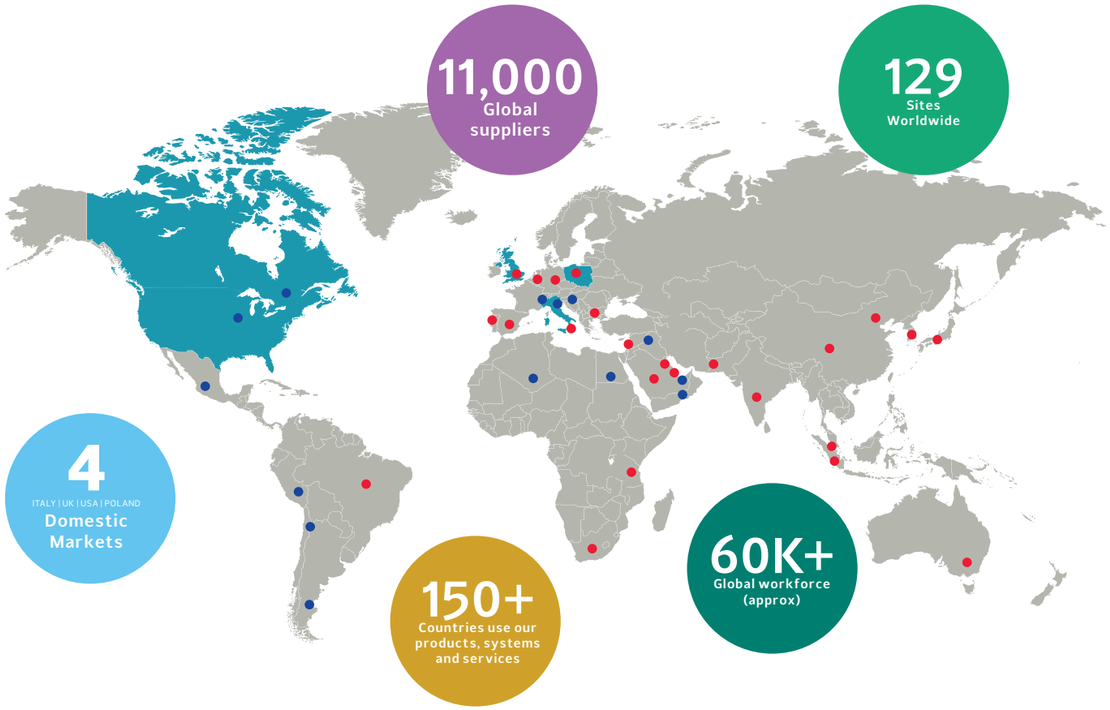
Leonardo is an international industrial group that delivers multi-domain technological capabilities for global security. A key player in the leading strategic Aerospace, Defence and Security programmes, it employes over 62,000 people worldwide.

The company has a significant industrial presence in Italy, the UK, Poland and the US, and it also operates in 150 countries through subsidiaries, joint ventures and investments. Leonardo is a technological and industrial partner of governments, defence administrations, institutions and companies.

Within the Defence Electronics business area, Leonardo produces multi-domain solutions for surveillance, security, and the protection of deployed forces and critical infrastructure, developed to counter traditional and unconventional threats, including the most advanced threats such as drone swarms (C-UAS), hybrid threats and hypersonic missiles, through the native use of artificial intelligence. The company also develops sensors, C4ISTAR systems and self-protection equipment capable of ensuring the operational effectiveness of complex systems in any context, thanks to comprehensive situational awareness and information superiority.

Subsidiaries (Leonardo International)

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Kenya
Kuwait
Malaysia
Pakistan
Poland
Portugal
Qatar
Romania
Saudi Arabia
Singapore
South Africa
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Spain
Turkey
USA



Regional Offices

Algeria
Argentina
Austria
Chile
Egypt
Germany
Hungary
Mexico
Oman
Peru
Turkey
UAE

LEONARDO INFRARED DETECTORS

Leonardo's dedicated Centre of Excellence in Southampton (UK) designs and manufactures high-performance infrared (IR) detectors.

With heritage dating back to the origins of semiconductor development in the 1950s, Leonardo's Southampton site today is a world-class state-of-the-art facility representing the UK's sovereign capability in the design, development and manufacture of high-performance IR detectors.

Built on decades of materials science and engineering expertise, Leonardo's Southampton site is an established hub for infrared innovation, specialising in cooled 2-dimensional (2D) Mercury Cadmium Telluride (MCT) Focal Plane Array (FPA) detectors and single element DLATGS (Deuterated L'Alanine doped Triglycene Sulphate) Pyroelectric detector technologies.

Leonardo's cooled infrared detector solutions are integral to the world's most sophisticated thermal imaging programmes. By maintaining primary links with global research institutions and industry leaders, we continue to provide mission-critical infrared detector technology in all areas of Defence and Security, Space Exploration and Astronomy, and high-performance infrared Spectroscopy.





CORE TECHNOLOGY

Leonardo's in-house capabilities extend from growth of raw materials from chemical elements, through array processing, semiconductor hybridisation, integration of detector components, to vacuum dewar assembly and extensive environmental and electro-optic testing. Our vertical integration enables us to ensure consistent quality of critical operations at every stage of each manufacturing process.

Our world class MCT Photovoltaic (PV) material technology enables high-definition thermal imaging across all infrared spectral bands from SWIR, MWIR to LWIR and DWIR.

The unique pixel geometry of our MCT arrays achieves exceptionally sharp imagery while minimising optical and electrical crosstalk.

In addition, we have advanced this technology with superior MCT designs to create Avalanche Photodiode (APD) arrays. These offer high electrical gain per pixel without increasing noise, providing significant advantages for low-radiation and high-speed applications in both the SWIR and MWIR wavebands.

Specialised Capabilities – Cooled Infrared Detectors

Leonardo's Southampton site houses the skills and expertise at every level of infrared detector design and production which enables us to offer the ultimate detector solution to meet our customers' specifications:

- → MCT crystal growth by Metal Organic Vapour Phase Epitaxy (MOVPE) enabling custom MCT production
- → Adaptable wavebands from SWIR, MWIR to LWIR and DWIR
- → Advanced MCT wafer processing producing 2D arrays of 2k x 2k pixels, and larger
- → Precision bonding of silicon ROICs to MCT arrays
- → Hermetic encapsulation providing high integrity vacuum dewar integration with a range of cooling options
- → Electro-optic and environmental testing conducted to recognised industry standards
- → Flexible supply of arrays, sub-assemblies or fully Integrated Detector Cooler Assemblies (IDCA)
- → Enhanced proximity electronics available across our range of detectors
- → Standard products and custom solutions - supplying production detectors across all wavebands, as well as detector developments tailored for specific customer applications



DETECTOR PRODUCTS

Leonardo's Southampton site produces a diverse range of infrared detectors, from single element pyroelectric detectors to large format cooled 2D Focal Plane Array detectors. Our cooled detectors are available in a range of formats from Half TV to >2k x 2k, and pixel pitches from 24µm to 8µm.

- → SWIR Detectors are optimised for high sensitivity and widely used for scientific and astronomical applications
- → MWIR Detectors are the most common choice for 24/7 passive imaging available in compact HD formats
- → LWIR Detectors are engineered to provide a tactical advantage when imaging through atmospheric aberrations such as smoke and turbulence
- → DWIR Detectors are sophisticated sensors incorporating both MWIR and LWIR technology in a single unit
- → DLATGS single element pyroelectric detectors for broad spectral range FTIR spectrometer instruments

At Leonardo we work with our customers to find the optimum detector solution from our range of production detectors or by working in partnership to develop a unique product to meet specific operational requirements.

DEFENCE & SECURITY

Leonardo's high performance IR detectors are employed in many international defence and aerospace programmes, supporting applications such as surveillance, missile guidance, target acquisition and platform protection.

Developed for both Leonardo's in-house systems and global defence partners, detectors are integrated into a range of airborne, naval and land-based EO/IR solutions. Their advanced infrared sensing capability underpins mission-critical performance across a broad spectrum of defence and security platforms worldwide.

Electro-Optical/Infra-Red (EO/IR) systems for military platforms

IR detectors are core components in Leonardo EO/IR surveillance systems, target acquisition, and thermal imaging systems used on land, airborne and naval platforms. These systems provide 24/7 situational awareness and targeting support for armed forces worldwide.

Missile seekers and guidance systems

Leonardo has a long heritage in infrared imaging and guidance seekers where detectors developed in Southampton are used for missile guidance and precision targeting. These technologies are part of missile programmes supplied to international customers.

Air defence and airborne protection

Leonardo IR detectors contribute to systems such as infrared search and track (IRST) and direct infrared countermeasure (DIRCM) systems that protect aircraft against IR-guided threats. These are deployed on nations' combat aircraft and support NATO allied fleets.

Broader defence and security applications

IR detectors underpin counter-UAS and wide-area surveillance systems and are integral to Leonardo thermal imaging cameras in Falcon Shield and Nerio systems. Leonardo infrared detectors are also integrated in border, coastal and critical infrastructure monitoring solutions, as well as EO/IR sensor suites in surveillance and targeting pods on allied military aircraft and helicopters.



SPACE EXPLORATION

Leonardo's infrared detector technologies support some of the world's most demanding space science and astronomical missions. With over 50 years of heritage in the space industry, the team at Southampton delivers detector solutions that enable breakthrough insights across Earth observation, planetary science and deep-space astronomy. Combining cutting-edge semiconductor expertise with rigorous space-grade engineering and close collaboration with international partners, Leonardo plays a pivotal role in turning ambitious scientific objectives into reliable flight proven instrumentation, leveraging international Programmes for Earth Observation, Scientific Exploration and Telecommunications and Navigation.

NASA's 2024 PACE (Plankton, Aerosol, Cloud, ocean Ecosystem) mission

Leonardo supplied specialised MCT infrared detectors for NASA's 2024 PACE mission (Plankton, Aerosol, Cloud, ocean Ecosystem) as part of the Ocean Colour Instrument on the spacecraft. These detectors are SWIR and their high sensitivity enables the instrument to observe ocean colour and properties with much greater detail than previous missions.

Infrared Atmospheric Sounding Interferometer New Generation (IASI-NG)

Leonardo supplied a suite of MCT infrared detectors for the Infrared Atmospheric Sounding Interferometer New Generation (IASI-NG) instrument produced by Airbus Defence and Space, France. This instrument launched in 2025 is carried on the European MetOp-SG(A) weather satellite and plays a crucial role in meteorology and climate monitoring to measure temperature, humidity, clouds, greenhouse gases, aerosols and trace gases in the Earth's atmosphere, to help understanding of climate change.

HOTSAT

Leonardo has supplied a variation of SuperHawk, our COTS HD (high definition) 8µm pitch MWIR detector, for HOTSAT - a cutting-edge British satellite built by Surrey Satellite Technology designed to provide high resolution thermal infrared imaging of Earth. Thermal data is collected day and night with a ground-breaking 3.5m resolution. Its purpose is to track heat variations from industries and infrastructures to enhance energy efficiency and environmental monitoring. First imagery can be seen on the cover of this brochure.

ASTRONOMY

Leonardo's heritage in detectors for astronomy instruments covers six decades of pioneering research and development. From the early days of military thermal imaging to the cutting-edge requirements of 21st century astrophysics, Leonardo has consistently pushed the boundaries of what is technically possible in sensing the invisible universe.

Our most significant contribution to modern astronomy is the Saphira Array – a linear mode Avalanche photodiode (LmAPD) high speed array developed in collaboration with the European Southern Observatory (ESO). Saphira (320 x 256 format with 24µm pitch) changed the landscape of ground-based observations with its ultra-low noise performance and near-photon-counting sensitivity.

Alongside the University of Hawaii's Institute of Astronomy, Leonardo has continued developing this technology for astronomical imaging, and can now offer 512 x 512/24µm, 1024 x 1024/15µm LmAPD arrays, as well as 2048 x 2048/15kµm LmAPD large format arrays.

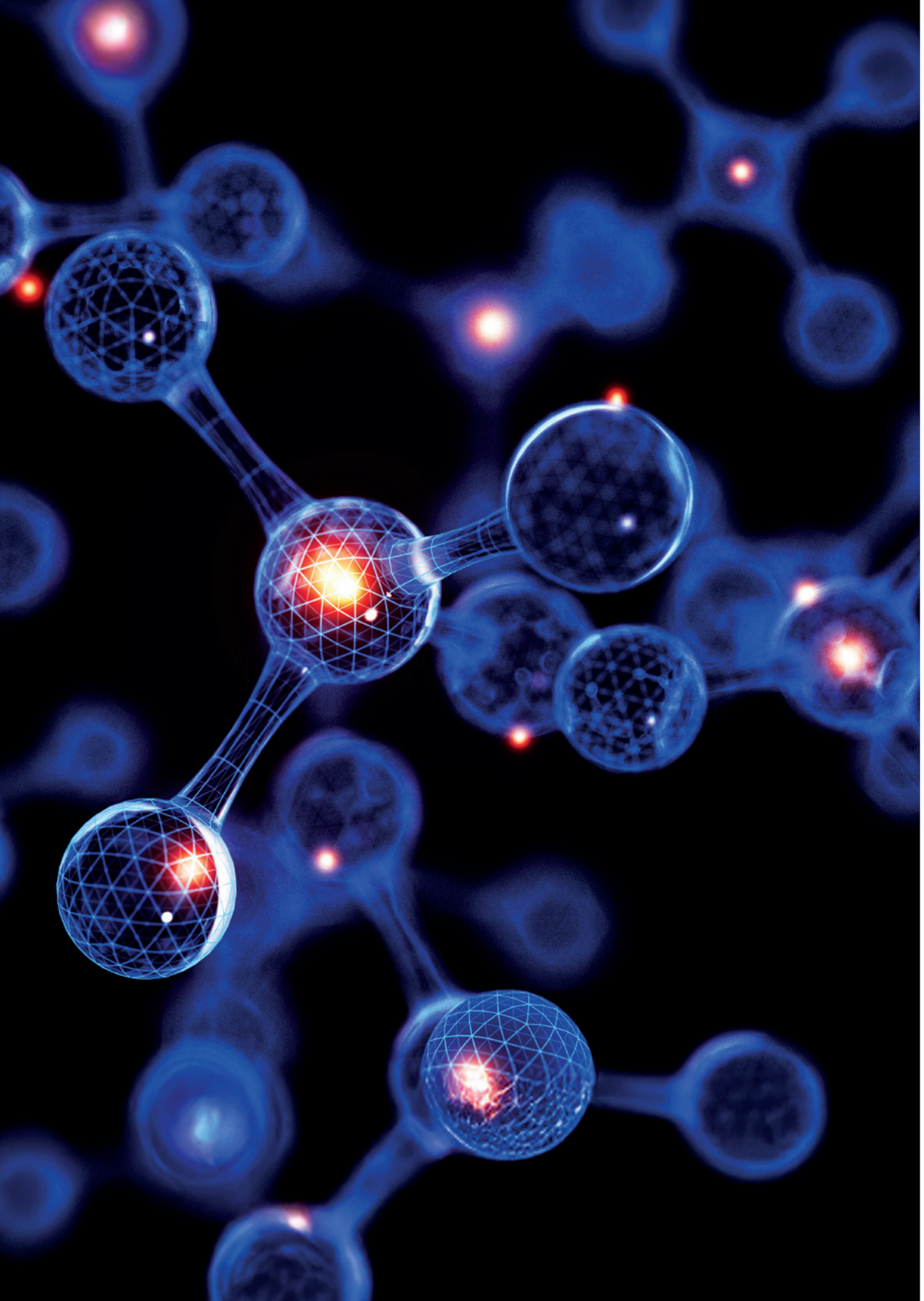
Leonardo's LmAPD infrared detectors are among the most advanced detectors used in astronomy for infrared imaging and adaptive optics. These detectors are designed to push the limits of sensitivity, speed, and precision in capturing infrared light from faint and distant celestial objects.

Leonardo's Saphira array is employed in instruments at Observatories around the globe for wavefront-sensing, fringe tracking and imaging. This includes instruments for the Subaru Telescope at Maunakea Hawaii, CHARA Array instrument at Mount Wilson Observatory USA, ESO's GRAVTIY Instrument at their Very Large Telescope site in Chile, and NASA's Infrared Telescope Facility, Maunakea, USA.

Leonardo's LmAPD detector technology is being further developed for the next generation of astronomy such as NASA's planned Habitable Worlds Observatory (HWO), the next flagship mission aimed at directly imaging and characterising Earth-like exoplanets and searching for signs of life beyond our solar system.

As NASA pushes detector performance toward formats and noise levels adequate for high-contrast exoplanet imaging and spectroscopy, Leonardo's LmAPDs are key enablers, helping to meet stringent performance goals for observing and analysing atmospheres of small potentially life-bearing planets.





DETECTORS FOR INFRARED SPECTROSCOPY

Leonardo is the leading global supplier of single-element pyroelectric detectors based on Deuterated L'Alanine triglycine sulphate (DLATGS), an organic crystal grown in-house by our materials scientists. Developed by Leonardo in Southampton in the 1970s, our unrivalled expertise in this technology has supported our competitive advantage and significant growth to become a high-volume manufacturer of superior performance detectors. Pyroelectric detectors can be operated at room temperature or can incorporate temperature stabilisation to overcome varying ambient conditions. Our DLATGS material has a broad spectral response from 0.4µm to >200µm making it the ideal technology for the infrared analysis of a wide range of material, liquid and gaseous substances. The addition of hermetic sealing offers long-term reliability in analytical instruments such as Fourier Transform Infrared Spectrometers (FTIR) and Gas Analysers.

Specialised Capabilities - Pyroelectric Detectors

- → Pyroelectric DLATGS organic crystal growth with dopants to enhance Curie temperature and natural polarisation
- → DLATGS element polishing and manufacture to optimise detector performance
- → Hermetic sealing of transistor package and window materials for high humidity applications
- → In-built single stage Thermo-Electric Cooler for element temperate stability in applications with changing ambient conditions
- → Variety of window materials available to optimise transmission in desired infrared wavebands
- → Electro-optic testing conducted on every detector supplied
- → Wide range of standard detectors available, as well as custom detector developments for specific instrument applications
- → Compliant with EU RoHS regulations
- → Space flight heritage in NASA and UAE programmes, and future programmes for ESA

Our DLATGS pyroelectric detector technology has an impressive heritage in numerous space flight programmes dating back to 2003 with NASA's Mars Exploration Rover Mission. Leonardo DLATGS detectors were the technology of choice for the Mini-Thermal Emissions Spectrometers. The instruments survived for many years beyond their planned mission schedule on the harsh surface of Mars, breaking all extra-terrestrial records.

Leonardo also designed and supplied miniature single element DLATGS detectors used in the thermal emissions spectrometer for NASA's OSIRIS-Rex, a regolith sample return mission in 2016 to Asteroid Bennu, to help scientists determine the molecular precursors to the origin of life and the Earth's oceans.

More recently Leonardo has supplied this technology for ESA's FORUM (Far-Infrared Outgoing Radiation Understand and Monitoring) mission in 2027, which will measure Earth's outgoing radiation never measured from space before, to provide insight into Earth's radiation budget and how it is controlled, thereby fill in a missing piece of the climate jigsaw.

PARTNERSHIP – WHY WORK WITH US

Leonardo is a trusted partner, working side-by-side with our customers to tailor detector solutions to meet unique specifications from initial concept to qualification.

Quality

Our detectors enable critical missions where precision and reliability cannot be compromised. Each detector is engineered for purpose and optimised for lifetime stability in demanding operational conditions. Our reputation is built on consistency and traceability, underpinned by our ISO Accreditations and 100% inspection protocols.

Our full list of Quality, Environmental and Occupational accreditations are available on request.

Partnering with Leonardo in Southampton

What this means for our customers:

- → We are a fully integrated infrared detector supplier
- → We supply premium detector products providing exceptional image quality for the most demanding of applications
- → Our range of standard products comprise varying pixel pitches, array formats and wavebands to suit most system requirements
- → We supply compact Integrated Detector Cooler Assemblies, sub-assemblies and packaged arrays
- → Detector interface electronics can be supplied with many detector products to support successful integration
- → We offer custom detector designs, developments and manufacturing services
- → In-house scientists, ROIC and detector design engineers provide the optimum detector solutions for your application
- → Engineering support helps new customers maximise performance of our technology to enhance system capability
- → Our Leonardo network supports our teams and our customers around the world

Our Mission

To transform the future of infrared sensing through partnerships, technical expertise, and a commitment to delivering exceptional customer value.





OUR FUTURE

Leonardo is developing sensing technologies needed for future generations of defence platforms alongside solutions for tomorrow's scientific challenges. Our internationally recognised experts are committed to pushing the boundaries of scientific understanding to bring technology developments to the markets we serve. We focus on continuous innovation and long-term partnerships to bring effective solutions and value to our customers.

Work will continue to extend our capabilities in:

- → Multifunctional and multiband sensors
- → Photon level sensitive MCT APD arrays, alongside improving the performance of conventional MCT and DLATGS technologies
- → Higher resolution sensors and smaller pixel pitch focal plane arrays, for encapsulation into a new suite of low-SWaP (Size, Weight and Power) dewars
- → Custom developments using a selection of proven technology building blocks leading to military and space-qualified detector products
- → Expanding portfolio - alternative sensing materials, alongside the next generation of fully digitised products

With investment in state-of-the-art manufacturing, our people and our supply chain will ensure capacity exceeds required standards for future programmes and provides customer service beyond expectations.

LIFE AT LEONARDO

Working at Leonardo opens the door to so many career opportunities, being part of a world-class engineering and manufacturing company.

We are committed to inclusion and diversity in all areas of the business, as well as developing our staff's skills and interests through specific training programmes.

Leonardo's growing reputation as one of the UK's most rewarding places to develop a career is further strengthened by being named in LinkedIn's 2025 Top Companies.

A WORLD OF OPPORTUNITY

Leonardo offers job opportunities across the UK covering a variety of job roles at all levels – from interns and apprentices to highly qualified professionals – including engineers, cyber security experts, programme and project managers, business analysts and many more.

Leonardo is pleased to announce we have been recognised in the annual Glassdoor Employees' Choice Awards for the second consecutive year, in the list of the Best Places to Work in 2026.

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