

Centre for EO Instrumentation
& Space Technology



CEOI-ST Technology Programme

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21th April 2015

Technology Programme Rationale



CEOI-ST Theme	Technology Programme Aims
Innovation in EO and Space Technology	Through funding innovative developments of EO instruments and ST, to position UK teams in national and international competitions and in winning opportunities
Technologies for services and growth	Future growth in space identified in the IGS is dominated by downstream applications; enable this growth by developing new and innovative developments in EO instruments and space technologies
Achieving higher TRL through demonstration	Take key technologies through the TRL development cycle to ensure they move as quickly as possible to implementation and exploitation

CEOI-ST EO and NSTP Technology programmes



- Earth Observation programme
 - Mission studies
 - Instrument development
 - Sub-system technology development
 - TRL raising – through to TRL 5/6
 - Business case development

- National Space Technology Programme
 - Space technology R&D projects that align with the National Space Technology Strategy, IGS and the related technology roadmaps covering;
 - Telecommunications
 - Sensing
 - Position, Navigation and Timing
 - Exploration and Robotics
 - Access to Space
 - Proposals outside the NSTP roadmap will require stronger justification

Scales of Technology Projects



Grant Type	Funding and Duration	Eligible Activities
Flag Ship Grants	Typically up to £1,000k grant, with 18-24 months duration	<ul style="list-style-type: none">• Technology development to a high TRL (typically 5 or above)• Clear exploitation route and rationale for timeliness• Clear case for return on the investment (science, societal, commercial, IGS)
Fast Track Grants	Typically £50K to £150k grant, up to 12 months duration	<ul style="list-style-type: none">• Industrial research• Feasibility studies• Experimental development
Pathfinder Grants	£50k maximum grant, normally no more than 6 months duration	<ul style="list-style-type: none">• Fundamental research• Feasibility studies• Industrial research
Grants for Exploratory Ideas (GEI)	£10K maximum grant, no more than 6 months duration	<ul style="list-style-type: none">• Fundamental research• Feasibility studies• Industrial research

Grant funding

- Projects are awarded grants that part fund the project
- Industry is required to provide a PV contribution to eligible project costs in accordance with the European State Aid General Block Exemption Regulations (GBER)
 - Degree of intervention (grant %) depends on project type and size/type of organisation

State Aid Category	Intervention rate		
	SME	ME	LE
Fundamental Research	100%	100%	100%
Feasibility study	70%	60%	50%
Industrial research	70%	60%	50%
Industrial research projects involving collaboration/ dissemination ²	80%	75%	65%
Experimental development	45%	35%	25%
Experimental development projects involving collaboration/dissemination ²	60%	50%	40%

- For GEI grants, industry can claim exemption from having to make a contribute under the EU de minimis regulations.
- Academic institutions are awarded 80% funding

CEOI-ST Example EO Technology Projects



LIDAR & Laser Heterodyne Radiometry (LHR)

Hollow waveguide implementations
QinetiQ, Hollow Guide Ltd & RAL Space

Sub-millimetre wave technology

320-360 GHz sideband separating mixer showing (above left) the STEAM-R radiometer (SSC)
RAL Space, Airbus DS & QUB

Frequency Selective Surface QUB

Active Microwave technologies

GNSS Reflectometry

SSTL + NOC, Universities of Surrey & Bath

On-Board SAR Processing
Airbus DS/BAE Systems

Atmospheric composition

HAPS for Air Quality monitoring
Airbus DS, Leicester & Lindstrand

Compact concentric spectrometer for space and terrestrial use
U of Leicester & SSTL

Wide-band spectrometer
STAR-Dundee

Meta-materials devices
Airbus DS, QMC

Optical instrumentation

Lightweight mirror technologies
Gooch & Housego + SSTL

Microslice hyperspectral imager
U of Durham

Thermal Infrared instrumentation

Fourier Transform Spectroscopy with 2D TIR detectors
Airbus DS, SELEX & RAL Space

TIR Imaging for clouds
UCL

See CEOI-ST web site for project summaries www.ceoi.ac.uk

Funded CEOI-ST Technology Projects



Call	Grant Value	Completion Date	Outcome/Comments
7 th EO Call	£2.2M	Sept 2015	18 Fast Track/Pathfinder and Bilateral projects funded to date
8 th EO Call	£3.2M	Dec 2016	4 Flagship EO projects and one Feasibility study
NSTP2 Phase 1 FT/PF Call	£2.7M	Aug 2016	29 Fast Track/Pathfinder projects funded so far
NSTP2 Phase 1 GEI Call	£155K	Oct 2015	16 mini-studies selected in first 3 calls

7th EO Call Fast Track Projects



Proposal Title	Lead Organisation	Project Partners
Exploring SAR interferometer calibration solutions for ocean surface current errors for the Wavemill space mission	NOC	Starlab Ltd Airbus DS
Global Satellite observations of winds, rain and clouds	U Reading	U. Leicester
Mechanised Precision Bonding of Composite Assemblies	U Glasgow	Gooch & Housego
TRUTHS: a benchmark mission for decadal climate – Facilitating its urgent implementation	NPL Management Ltd	SSTL
'LOCUS Critical Payload Development for Future In Orbit Demonstration'	U Leeds	STFC RAL, Star Dundee
MISRlite - Multi-angle IR Stereo radiometer using uncooled microbolometer arrays for global winds	MSSL-UCL	SEA
Radiation Testing of Selex ES CMOS ROICs for Earth Observation IR Sensors	Selex ES, UK	None
Contactless Power & Data Transfer for Conical Scanning Instruments	SEA Ltd / Thales Alenia Space UK Ltd	ESR Technology

Proposal Title	Lead Organisation	Project Partners
UKSA-CNES Bilateral Carbon Mission: Support Study	U of Leicester	U. Leicester, Selex ES, SSTL, Space ConneXions Ltd, U. Edinburgh, Airbus DS Space Systems, ATC

7th Call Pathfinder Projects



Proposal Title	Lead Organisation	Project Partners
183 GHz Frequency Selective Surface (FSS)	Queens U Belfast	None
Hyperspectral Imaging for Air Quality: Application of a hyperspectral imaging suite for 3D retrievals	U Leicester	None
Characterisation of Ferrite Material in Remanent State for use in New High Peak Power Applications	COM DEV International Systems Ltd	None
UK Support for the ALiSS Mission Study	STFC RAL	None
High frequency Doppler Radars #2 (HIDRA 2)	STFC RAL	U. Leicester
Demonstration of CO2 LHR	STFC RAL	None
ICEMuSIC – Instrument optimisation study and mission definition	U Cardiff	Met Office U. Hamburg
COConformal Retro Reflectors for Earth Observation (CORREO)	U Cranfield	U. Nottingham

8th Call Flag Ship Projects



Proposal Title	Lead Organisation	Project Partners
TRUTHS: Increasing TRL of the Cryogenic Solar Absolute Radiometer (CSAR) and the in-flight calibration system	NPL Management Ltd	Airbus DS
The Compact Air Quality Spectrometer: Raising TRL for key subsystems	University of Leicester	SSTL
Critical Technology Advancement of the LOCUS Mission: Towards Future Space Flight	University College London	STFC RAL MSSL Glwyndr University JRC Systems Star Dundee
The Compact Infrared Imager and Radiometer - CubeSat based	University of Oxford	Clydespace STFC RAL Sat Apps Catapult
Industrial Research for Next-generation Radar Electronics	Airbus DS	

Current & Future Technology Calls

Call	Grant Value	Open Date	Closing Date	Outcome/Comments
NSTP2 Phase 2 Flagship Call	£2M	Open	June 2015	Call now underway; target 2 Flag Ship projects, Start in Sept 2015
NSTP2 Phase 1 4 th GEI Call	£50K	Open	June 2015	Target 5 further GEI's
EE9 Preparation Call	£0.5M	June 2015	July/Aug 2105	Projects start in Sept 2015; feed into ESAC EE9 Call
EO Mission	£0.5M	July 2015	Aug 2015	ITT in preparation
9 th EO Call*	£2M	Aug 2015	Sept 2015	Details to be confirmed
NSTP2 Phase 2 PF/FT Call*	£3M	Sept 2015	Oct 2015	Fast Track/Pathfinder projects
NSTP2 Phase 2 GEI Call*	£200K	Sept 2015	Every 4 months	Mini-studies selected every 4 months

* UK Space Agency planned Calls

- Full details of all Call can be found on the CEOI-ST web site: www.ceoi.ac.uk
- To ensure you receive latest call notification add your contact details to the CEOI-ST email list by sending your email details to the CEOI Director

Thank You &
Any questions?