



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



ALMA
MATER



STUDIORUM
UNIVERSITÀ

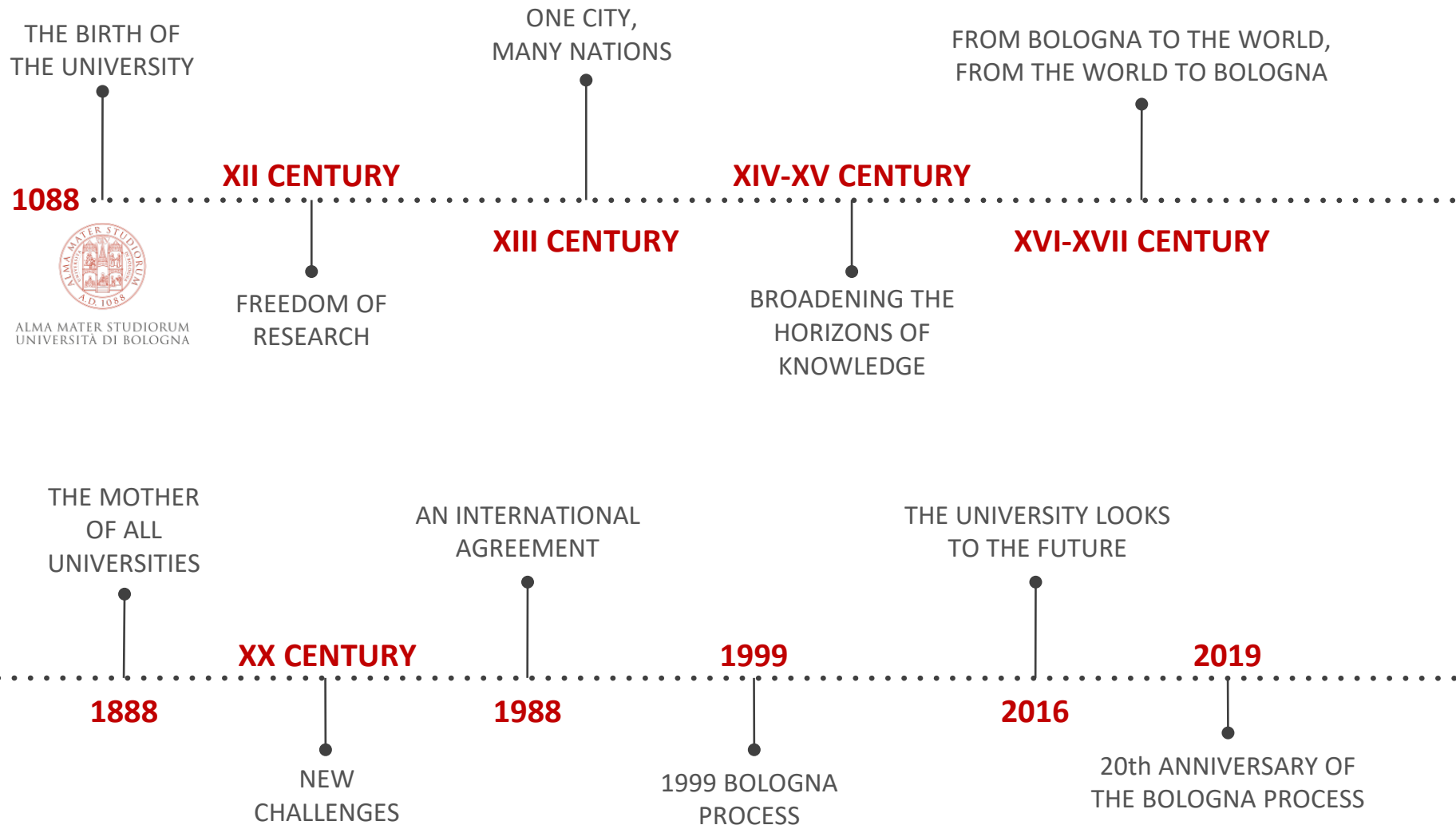


DI BOLOGNA

2021/2022

Prof. Paolo Tortora
07/12/2022

FROM 1088 TO THE FUTURE



MULTICAMPUS UNIVERSITY





MULTICAMPUS UNIVERSITY

THE MAIN VOCATIONS

CESENA

- AGRIFOOD
- ARCHITECTURE
- ICT AND BIOENGINEERING
- PSYCHOLOGY

RAVENNA

- ENVIRONMENT AND SEA RIGHTS
- CULTURAL HERITAGE
- RIGHTS

FORLÌ

- ECONOMICS AND SOCIAL SCIENCES
- MECHANICAL AND AEROSPACE ENGINEERING
- TRANSLATION AND INTERPRETING

RIMINI

- SUSTAINABLE DEVELOPMENT AND WELL-BEING
- SERVICES FOR INDIVIDUALS, BUSINESSES AND COMMUNITIES
- TOURISM AND FASHION

STUDENTS



TOTAL NUMBER OF STUDENTS ENROLLED ON UNDERGRADUATE AND POSTGRADUATE DEGREE PROGRAMMES

90,291

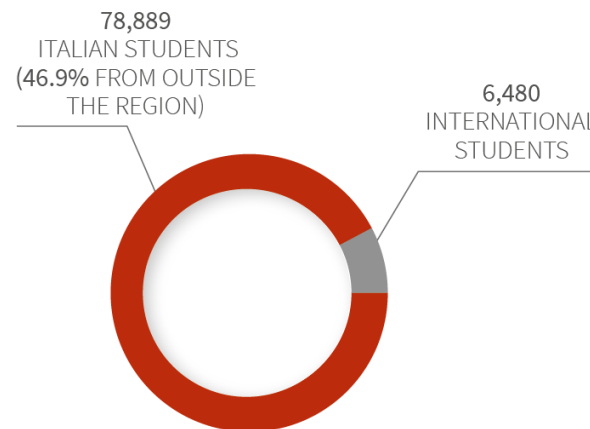


OF WHICH INTERNATIONAL STUDENTS

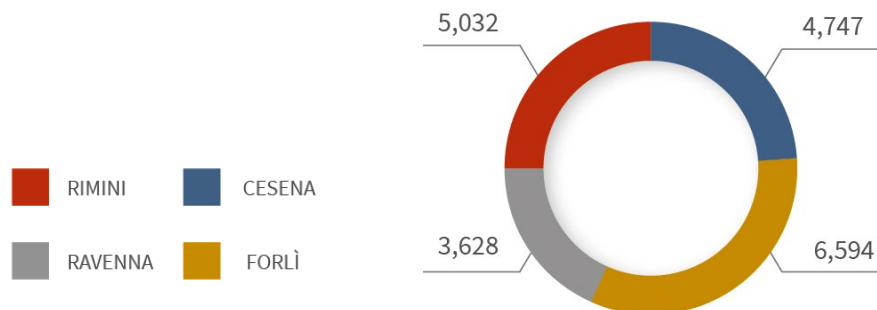
7,062

TOTAL NUMBER OF STUDENTS ENROLLED ON DEGREE PROGRAMMES:

85,369



TOTAL NUMBER OF ENROLMENTS BY CAMPUS: 20,001 (23.4%)



TEACHING

A.Y. 2021/2022

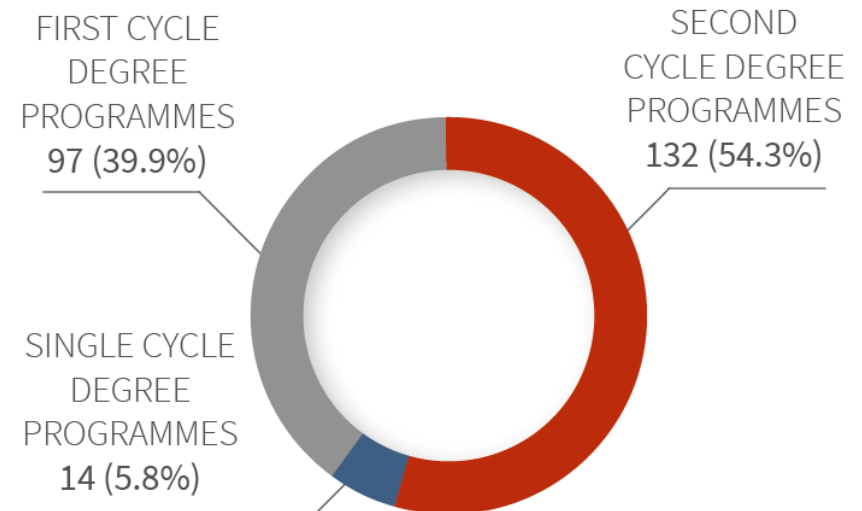


DEGREE PROGRAMMES (A.Y. 2021/2022)

243

OF WHICH 96 INTERNATIONAL:

- 56** TAUGHT IN ENGLISH
- 23** TAUGHT IN ENGLISH
DOUBLE/MULTIPLE DEGREES
- 17** DOUBLE/MULTIPLE DEGREES
NOT TAUGHT IN ENGLISH



- Bachelor's Degree in Aerospace Engineering
Bachelor's Degree in Astronomy
- Master's Degree in Aerospace Engineering (with "Space" curriculum – taught in English)
Master's Degree in Astrophysics and Cosmology (taught in English)
- Ph.D. in Aerospace Science and Technology
Ph.D. in Astrophysics
- Second-level Master in SPace mISSIONS sCIence dESign and applicationS (SPICES)



RESEARCH

Knowledge areas:



**Agri-food,
bioeconomics, natural
resources, agriculture
and the environment**



**Culture, creativity
and inclusive
societies**



Health



**Climate, energy and
mobility**



**Digital, industry
and space**



Public safety

INDUSTRIAL RELATIONS

47 active framework agreements with major businesses and business associations

7 Joint Research Laboratories with businesses

5 Advanced Vocational Training schools for employees of companies

1 COMPETENCE CENTRE in the context of the National Industry Plan 4.0. BI-REX

Placement services. In 2021, more than 7,000 Italian and international companies were registered

37 ACTIVE AND ACCREDITED SPIN-OFFS IN 2020

12 ACTIVE AND ACCREDITED START-UP BUSINESSES IN 2020

BUSINESS INCUBATION AND DEVELOPMENT:

Almacube, Cesenalab, Innovation Square, Basement Club

SPACE RESEARCH: DEPARTMENTS AND INTERDEPARTMENTAL CENTERS

The research skills in the **space field** are expressed through several Departments and Interdepartmental Centers of the University:

- Department of Industrial Engineering (DIN)
- Department of Electrical, Electronic and Information Engineering (DEI)
- Department of Civil, Chemical, Environmental and Materials Engineering (DICAM)
- Department of Computer Science and Engineering (DISI)
- Department of Physics and Astronomy (DIFA)
- Department of Chemistry (CHIM)
- Department of Biological, Geological and Environmental Sciences (BiGeA)
- **Interdepartmental Centre for Industrial Aerospace Research - CIRI AERO**
- Interdepartmental Centre for Industrial ICT Research - CIRI ICT

CIRI AERO: COMPETENCES

1. UO Aeronautics, Aerodynamics and Propulsion

- Aerodynamics and Fluid dynamics
- Plasmas
- Thermo-fluid dynamics
- Aerodynamic Plasma Control
- Propulsion
- Virtual Reality and Simulation
- Lightweight Structures and Composite Materials
- Flight Mechanics

2. UO Space Science and Technology

- Astrophysics and Cosmology
- Astrobiology
- Earth Observation
- Microsatellites and Space Systems
- Satellite Ground Station
- Radio Science and Planetary Exploration

COMPETITIVE PROGRAMMES

EUROPEAN PROGRAMMES

> 49,750 M€
HORIZON EUROPE

>148 MLN €
HORIZON 2020

> 10 MLN €
OTHER EUROPEAN FUNDING
(INTERREG, LIFE, CREATIVE
EUROPE)

2,3 MLN €
Joint initiatives (JPG, ERANET,
PRIMA, ECSEL)

NATIONAL PROGRAMMES

> 182 MLN€
PNRR

> 113,8 MLN €
DEPARTMENTS OF EXCELLENCE

> 20 MLN €
PRIN 2017 AND PRIN 2020

> 2,5 MLN €
NATIONAL OPERATIONAL
PROGRAMME (PON) FOR
INNOVATION RESEARCH

> 1,3 MLN €
FISR 2019-2020

REGIONAL PROGRAMMES

> 33 MLN €
POR-FESR 2014-2020
PSR 2014-2020
ADVANCED SKILLS

PLANS FOR COOPERATION WITH NEREUS

3 pillars:

- Pushing for regional interests through NEREUS to engage in political dialogue with relevant institutions (European Parliament, European Commission, ESA)
- Networking with Full and Associate members for joint proposals/projects
- Involve NEREUS in Communication and Public Outreach Promotion and awareness-raising activities in the context of HEU proposals



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Backup Slides on UNIBO Space Research Pillars

ASTRONOMY, ASTROPHYSICS AND COSMOLOGY



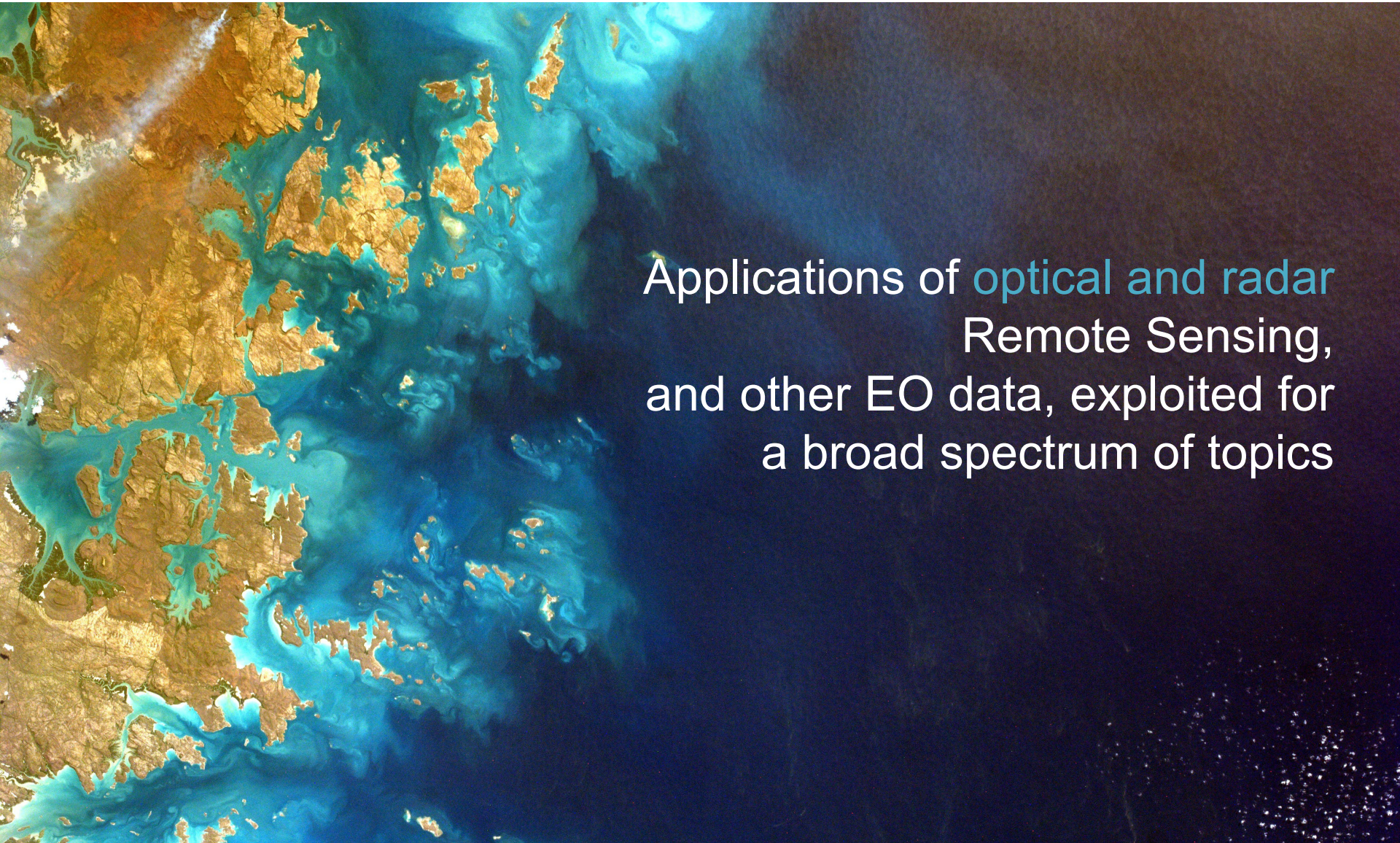
Understanding the
content and
evolution of the
Universe

SPACE AND COMMUNICATION SYSTEMS AND NETWORKS

The communication system is a key and critical element for space applications, as satellites are built to gather data through sensors or to serve as relay for users in a network



EARTH OBSERVATION APPLICATIONS



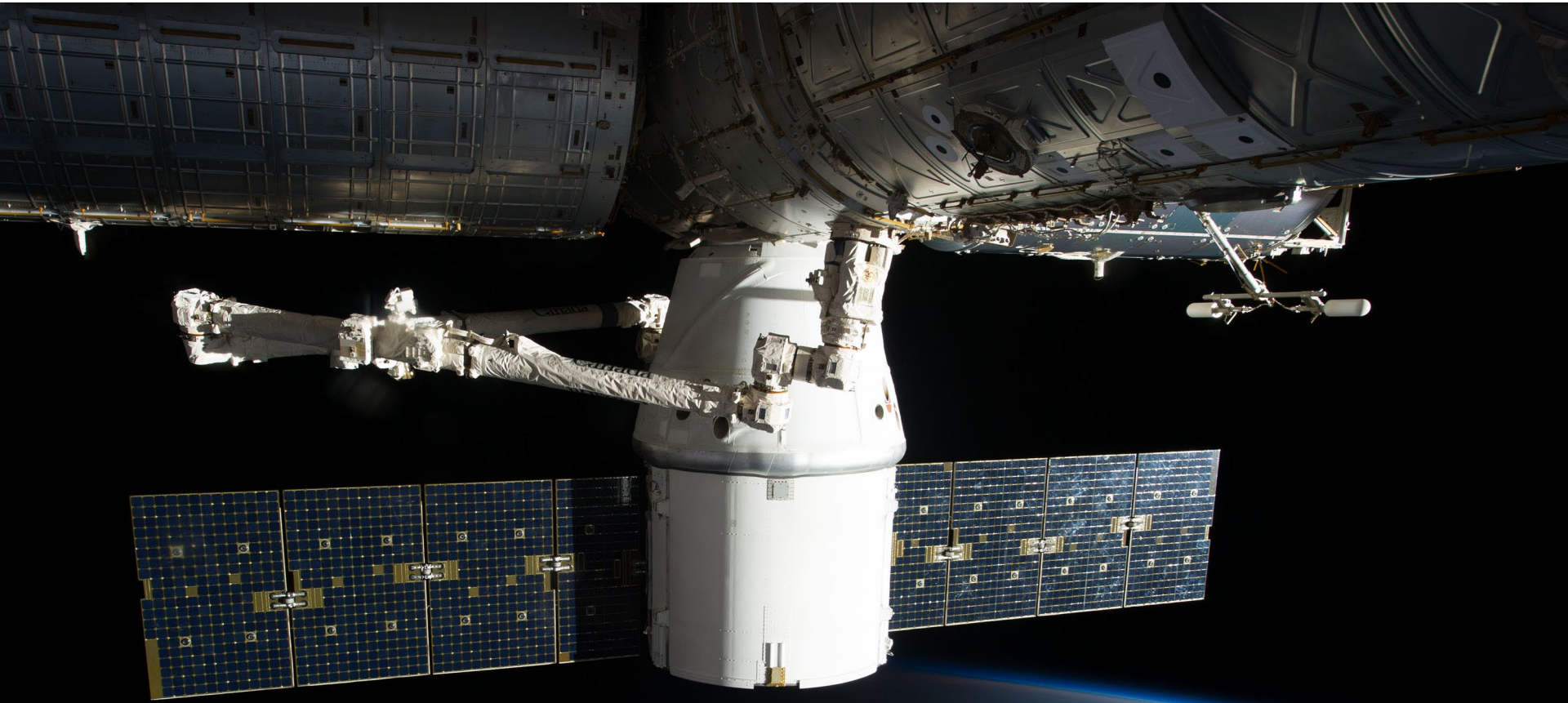
Applications of **optical and radar**
Remote Sensing,
and other EO data, exploited for
a broad spectrum of topics

EARTH OBSERVATION TECHNOLOGIES

Application and development of innovative data acquisition, modelling, processing solutions for **EO data**, with the aim to improve the quality and the type of the products



EGNSS SERVICES AND APPLICATIONS



EGNSS data is nowadays a critical technology in a very wide spectrum of applications including, but not limited to, navigation, monitoring ground movement and the atmosphere

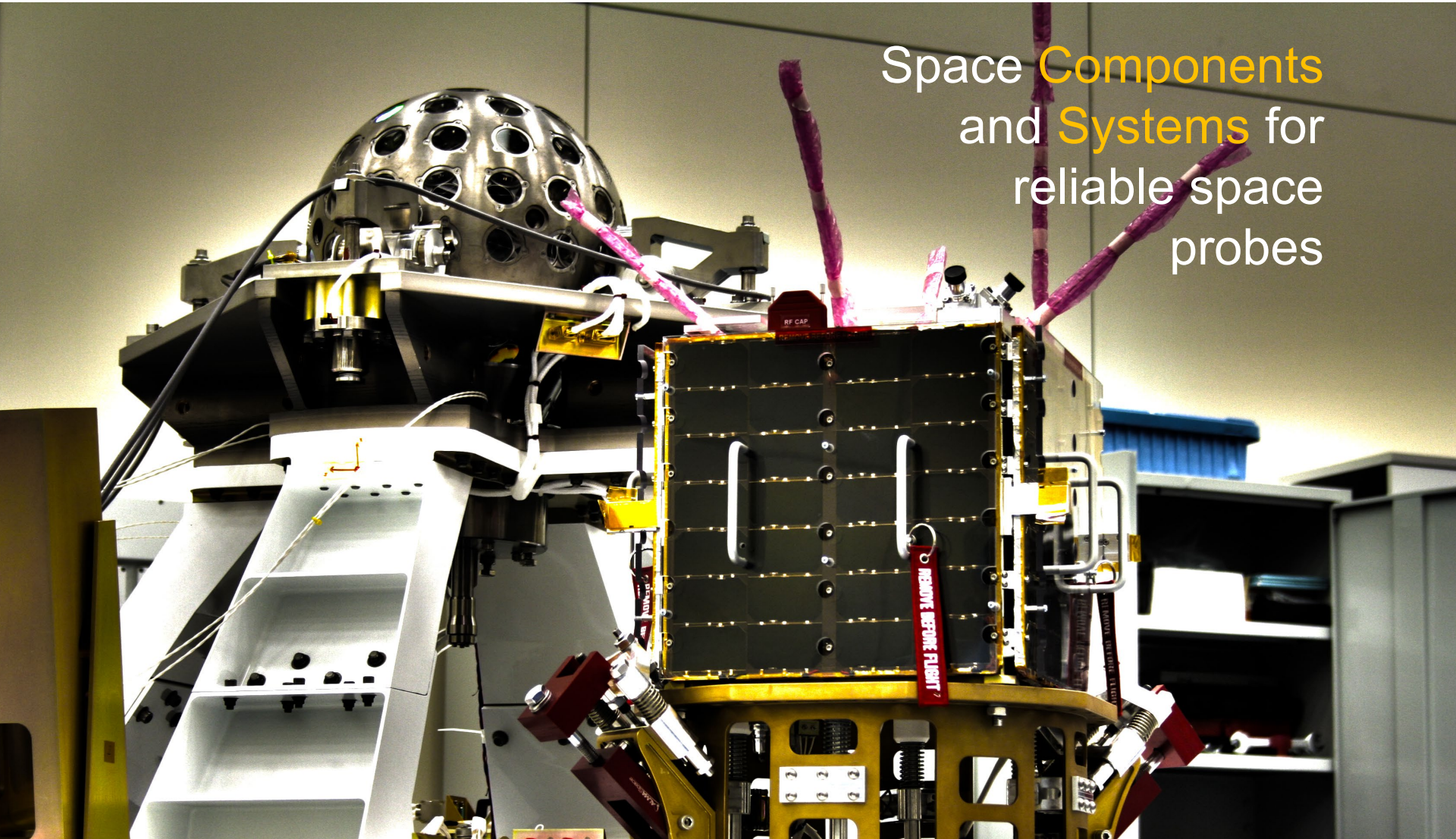
SPACE PROPULSION, POWER AND THERMAL SYSTEM



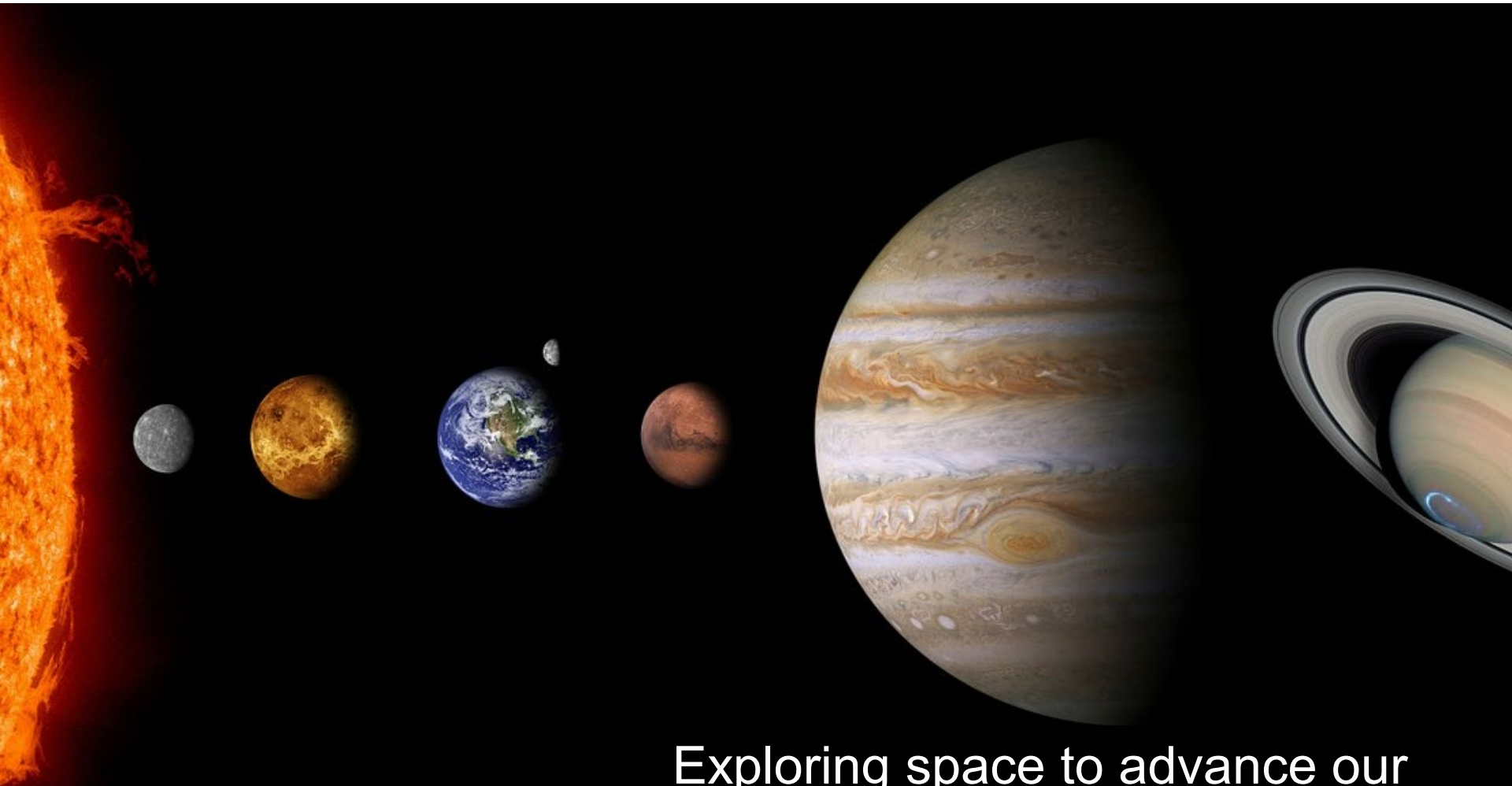
Space **Propulsion**, **Power** and **Thermal Systems** are essential tools to enable space exploration, in particular at large distances from the Sun and in extreme environments

SPACE COMPONENTS AND SYSTEMS

Space Components
and Systems for
reliable space
probes



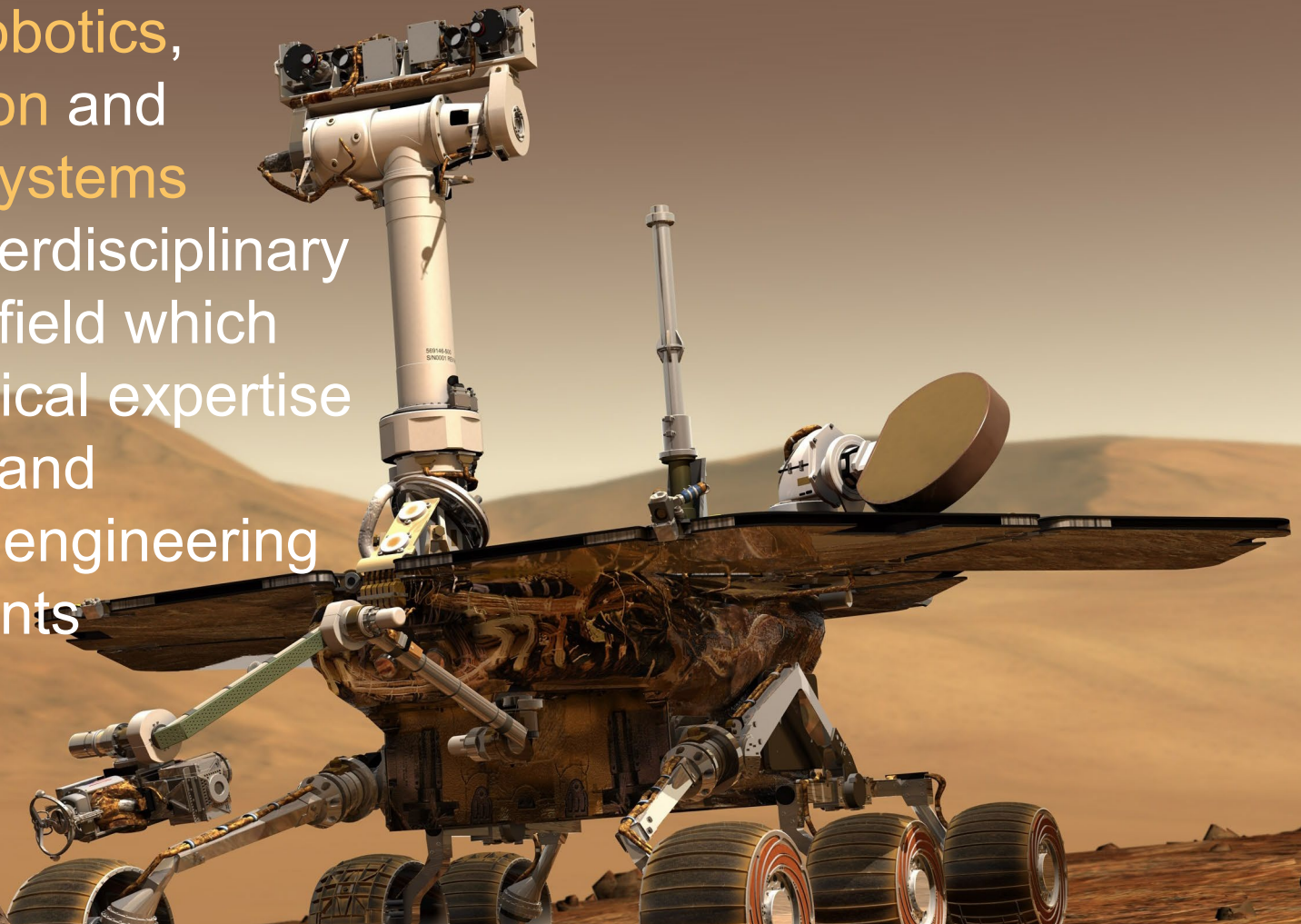
SPACE EXPLORATION




Exploring space to advance our
knowledge and innovate technology

SPACE ROBOTICS, AUTOMATION AND CONTROL SYSTEMS

Space Robotics, Automation and Control Systems are an interdisciplinary research field which mixes typical expertise from ICT and industrial engineering departments



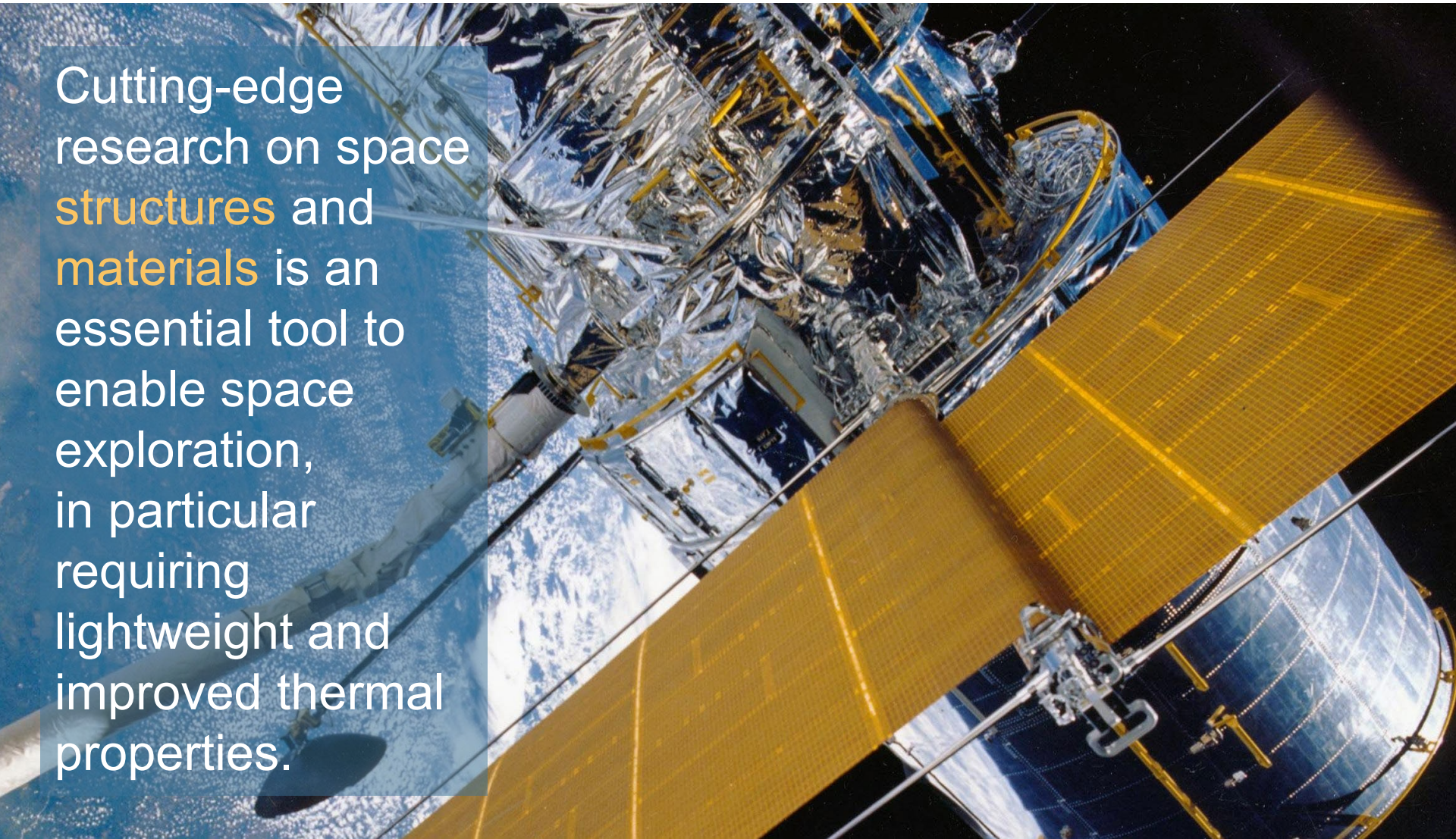
SPACE SOFTWARE AND DATA SYSTEMS

The background of the slide is a blurred image of computer code, likely JavaScript or a similar programming language, with various colors like red, green, and blue highlighting different parts of the code. The text is overlaid on this background.


A satellite in space produces a fountain of information. Data Systems oversee the technologies involved in spacecraft **onboard data handling (OBDH)** system.

SPACE STRUCTURES AND MATERIALS

Cutting-edge research on space **structures** and **materials** is an essential tool to enable space exploration, in particular requiring lightweight and improved thermal properties.



TOOLS FOR OPTIMAL EXPLOITATION OF SPACE DATA



Efficient algorithms to decipher the complexity of space data.