
CEOI Earth Observation Technology Showcase

10th December 2018

Agenda



Centre for
EO Instrumentation



CEOI Project Showcase

Monday 10th December
ECSAT, Harwell

10.00	Introduction
10.20	Passive u/mm/THz Technologies
11.20	<i>Break</i>
11.40	Radar Technologies
12.05	IR Technologies
12.45	<i>Lunch</i>
13.30	UV/Vis/SWIR Spectroscopy
14.45	<i>Break</i>
15.05	Visible Imaging
16.10	Closing Session/Questions
16.30	Close

Time	Title	Lead Organisation	Speaker
09.30	Arrival and Registration	CEOI/ESA	
10.00	Introduction EO Technology Strategy CEOI Project Portfolio	CEOI	Mick Johnson/ Chris Brownsword
10.20	Passive u/mm/THz Technologies		
10.20	LOCUS Mission and Critical Technologies	UCL/STFC RALSpace	Brian Ellison
10.45	HYMAS – Filterbank spectrometers for HYperspectral Microwave Atmospheric Sounding	Cardiff University	Peter Hargraves
11.00	Feasibility of Passive Bistatic GeoStationary EO	Cranfield University	Steve Hobbs
11.10	New Electronic Switching Arrangement for mm- wave Radiometer Calibration	Queen’s University Belfast	Raymond Dickie
11.20	Break		
11.40	Visible Imaging (1)		
11.40	Instrumentation and Data Handling for Low-Cost EO	Surrey Satellite Technology Ltd	Charles Cranstoun Steve Ross
12.05	IR Technologies		
12.05	Development and testing of large format MCT arrays for EO	Leonardo MW Ltd	Mark Herrington
12.20	MEMS-based spectrometers for ultra-miniature space-borne hyperspectral remote sounders	STFC RAL Space	Damien Weidmann
12.30	Development and demonstration of a CO ₂ Laser Heterodyne Radiometer	STFC RAL Space	Damien Weidmann
12.40	Lunch (to 13.30)		

CEOI Project Showcase - Afternoon Session

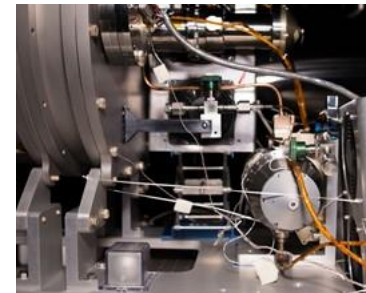
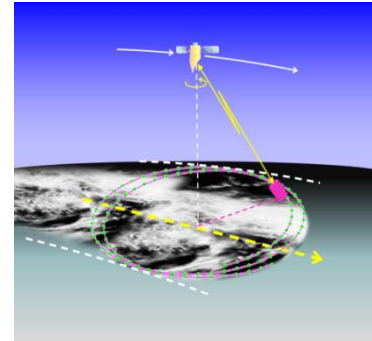


Time	Title	Lead Organisation	Speaker
13.30	UV/Vis/SWIR Spectroscopy		
13.30	Technologies for the TRUTHS Cryogenic Solar Absolute Radiometer (CSAR) and the in-flight calibration system	NPL	Nigel Fox
13.55	The Compact Air Quality Spectrometer	University of Leicester	Mark Sims
14.20	Technologies and demonstration of Multi-View Spectroscopy for Greenhouse Gas Remote Sensing	University of Leicester	Hartmut Boesch
14.35	Freeform Gratings for Ultracompact Spectrograph Designs	Durham University	Cyril Bourgenot
14.45	Break		
15.05	Radar Technologies		
15.05	Next-generation Radar Electronics	Airbus DS Ltd	Matt O'Donnell
15.30	Visible Imaging (2)		
15.30	A New Generation of Deployable Optical Systems to Increase Small Satellite Capability	Surrey Space Centre	G. Aglietti
15.45	Smart optics for Satellite Applications	University of Oxford	Dave Gooding (SSTL)
15.55	Onboard Data Autonomy for Next Generation of EO Nanosatellites	Craft Prospect	Steve Greenland
16.05	Closing Session/Questions		
16.30	Close		

What is the CEOI?



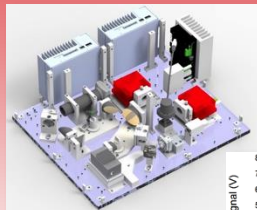
- UK Space Agency initiative to boost UK capability and remain at the forefront of EO technology for space
 - Fund innovative technologies for global EO mission opportunities
 - Support developments for commercial exploitation opportunities
 - Build capability, create new UK jobs and economic growth through leverage of investment in EO
 - Parallel industry investment, total approx £2-3M pa
- CEOI Programme focus on:
 - development of new EO instrumentation and technologies, taking EO technologies to higher TRL
 - horizon scanning and knowledge exchange
 - building highly capable academia/industry partnerships
 - Liaison with ESA
- Partnership led by Airbus with QinetiQ, STFC/RAL and University of Leicester



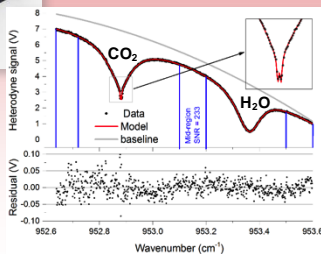
Recent CEOI Developments



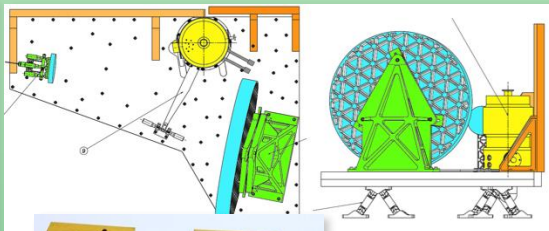
LIDAR & Laser Heterodyne Radiometry (LHR)



LHR Field Deployment
RAL Space



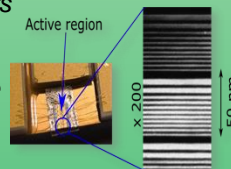
Sub-millimetre & THz technology



LOCUS
RAL/Leeds

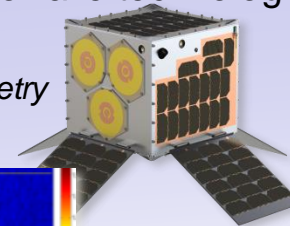
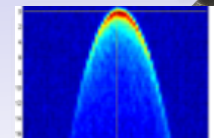
Supra-THz Mixers
RAL & Leeds

THz Quantum Cascade Lasers
Leeds

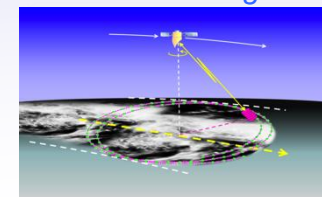


Microwave technologies

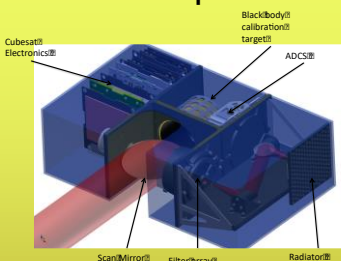
GNSS
Reflectometry
SSTL



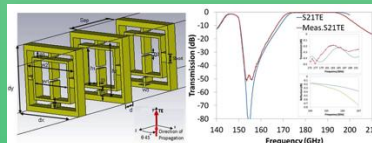
94GHz Wind/Rain
Radar Reading/RAL



Spectroscopy

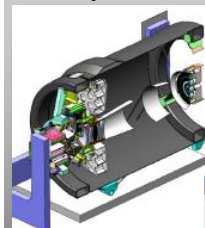


IR Radiometry (Cubesat)
U. Oxford

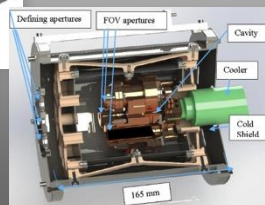


Frequency Selective Surfaces
QUB

Optical instrumentation

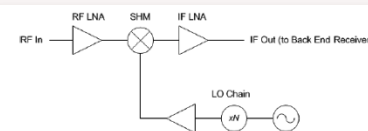


Hi-Res Imaging & Video
SSTL

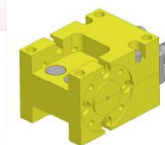


TRUTHS
National Physical Laboratory

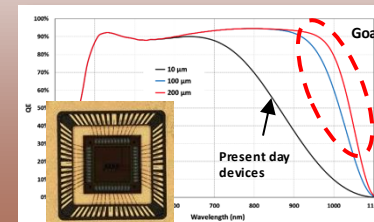
mm-Wave receivers
RAL Space



MWS-LNA229



Detectors
Teledyne E2V



GHOST
U. Edinburgh
STFC ATC



CEOI Programme for 2018/19



- **Challenge Workshop (30th April 2018)**
 - Future EO Mission Portfolio – community consultation
- **Industrial Consultation Workshop (22nd May 2018, MRC HQ)**
 - ‘Miniaturisation of High Performance Remote Sensing Instruments’
- **National EO Conference (4th to 7th September 2018)**
 - Tri-annual conference, with NCEO and RSPSoc;
 - Venue: University of Birmingham;
- **CEOI Technology Review (10th December 2018)**
 - Review of CEOI-7, 8 and 9 projects
 - Targeting space audience including ESA, InnovateUK/KTN, UKSA, STFC
- **CEOI ESA Earth Explorer 10 Mission Candidates (14th December 2018)**
 - Workshop to identify potential future UK activities related to the 3 ESA Earth Explorer candidate 10 missions;
 - Venue: Imperial College, London
- **Emerging Technologies Challenge Workshop (1st & 2nd May 2019)**
 - An investigation of innovative technologies for future EO missions
 - Bi-annual CEOI event
 - Venue: Cosener’s House, Abingdon



CEOI Twitter Feed



CEOI Twitter Impact Statistics: Aug-Sep 2018

- **Impressions:** Number of times users saw the tweet on Twitter 12.4K
- **Engagements:** Total number of times user has interacted with a Tweet e.g retweets, likes, follows etc 125
- **Engagement Rate:** Engagements divided by Impressions 1%



Happy 1ST Birthday @CEOI_Space
1st September 2018
120 Tweets, 150 Followers



Top Tweet Aug-Sep 18

Thank you @NERCscience, @ESA_EO and @spacegovuk for sponsoring the UK National Earth Observation Conference 4-7 Sept 2018.

New Website : ceoi.ac.uk

Home Page



Technology Portfolio



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- Events
- Opportunities
- Technologies
- EO Missions

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What is the CEOI?

Listen to this

The Centre for Earth Observation Instrumentation (CEOI) aims to be the driving force in the UK for the development and delivery of world class instrumentation for national and international EO missions for science, operational and commercial needs.

The CEOI vision is to develop and strengthen UK expertise and capabilities in EO instruments. We run competitions for new ideas in EO technology and oversee the selected projects, so as to position UK teams to win leading roles in future space programmes.

The CEOI encourages the transfer of technologies between space and terrestrial applications. We actively encourage industry/academic partnerships through a series of workshops, technology showcases and information dissemination activities. [Read more...](#)

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CEOI
@CEOI_Space
CEOI Project Review Day, 10th Dec 2018, ECSAT, Harwell. Come and hear from project teams presenting completed @spaceplusuk CEOI-funded projects. Meet with others in the #EO community and learn about great technology developments being undertaken in the UK. [ceoi.ac.uk/2018/10/11/ceoi...](#)

Latest on CEOI

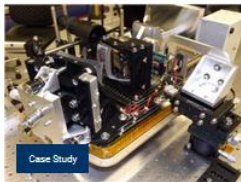


Conference

@ 11/10/2018

CEOI Project Review Day

The CEOI will be holding a Project Review Day on 10th December 2018 at ECSAT, Harwell. The primary aim is...



Case Study

@ 30/08/2018

CompAQS Case study released

Technology Market Case Study highlighting how the UK Space Agency funding turned University of Leicester and SSTL Compact Differential Optical...



11 Oct 2018

Next EO Event

Enabling New Space conference

19/10/2018
Conference
techUK

Events Calendar

October 2018						
MO	TU	WE	TH	FR	SA	SU
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				



Conference

@ 30/08/2018

UK National EO Conference

The UK National EO Conference takes place between 4th -7th September in Birmingham. Full information on the event can be found...



Opportunities

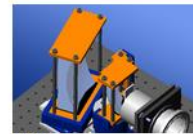
@ 30/08/2018

CEOI 11th Call: Seven New EO Projects Funded

The CEOI is pleased to announce grant funding to UK businesses and organisations, matched with their own investments, to develop...

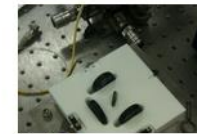
Home Technologies

Technologies



UV/Visible

Projects to develop technologies for imagers and spectrometers operating in the UV and visible wavelengths



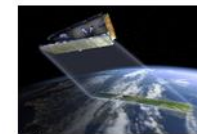
Infra-Red

The CEOI has funded a number of projects to develop new technologies for EO using Infra-red



Lidar

Preliminary investigations of space-based Lidar EO concepts



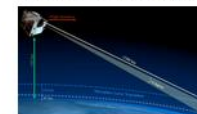
Radar

Space based synthetic aperture radar (SAR)



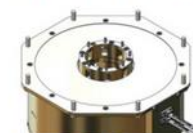
Passive Microwave

Passive (receive only) microwave and millimetre wave technologies



Thz Technologies

Development of THz receiver technology



Support Technologies

Technologies applicable to multiple instrument types

Edit

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29	30	31				

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Website Privacy Policy

The CEOI is funded by the UK Space Agency



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EO Technology Strategy

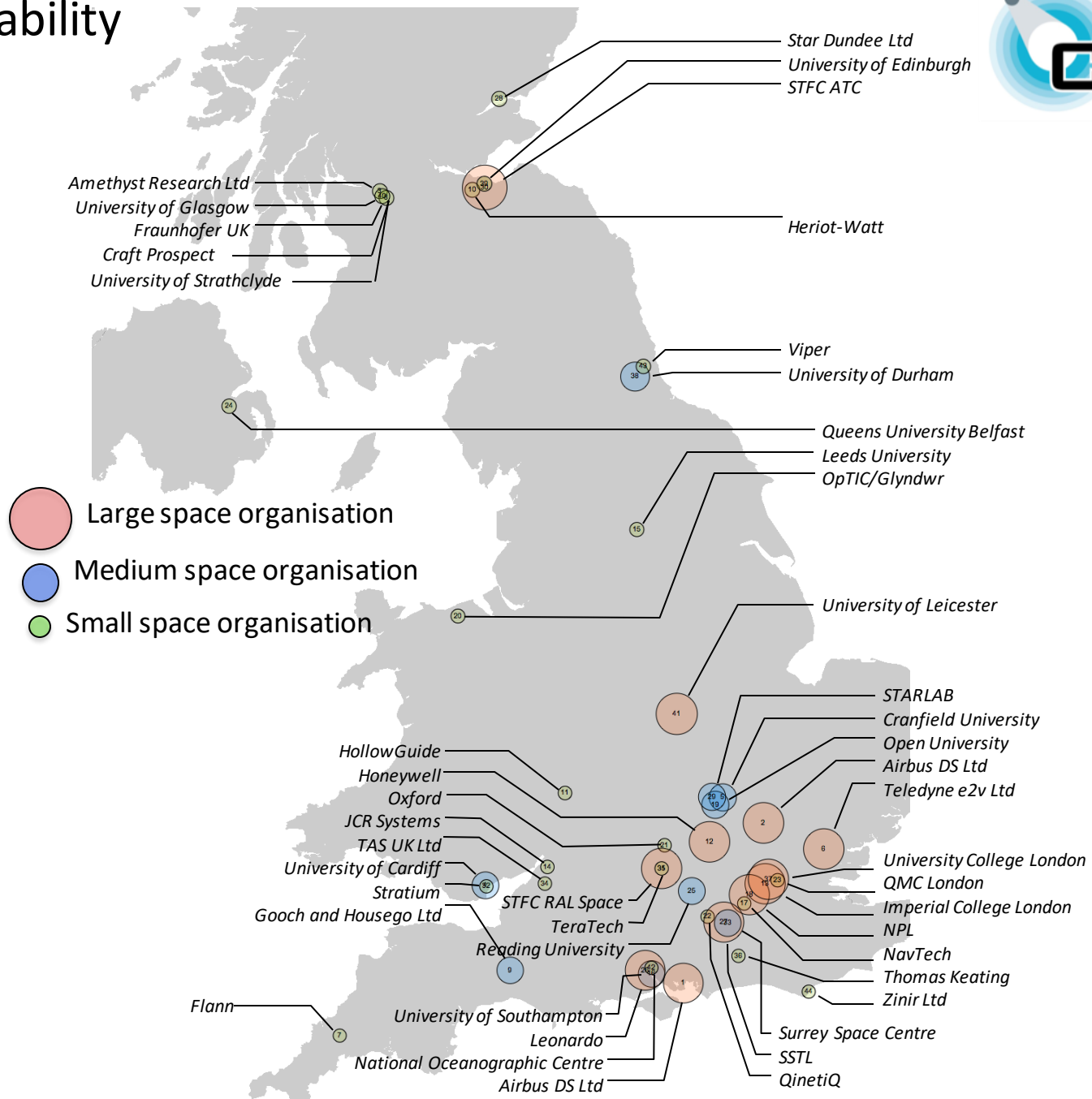
Published on 4th December 2017

<https://www.gov.uk/government/publications/uk-earth-observation-technology-strategy>

Our 10-year vision is for the UK to become a world leader in new EO technologies

- **Economic Impact:** Develop EO technologies which lead to increased exports, jobs and economic growth
- **Innovation:** Support new and innovative ideas that offer tangible benefit to future missions
- **Capability:** Strengthen capability where the UK already leads, can build a lead in a new area or can overtake existing capability elsewhere
- **Return on ESA Investment:** Maximise the benefit from the UK funding to ESA and other institutional bodies

UK EO Capability



Initial Strategy - UK EO Capability Analysis



Technology theme	Technology lines of development	Organisations involved	Type of organisation			
			Large Enterprise (Industry)	SME	Academic	Government/ Institutional
Passive Microwave	27	16	2	6	6	2
UV/Visible	22	13	3	1	6	3
Radar	19	9	3	1	3	2
IR	12	10	4	2	2	2
LIDAR	4	2	0	1	1	0
Support technologies	7	6	3	1	1	1

UK EO Technology Capability



Technology Theme	UK Strength	Market Trend	Comments
Radar/SAR	✓✓✓	✓✓✓	Excellent & established UK capability; Significant commercial/operational markets
Passive microwave	✓✓✓	✓✓✓	Excellent and broad UK capability; Ongoing operational/science markets
Optical imaging	✓✓✓	✓✓✓	Excellent & established UK capability; Significant commercial/operational markets
Optical spectroscopy	✓✓✓	✓✓✓	Excellent and established UK capability; Significant commercial/operational markets
IR imaging	✓✓	✓✓✓	Growing UK capability; Growing commercial/operational markets
IR radiometry	✓✓✓	✓✓✓	Excellent and broad UK capability; Ongoing operational/science markets
IR spectroscopy	✓✓	✓✓✓	Growing UK capability Ongoing operational/science markets
LIDAR	✓	✓✓	Some UK capability; Viability of space-based LIDAR sensing to be established
Radar Altimetry	✓	✓	Limited UK capability; Strong competition within Europe
UV spectroscopy	✓✓	✓	Good UK capability Limited user pull

Technology Programme

CEOI 12th EO Technology Call



- Full details of the CEOI 12th Call will be released this week
- At least £2M of funding will be available
- Looking for good proposals for innovative new EO technologies and airborne demonstrators
- Flagship, Fast Track and Pathfinder projects:
 - Projects should advance the EO Technology Strategy
 - Initiate new technology ideas and mission options for global export opportunities
 - CEOI looking to fund a balanced portfolio of technology projects

CEOI 12th Call – Timescales



Event	Date
Announcement	6 th Dec 2018
ITT Issued	14 th Dec 2018
Closing date for Proposals	12 th Feb 2019
Projects Commence	From Mar/Apr 2019

CEOI Projects covered by this Workshop



Call	Grant Value	Projects Funded
8 th EO Call	£3.2M	4 Flagship projects and one Feasibility study
9 th EO Call	£1M	4 Fast Track and 2 Pathfinder studies
10 th EO Call	£2.4M	2 Airborne Demonstration projects 16 Fast Track/Pathfinder projects.

- The primary aim is for project teams to present CEOI-funded projects that have completed in recent months, to describe the objectives, the technology developments and the main achievements.
- Just one presentation will be given for technologies/missions that have been supported across multiple calls.
- Projects which were presented at the National EO Conference in September will not be presented again today. Their presentations are available on the CEOI website