

Space City

How might Space Park Leicester
impact on your business?

Jane Cowley

Chair of Leicestershire Business Voice

Dr Grant Bourhill, Chief Executive of Science Parks, University of Leicester



Grant joined the University of Leicester in April 2018 to help the University and partners achieve an exciting vision for the future by developing vibrant sector-specific science parks, building on the University's strengths in Space and Life Science.

Professor Richard Ambrosi, Deputy Director, Space Research Centre, University of Leicester



Richard has worked on a number of space projects at the University of Leicester, and is also Director of the MSc in Space Exploration Systems and Chairs the Space Exploration Advisory Committee. He is part of the Space Park Leicester team, currently working on developing a new space tech cluster in Leicester.



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SPACE PARK LEICESTER UNIVERSITY OF LEICESTER

DR GRANT BOURHILL, CHIEF EXECUTIVE OF SCIENCE PARKS
PROFESSOR RICHARD AMBROSI, DEPUTY DIRECTOR,
SPACE RESEARCH CENTRE



Space Park

Leicester

A world-leading site
for innovative research,
enterprise and education
in space and Earth
observation

Development by



In partnership with

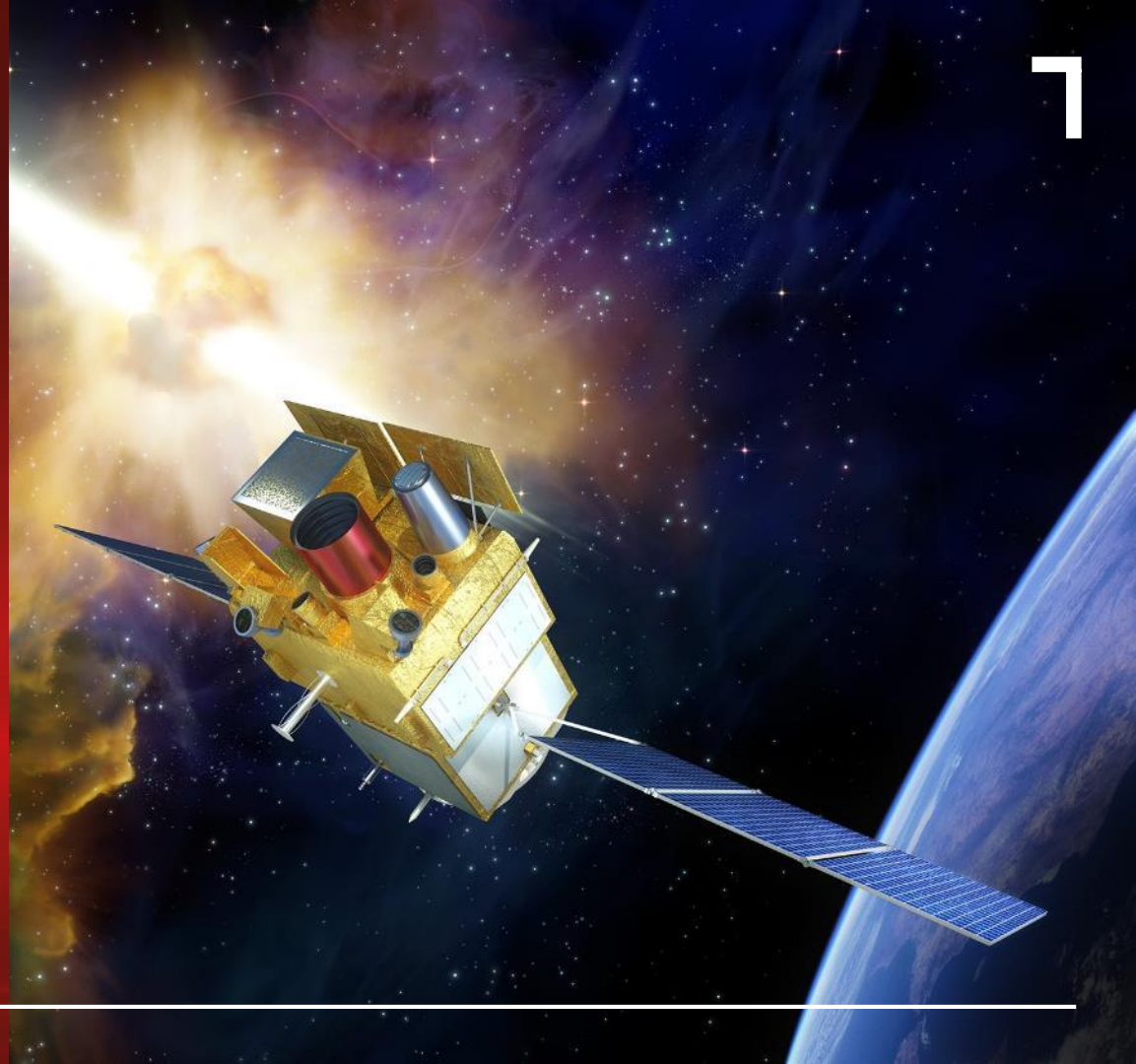




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THE OPPORTUNITY

- Global space market will grow 80% to £400bn by 2030
- UK ambition - capture £40bn
- Productivity – 3 times national average
- Growth – 5 times national average
- Exports – one third of UK sales
- Opportunity in build, launch, data and services



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UK SPACE CLUSTERS

Harwell: National Space Test Facility, Catapult, business incubators

Leicester: low-cost robotic manufacturing; space engineering; data; skills

Glasgow: electronics, microsattellites

Surrey: small satellites, in-space robotics

Goonhilly: satellite communications

Newquay: horizontal launch

Sutherland: vertical launch



60 YEARS OF SPACE INNOVATION

1960

Established
Space@Leicester

Impact

Leicester-built
instrument in orbit
every year since 1967

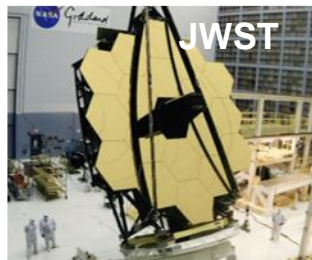
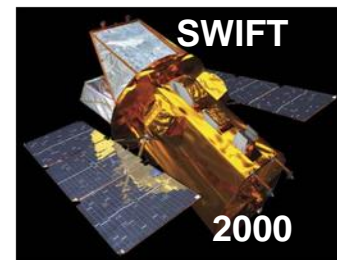
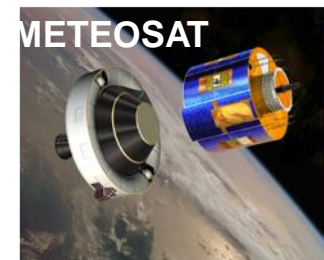
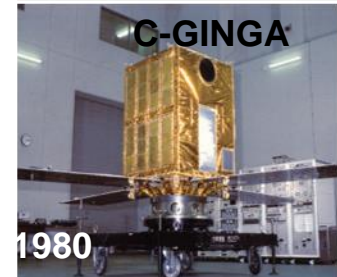
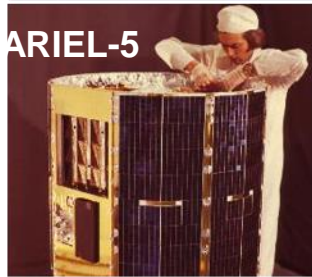
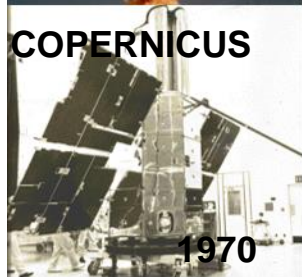
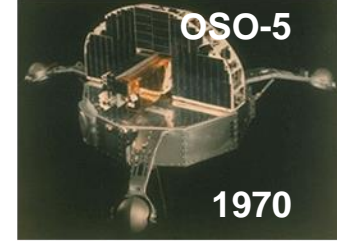
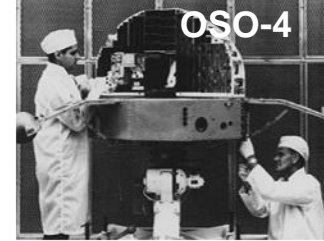
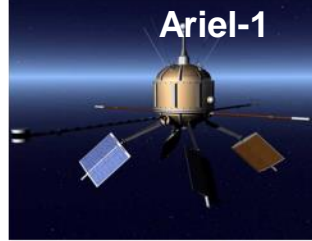
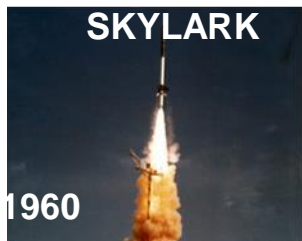
Skills

Largest concentration
of space-focused
expertise in UK
academia

Space education from
school pupils to PhDs

End-to-End capability

From science concept
to operational mission



- Commercial
- Market-driven (i.e. data services)

- Speed
- Constellations

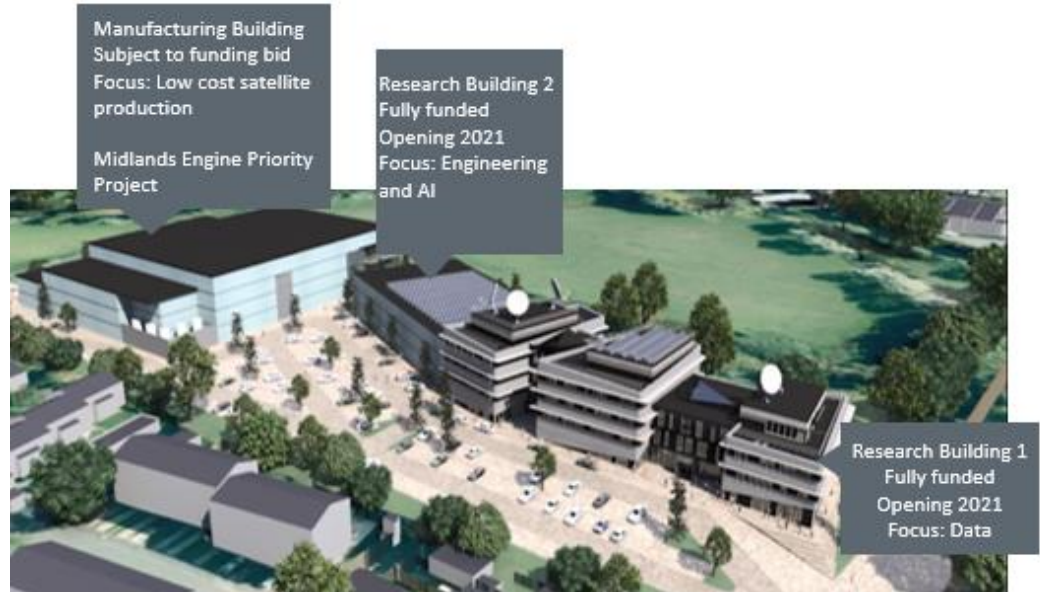
- Cost
- Build capacity



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SPACE PARK LEICESTER

- Integrating industry with academia
- Collaborating with industrial partners – from start-up SMEs to multinational companies
- Facilitating industrial growth of space and non-space companies
- Research and development, teaching and public engagement
- Improving student experience and retention



SPACE PARK LEICESTER: PROGRESS



8th January 2020



30th January 2020



4th March 2020



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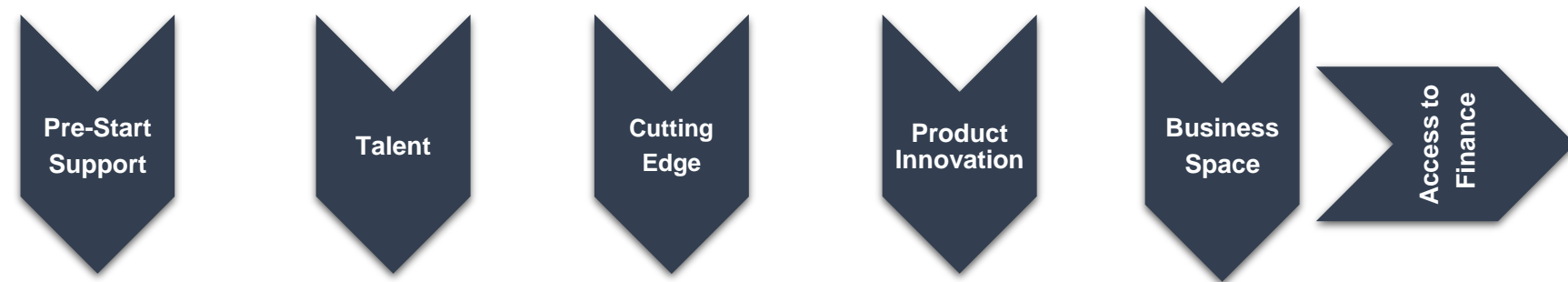
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SPACE PARK LEICESTER: GROUND-BREAKING



OUR OFFER



Innovation Leicester

Advice
Coaching
Networks
Space

Collaborative R&D

Placements
Internships
Employment

Research
Expertise
Post
Graduates

Consultancy

Design
Prototyping
Funded
projects

Incubation
Hot Desks
Leases

IP

LATEST OFFER

State-of-the-art facilities

Design

Precision Machining

Additive Manufacture (3D Printing)

Electronics Build and Test

Coating and Photolithography

STAR Dedicated Team

University Engineers and Technicians

University Research and Academics



Space Park Leicester

SPACE FOR BUSINESS:
STAR ACCELERATOR

www.le.ac.uk/space-for-business
[#SpaceParkLeicester](https://twitter.com/SpaceParkLeic)

t: +44 (0)116 252 3579
e: spaceparkleicester@le.ac.uk

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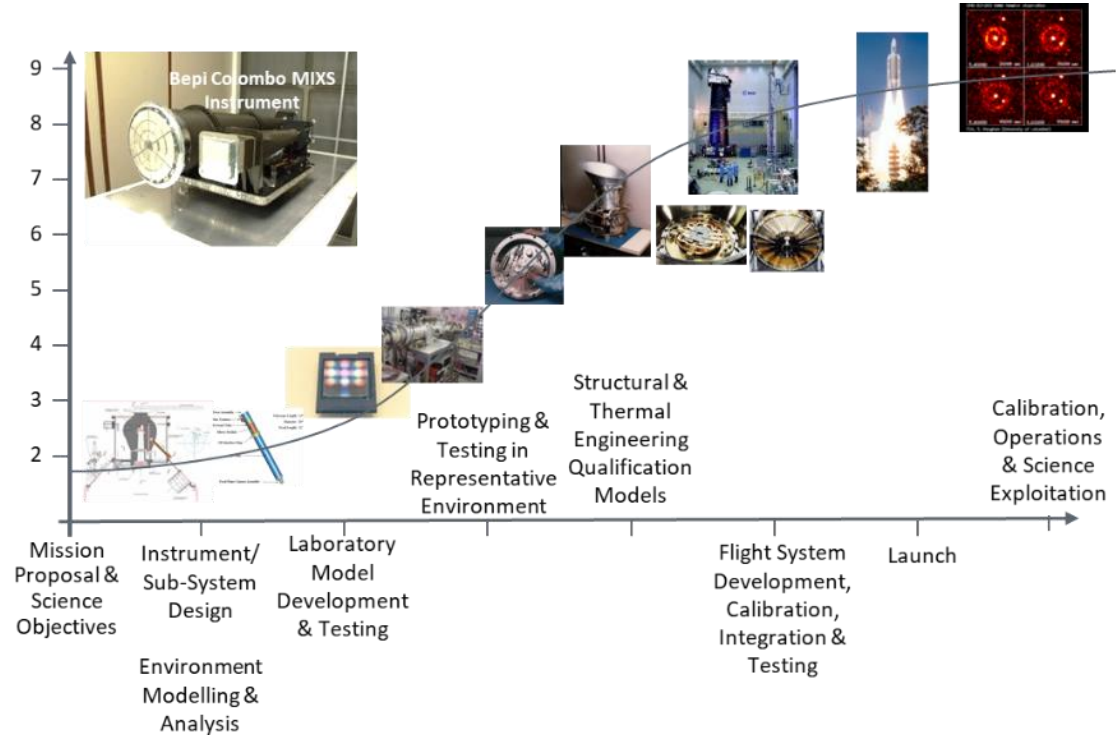
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LEICESTER  European Union
European Regional
Development Fund  MIDLANDS
ENGINE

STAR Accelerator is part funded by the European Regional Development Fund



END-TO-END CAPABILITY

- From science concept to operational mission
- One of few University groups with depth of expertise from concept to launch.
- Evolution of the structure could emulate modelled APL's Civil Space division.





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CUTTING EDGE RESEARCH

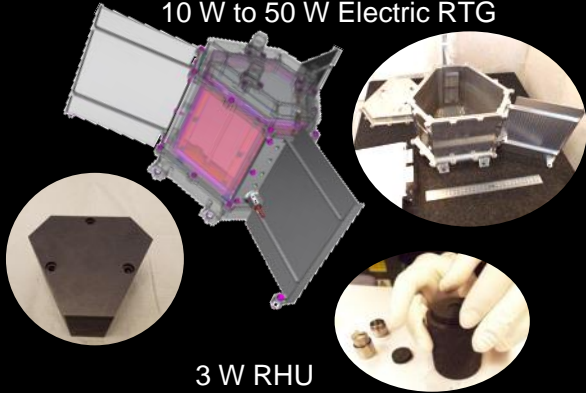
- Space Instrumentation & Technology for space science
- Innovative education & training programmes
- Research in new instrument and space technologies covering all of the space science strands at Leicester.
- Innovative teaching and training programmes including new MSc courses, skills for students interested in developing their own startups, apprenticeship programmes.



Enabling Technologies & Working with Industry

Making progress in space science and exploration requires going to new places and doing new things enabled by new technologies.

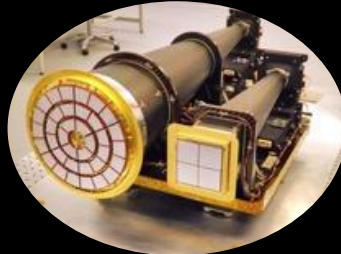
10 W to 50 W Electric RTG



3 W RHU

**Radioisotope Thermoelectric Generators
& Heater Units Utilising ^{241}Am**

Deep Space and Planetary Surface Missions



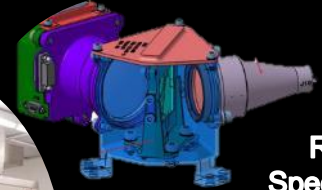
**Bepi Colombo-MIXS
Low Mass Optics**



**CTA-CHEC-P Camera
Fast (ns, ps) Detectors**



**Raman
Spectrometer
ExoMars**



**SPLIT & Double Walled Isolator
Mars Sample Return**



COLLABORATIONS & PARTNERSHIPS

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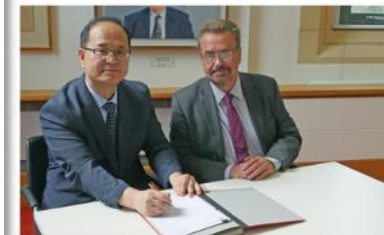
- Collaboration as a driver for growth and education.
- Collaboration across geographical, geopolitical and academic-industry boundaries.
- MSc in Space Exploration have international collaboration and industry involvement as a core feature.
- Many programmes involve international collaboration of some type.



MSc Space Exploration Systems



University of Leicester and National Nuclear Laboratory sign an agreement with Korea Atomic Energy Research Institute on future space battery design



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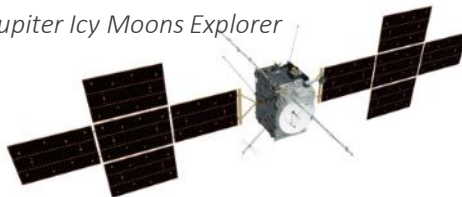
Small Variable Object Monitor Mission



Significant Leicester Contribution

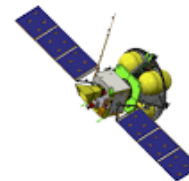


Jupiter Icy Moons Explorer

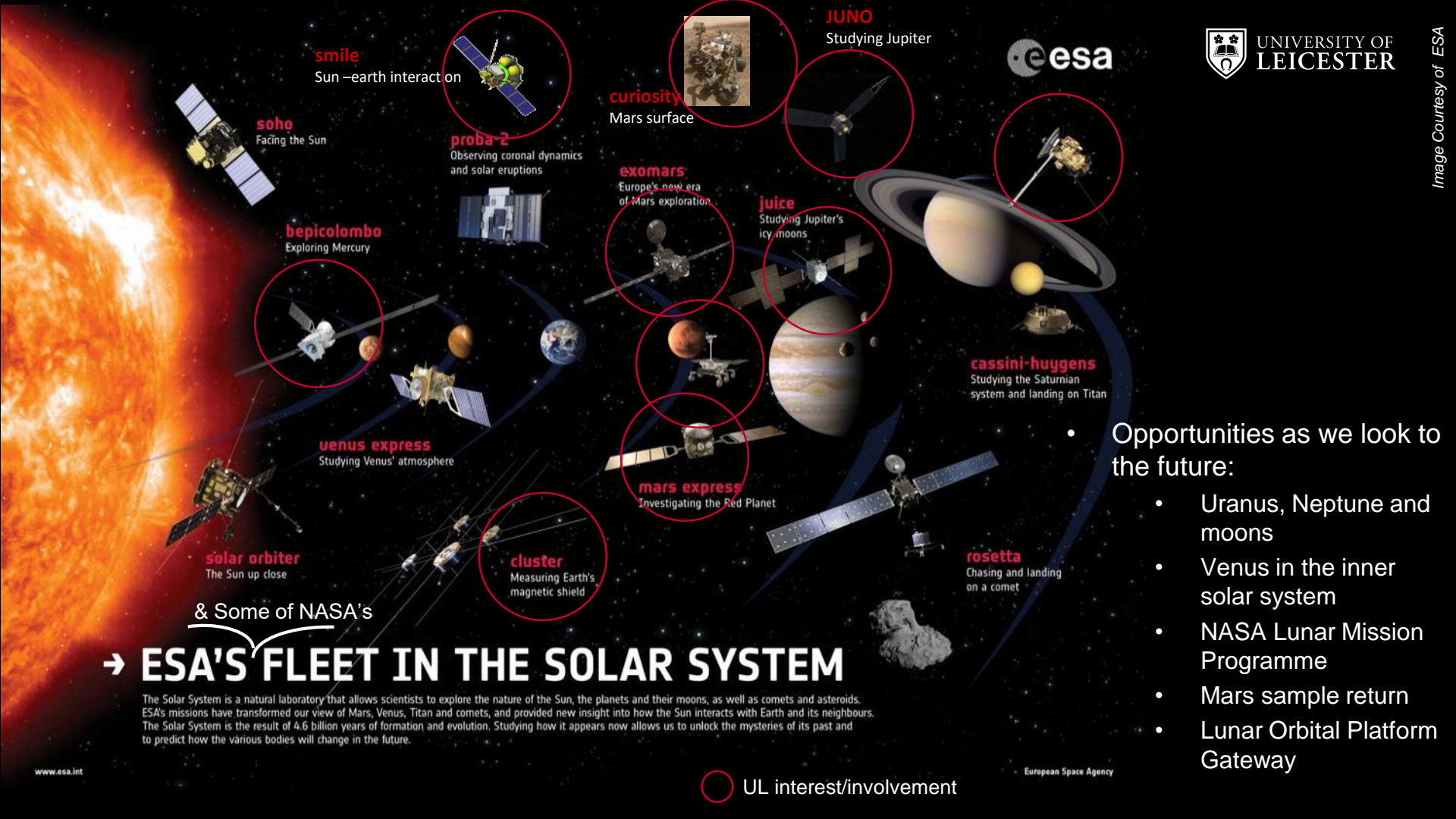


Italy, UK, Germany, France, The Netherlands, Sweden, USA

Solar Wind Magnetosphere Ionosphere Link Explorer



China, UK, Canada, Belgium, Austria



smile
Sun –earth interaction

soho
Facing the Sun

bepicolombo
Exploring Mercury

venus express
Studying Venus' atmosphere

solar orbiter
The Sun up close

proba-2
Observing coronal dynamics and solar eruptions

curiosity
Mars surface

exomars
Europe's new era of Mars exploration

mars express
Investigating the Red Planet

cluster
Measuring Earth's magnetic shield

JUNO
Studying Jupiter

juice
Studying Jupiter's icy moons

cassini-huygens
Studying the Saturnian system and landing on Titan

rosetta
Chasing and landing on a comet

& Some of NASA's
→ **ESA'S FLEET IN THE SOLAR SYSTEM**

The Solar System is a natural laboratory that allows scientists to explore the nature of the Sun, the planets and their moons, as well as comets and asteroids. ESA's missions have transformed our view of Mars, Venus, Titan and comets, and provided new insight into how the Sun interacts with Earth and its neighbours. The Solar System is the result of 4.6 billion years of formation and evolution. Studying how it appears now allows us to unlock the mysteries of its past and to predict how the various bodies will change in the future.

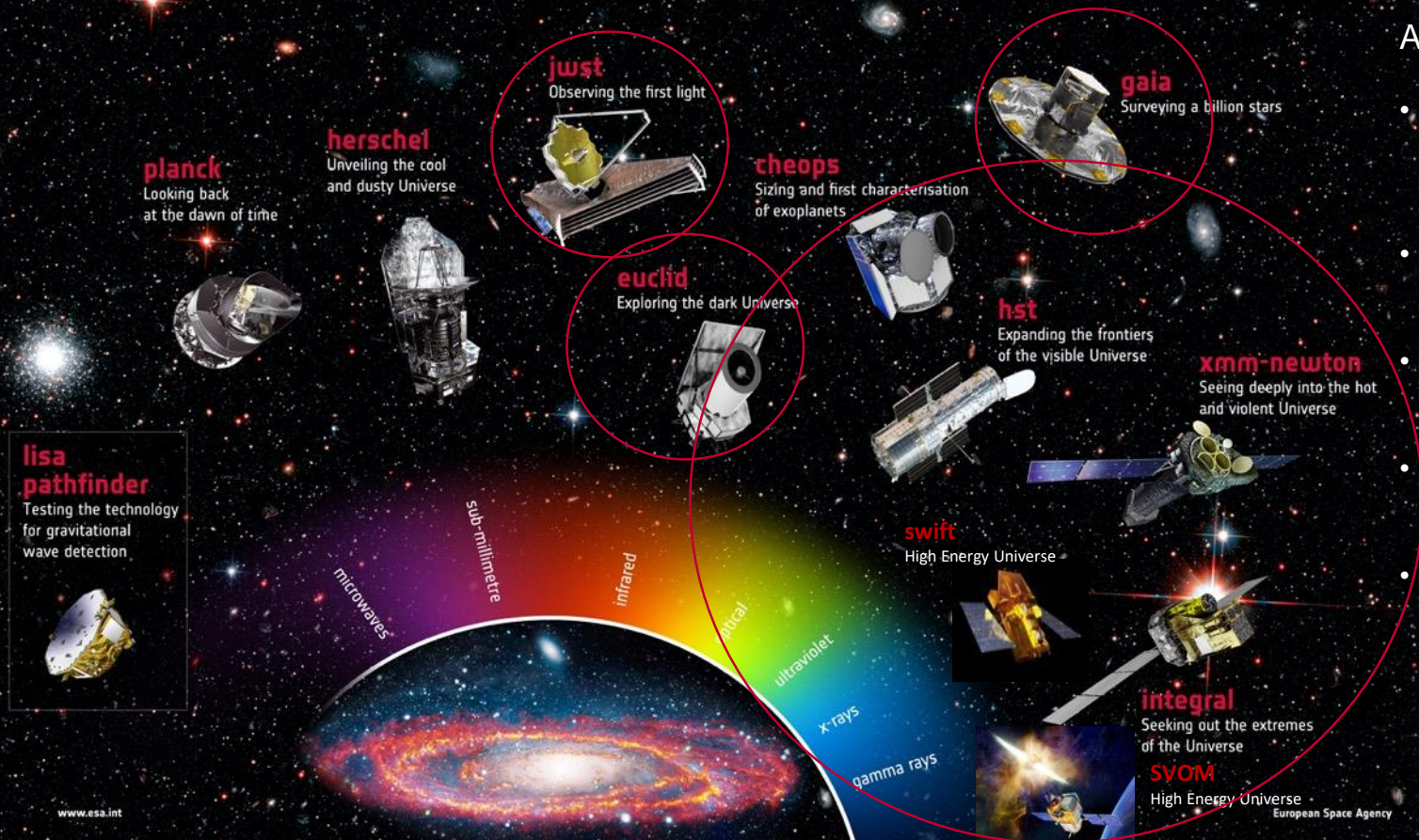
• Opportunities as we look to the future:

- Uranus, Neptune and moons
- Venus in the inner solar system
- NASA Lunar Mission Programme
- Mars sample return
- Lunar Orbital Platform Gateway

→ ESA'S FLEET ACROSS THE SPECTRUM



Thanks to cutting edge technology, astronomy is unveiling a new world around us. With ESA's fleet of spacecraft, we can explore the full spectrum of light and probe the fundamental physics that underlies our entire Universe. From cool and dusty star formation revealed only at infrared wavelengths, to hot and violent high-energy phenomena, ESA missions are charting our cosmos and even looking back to the dawn of time to discover more about our place in space.



Astrophysics

- Current and future missions with significant Leicester involvement.
- ATHENA (X-ray Astrophysics)
- Theseus (X-Ray Astrophysics)
- Einstein Probe (ESA – China Collaboration)
- SMILE (ESA-China Collaboration)

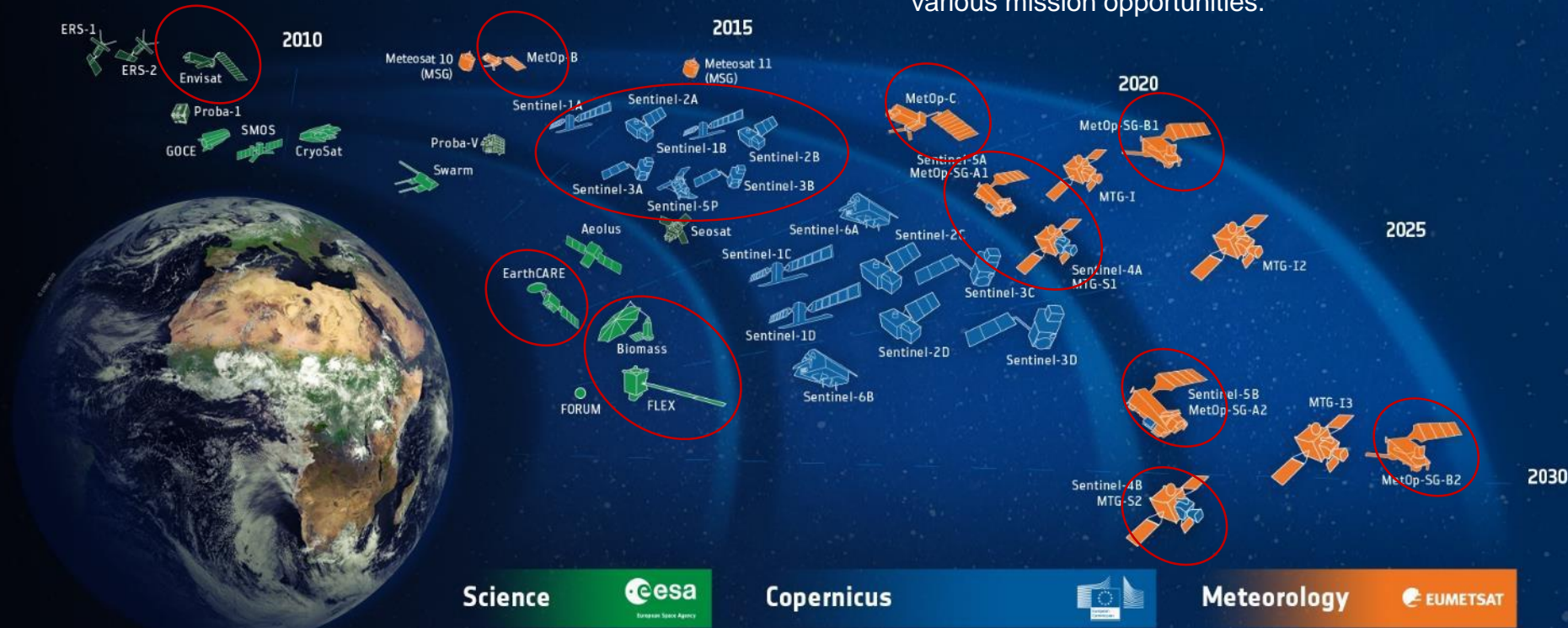
○ UL interest/involvement



ESA, EU and EUMETSAT

Earth Observation

- Science team membership.
- Use of data products.
- Official roles on missions.
- SRC has been developing instruments in partnership with Earth Observation Science for various mission opportunities.



NEW SPACE

- Access to space is a key aspect of the Leicester Space Park.
- In a New Space world the challenge is how to make the process from concept to operational mission more efficient, productive and cost effective.
- The private sector is becoming more active in driving change in the space sector.

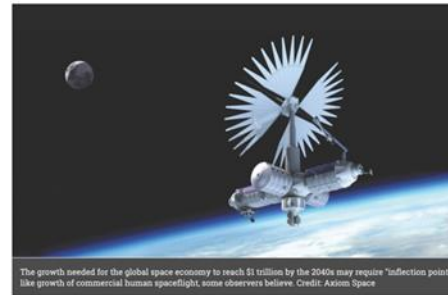
Japanese lunar exploration company ispace raises \$90 million

By Jeff Foust — December 13, 2017



A trillion-dollar space industry will require new markets

By Jeff Foust — July 5, 2018



RENTON, Wash. — Forecasts that predict the space industry to grow to a trillion dollars by the 2040s will require the development of new markets, even with the modest annual growth rates needed to achieve that goal.

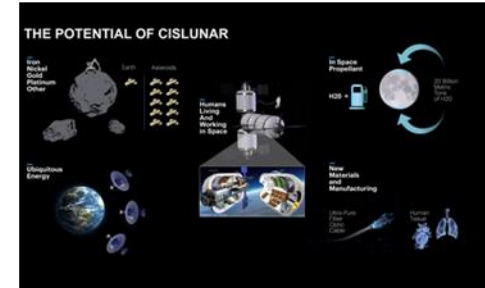
A panel session June 26 at the Space Frontier Foundation's NewSpace 2018 conference here noted that several reports in the last year by investment banks predicted that the global space economy, currently valued at about \$350 billion, could grow to \$1 trillion or more in the 2040s.

Luxembourg to support space mining

By Jonathan Amos
BBC Science Correspondent

3 February 2016

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CONTACT US

spaceparkleicester@le.ac.uk

0116 252 3579

www.le.ac.uk/spacepark

@SpaceParkLeic

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www.le.ac.uk/spacepark
[#SpaceParkLeicester](https://twitter.com/SpaceParkLeicester)

Any questions?

Make your voice heard

If you enjoyed today's event and would like to find out about becoming a Leicestershire Business Voice member, please speak to a Board Director today or visit our website www.lbv.co.uk

By joining LBV, you can:

- ✓ Help businesses thrive
- ✓ Voice your opinions with local & regional decision makers
- ✓ Influence policy affecting our economy

Please visit the website for details of our Members' Dinner on Thursday 14 May 2020

Thank you for your support
