

# EO and Remote Sensing Technologies – Non-Space Applications

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26<sup>th</sup> October 2017

**Innovate UK**  
Knowledge Transfer Network

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# Connecting people to drive innovation

Find expertise

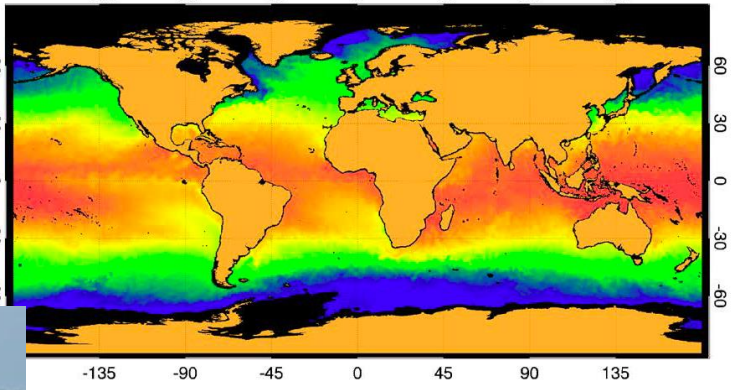
Find markets

Find funding and finance

# Projects

CREATIVE & DIGITAL  
materials security  
NEW TECHNOLOGIES graphene  
TRANSPORT simulation  
INFRASTRUCTURE data & trust  
solar energy MATERIALS  
BIOTECH manufacturing  
AGRI-FOOD IoT  
LIFE SCIENCES robotics

Cross sector projects on current topics help drive innovation.



# Technology Transfer from space

## Space needs:

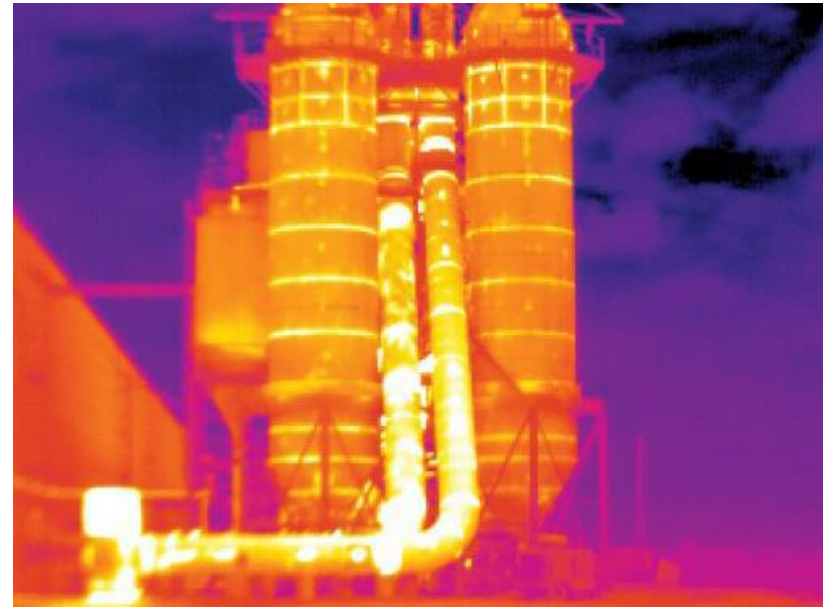
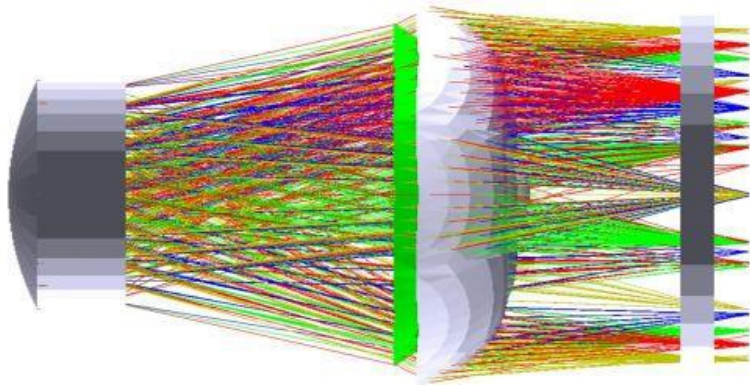
- low weight
- strength and durability
- efficiency and reliability
- compactness
- temperature resistance
- radiation resistance
- corrosion resistance



# UV/Vis/IR

Emerging terrestrial applications for UV / Vis / IR remote sensing

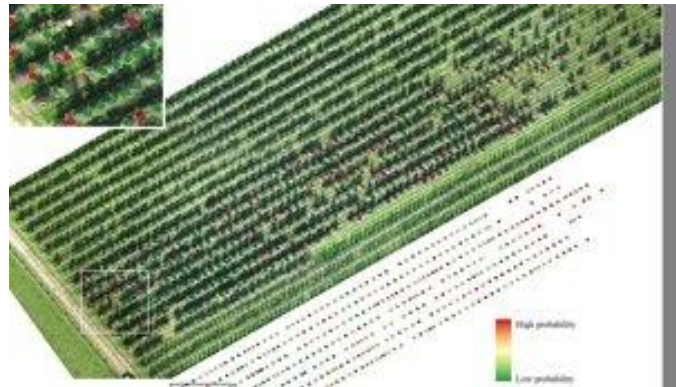
- Remote sensing of flammable and hazardous areas
- Security and Health & Safety
- Cubesats and UAV Cross-over
- Pollution Monitoring



# Hyperspectral cameras for precision farming

Hyperspectral cameras flying on drones are now able to see details as small as 4–5 cm. -potential in forestry, biomass monitoring, waste and pollution management.

Novel hyperspectral imaging chip from imec combined with VITO's image processing honed by working with ESA on remote sensing satellites.

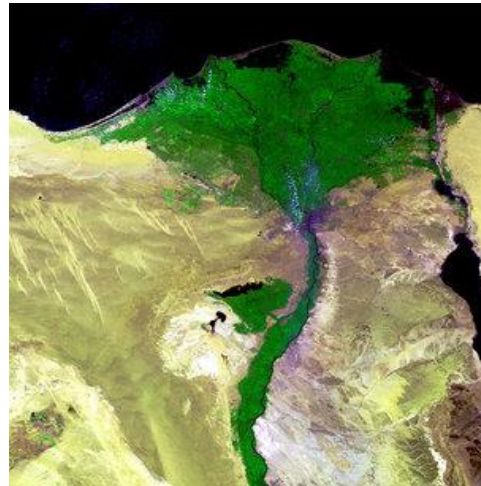
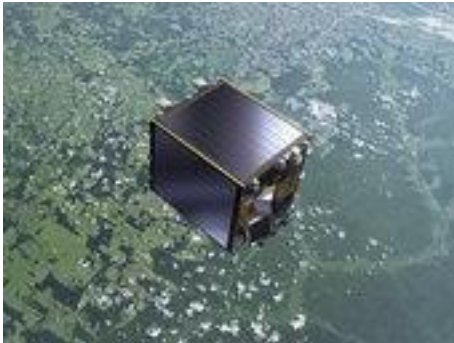


# High speed IR camera

Originally developed for Proba 5

- spotting defects on solar panels
- diagnose skin diseases

Significantly higher sensitivity achieved by the sensor and the speed, making it possible to complete the scan in a reasonable time.





# Millimetre, microwave and terahertz

- Explosives, weapons and drug detection
- Gas analysis of exhaust plumes, spatial distribution of chemical species, and chemical species monitoring in engine test beds
- Remote sensing of internal parts and processes of an engine
- Hydrocarbon leaks over large industrial facilities, leaks from refrigerators in warehouses and retail facilities, monitoring of fracking sites and waste dumps

## Issues:

- Cost
- Miniaturisation
- Processing technologies



# Terahertz for security

ThruVision™  
Systems



> ThruVision's TS4 generation of terahertz scanners (ThruVision Ltd)

Introducing

# TS4



[Click to learn more...](#)



# Innovate UK

National Space Technology Strategy 2016

National Space Technology Strategy 2014

# Knowledge Transfer Network



IR technologies	Cooled Aperture Lensless Imaging	Compact Multi-Spectral Imaging	Green House Gas (GHG) Instruments	Hybridized IR	Image Being Resonance Image for Ultra Time Observation	Imaging LiDAR detector + APD Arrays	In-flight calibration source	Large area APDs	Large format wave front MCT detectors	Linear mode APD	Mid infrared laser heterodyne systems	Monolithized SiGe (TD) for IR	Nest Conversion of DMC imagers	Photonic Spectrometers	Quantum Cascade Laser's QCLs	Single pixel and small array fast detectors	Single pixel type II superconductor and wave detectors	V-LWR MCT	Thermal IR Imager	Large format HgCdTe array APDs	Mid-IR in angle (slat / small array detector for FPA)	Uncooled Peltier bolometer arrays	Item 224								
Passive microwave technologies	AI based Full-matrix synthetic aperture radar	Calibration Sources	Compact Thru Transceivers	Frequency Monitoring Package	CNSC Electronics Module	Antennas for Spaceborne SAR	Metamaterials	AWAC Electronics	Microwave Electronics	Spaceborne SAR	Coastal Radar	Passive Microwave Calibration	Pre-flight calibration	Spaceborne SAR	Signals	Spaceborne SAR	Spaceborne SAR	Sub-mm TES detectors	Sub-mm (and filters)	Sub-THz Polarized Night-vision	Spaceborne SAR	Waveguide Filters	Waveguide Back-ends								
UV/visible technologies	Active IR Lightweight Imager	Advanced Nanophotonic Metasurfaces	CCD Detectors	CMOS Image Sensors	CMOS TDI detectors	Ultra-compact	Detritus monitor	Deployable optical mirrors	Energy sensitive Detectors	Exploitation of new UV space applications techniques	Optical based remote sensing for LEO	High Resolution Cameras	High-resolution Cameras	Hybrid Detectors	Hypercompact Imager	Image sensors technology for spaceborne SAR	Imaging and Spectral Detector Calibration	Improved performance of UV-CCD detectors	Image sensors for spaceborne SAR	Large Optical Filters	Large deployable optical mirrors	Optical Clocks	Optical Image Sensor Technology	UV Spectrometers	Spaceborne SAR	System On Chip	High definition space borne sensors	High resolution cameras	Curved Focal Planes	Curved Detectors	Wave Technology
Lidar technologies	Advanced Laser Diodes/Drivers	Beam-scanning	Compact fibre laser	Electron Beam Driven Laser Diodes	High Speed Photon Imaging	Hollow Wave Guides	Integrated Optics Scan Combiner	Laser Technology	Lasers for Lidar	Lidar 3-D sensing system	Lidar calibration system	Lidar transmitter	Lidar transmitter optics	Mapping LIDAR	Rayleigh I and Scatterer Technology	SIPOD	Spaceborne SAR	Wide swath Lidar	SAR LIDAR	Silicon APDs	MCT APDs										
Radar technologies	Coherent SAR sensors	GaN epitaxy	Large deployable RF antennas	Large phased arrays	Low cost SAR Environments	Microwave Switching	Downlink Radar	Real-time and hardware calibration for SAR/ISAR Mission	SAR Back End - Low Cost	SAR Back End - Multi-Channel	SAR Back End - High Reliability	SAR Front End - High Frequency Antenna	SAR Front End - Low Cost	SAR Front End - Low Frequency Antenna	Scanning polarisation diversity radar	Multi frequency radar	Small low cost SAR Transmitters	Bi-static radar	Very low microwave radar	Ship detection radar	Digital beamformers	GaN SSPAs	Sub-band antenna technologies	Photonic SAR	I-band antenna port and technologies	Advanced SAR					
Support technologies	Advanced SAR sensors	Deep learning for SAR image processing	Image processing in on-board	In-flight Spectral metrology	Deep learning for SAR image processing	Robot Mission Processing	Scanning mechanisms	Small satellite cookers	Constellation management technologies	Formation flying technologies	Deep learning for SAR image processing	Power / thermal management technology	Autonomous testing using on-board sensors	Spaceborne SAR	Spaceborne SAR	Cross cutting	Orbiting technologies	Low latency of the optical SAR	Agile and robust communication	SIPOD											
Ground-based technologies	Accessibility	Automation and simulation	Data Mining of large data sets	Grid Computing	Image processing and analysis	Mission Control Systems	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	Orbiting technologies	
Technology Theme	Autonomous Navigation and Control	Infrared Detectors and Systems	Laser Technology and Systems	Power Electronics and Systems	Support Technologies for Sensing Systems	UV/Visible Detectors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	Advanced SAR Sensors and Systems	

# Funding and advice

- Innovate
- ESA Technology Transfer Programme
  - ESA BIC
  - ESA TTN
- Knowledge Transfer Network

# space.ktnlandscapes.com

## Space & Satellite Applications UK Landscape

### Overview



Thank you

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