european
space technology
harmonisation

European Space Technology Harmonisation

Industry Space Days 2026

Edmund Williams

Head of Technology Coordination and Planning Office | TEC-RH

17/09/2026

REFERENCE: ESA-TECRH-HO-2026-002901

EUROPEAN SPACE AGENCY

ESA MANDATE

european space technology harmonisation

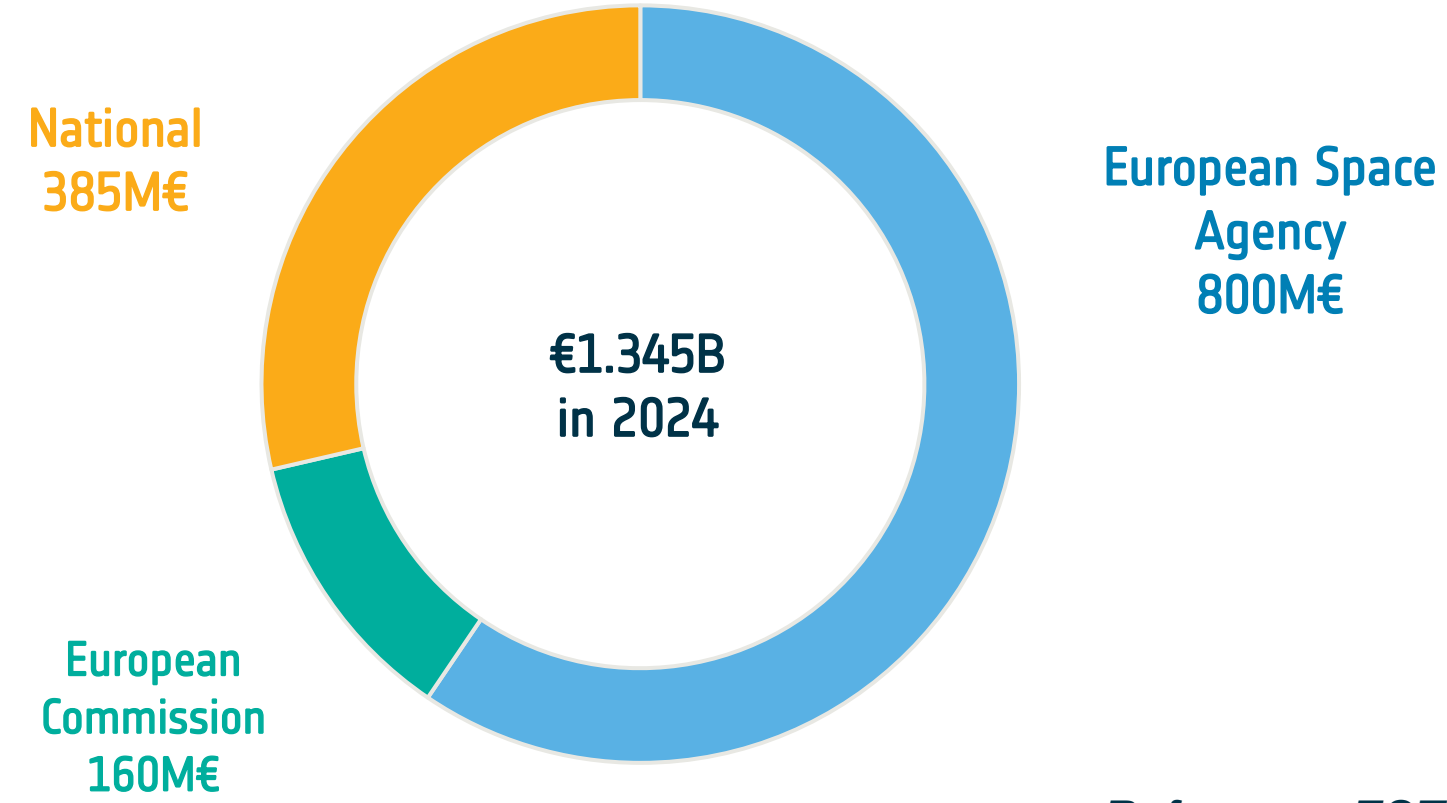
→ ESA CONVENTION AND COUNCIL RULES OF PROCEDURE

> *"The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes,* **cooperation** *among European states in* **space research and technology** *and their space applications (…)"*
>
> *ESA Convention – Article II PURPOSE*

AN INCREASING EUROPEAN BUDGET DEDICATED TO R&D

european space technology harmonisation

Institutional Space Technology civil R&D budgets in Europe reached **1.345 B€** in 2024:



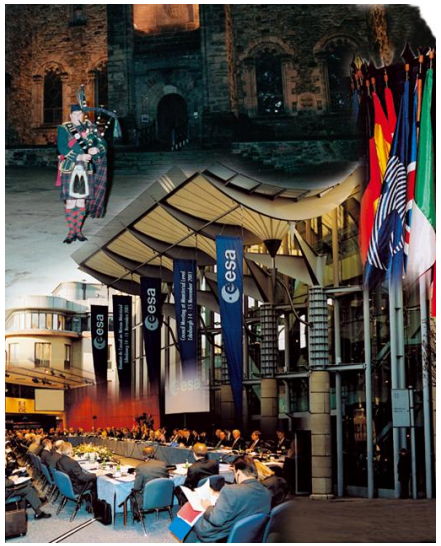
Reference: ESTMP Brochure 2025

AN EVOLVING PROCESS FOR OVER 25 YEARS

european space technology harmonisation

2000-2001

Harmonisation pilot case and mandate



Ministerial Council Meeting in Edinburgh, November 2001

2006

Creation of the IPC-THAG advisory group

THAG
Technology Harmonisation Advisory Group

2009

EC-ESA-EDA Non-dependence process defined based on Harmonisation

2013

100th Harmonisation Roadmap agreed and released

2025

Major update of the process

european space technology harmonisation 45 years

TABLE OF CONTENTS

european space technology harmonisation

WHAT IS HARMONISATION

HARMONISATION SCHEDULE

WHY TO PARTICIPATE

HOW TO PARTICIPATE

WHAT IS ESA TECHNOLOGY HARMONISATION ?

european space technology harmonisation

Harmonisation Meeting in ESTEC in May 2026.
Presenter from ESA.

Harmonisation Panel at "50 years of Innovation at ESA", Florence in May 2025.
Panellists from ESA, THAG Delegates, SME4Space, EASTRO, ESRE.

It is a **structured process** led by the European Space Agency (ESA) to **coordinate** and **align** technology development activities **across Europe's** space sector.

OBJECTIVES OF HARMONISATION

european space technology harmonisation

FILL STRATEGIC GAPS & MINIMISE UNNECESSARY DUPLICATIONS

CONSOLIDATE EUROPEAN STRATEGIC CAPABILITIES

ACHIEVE A COORDINATED & COMMITTED EUROPEAN SPACE TECHNOLOGY POLICY & PLANNING

CONTRIBUTE TO ENSURING CONTINUITY & COHERENCE BETWEEN TECHNOLOGY & INDUSTRIAL POLICIES

AN INCLUSIVE COLLABORATION

National Agencies

THAG
National Delegations

European and Canadian Space Entities*

* Space Entities include Industry, R&D Organisation, Academia and Associations.
- **SME4Space** provides support to SMEs to contribute to the Harmonisation process.

ESA TECHNOLOGY HARMONISATION OUTPUTS

european space technology harmonisation

Technology Harmonisation Dossier (THD)

- 10 THDs published per year.
- Contains state of the art of the technology and Roadmaps.

European Space Technology Master Plan (ESTMP)

- 1 ESTMP published per year.
- Overview of space technology in Europe.

Harmonisation delivers not only roadmaps and dossiers, but also a **strong network of cooperation** among European space stakeholders.

CONTENT OF THE DOSSIERS (THD)

european space technology harmonisation

- **STATE OF ART IN EUROPE,** KEY ISSUES, COMPETITIVENESS AND BENCHMARKING
- **TECHNOLOGY TRENDS**, SYNERGIES AND TRANSFER OPPORTUNITIES
- MISSION NEEDS, **MARKET PERSPECTIVES** AND EUROPEAN STRATEGIC INTERESTS
- **R&D FUNDED ACTIVITIES** RELEVANT TO THE TOPIC AT EUROPEAN AND NATIONAL LEVEL
- **STRATEGIC ROADMAPS** AND R&D LINES RECOMMENDED FOR THE FUTURE YEARS

ACTIVE HARMONISATION TOPICS

european space technology harmonisation

Micro And Nano Tech. - MEMS Pressure Sensors, MOEMS and RF-MEMS
Optical Detectors
Photonics
Actuators Building Blocks for Mechanisms
Additive Manufacturing
Coatings
Composite Materials

Cryogenics and Focal Plane Cooling
Deployable Booms & Inflatable Structures
Heat Transport Equipment and Systems
Printed Circuit Boards and Electronic Assembly Technologies
Pyrotechnic Devices
Solar Array Drive Mechanisms
Technologies for Hold Down, Release, Separation and Deployment Mechanisms
AOCS and GNC Systems
Avionics Embedded Systems

On-Board Computers, Data Handling Systems and Microelectronics
On-Board Software
On-Board Radio Navigation Receivers
TT&C Transponders and Payload Data Transmitters

Electromagnetic Compatibility
Electrochemical Energy Storage
Power Management and Distribution
Solar Generators and Solar Cells

Array Antennas and Periodic Structures
Critical Active RF Technologies
Frequency and Time Generation and Distribution (Space & Ground)
Microwave Passive Hardware

Lidar Critical Subsystems
Optical Communications for Space
Power RF Measurements & Modelling
Reflector Antennas
Technologies for Optical Passive Instruments (Stable & Lightweight Structures, Mirrors)
Technologies for Passive Millimetre & Submillimetre Wave Instruments

Automation and Robotics
Life Support Technologies

CubeSat Propulsion
Chemical Propulsion - Components (including Tanks)
Electric Propulsion Technologies
Technologies for Fluid Mechanics

Functional Verification and Missions Operations Systems
Ground Station Technology

Big Data from Space
Enabling Artificial Intelligence for Space System Applications
Model Based for System Engineering
System Modelling and Simulation Tools

De-orbiting Technologies
Radiation Environments & Effects

TABLE OF CONTENTS

european space technology harmonisation

WHAT IS HARMONISATION

HARMONISATION SCHEDULE AND UPCOMING CYCLES

WHY TO PARTICIPATE

HOW TO PARTICIPATE

10 TOPICS REVIEWED PER YEAR

european space technology harmonisation

2027 Cycle 1

- Array antennas and periodic structures
- Electric Propulsion Technologies
- Lidar Critical Subsystems
- Photonics
- Optical Detectors

2027 Cycle 2

- Automation and Robotics
- Big Data from Space
- Inflatable Structures
- Microwave Passive Hardware
- Optical Communications for Space

TIMELINE OF THE HARMONISATION PROCESS

european space technology harmonisation

The process has been revised in 2025 to be **more inclusive**, more **efficient** and include a **new roadmap format** with high level strategic objectives.

2027 CYCLE 1

1 cycle ≈ 9 months

ESA THAG Space Entities European Commission European Defence Agency

TABLE OF CONTENTS

european space technology harmonisation

WHAT IS HARMONISATION

HARMONISATION SCHEDULE

WHY TO PARTICIPATE

HOW TO PARTICIPATE

BENEFITS FOR PARTICIPATING ENTITIES

european space technology harmonisation

WHY TO PARTICIPATE IN EUROPEAN SPACE TECHNOLOGY HARMONISATION ?

Your contribution to the Harmonisation products:

TECHNOLOGY HARMONISATION DOSSIERS AND STRATEGIC ROADMAPS

Gives you

MARKET INTELLIGENCE

A comprehensive analysis of technologies' state-of-the-art, benchmarking and trends.

OPPORTUNITIES

Insight into tech transfer opportunities.
Insight into future needs and priorities.

VISIBILITY

Networking across various key space stakeholders.
Direct access to ESA Experts.

STRATEGIC ROADMAPS

Early-access to European-wide roadmaps.
Alignment with Harmonisation strategic objectives.

INFLUENCE

A voice in shaping the future developments.

WHO CAN PARTICIPATE ?

european space technology harmonisation

OPEN TO ALL EUROPEAN & CANADIAN ENTITIES

Space industry leaders • Research institutes • Startups & SMEs • Academic researchers • Associations

Non-space entities can also identify spin-in or spin-out opportunities.

1,000+ EUROPEAN ENTITIES

Agencies, industry, R&D, academia and associations

30+ COUNTRIES

involved in the process

ESA TECHNOLOGY BROKERS

Network involved

380 AVERAGE PARTICIPANTS

at Kick-Off Meeting webinars

TABLE OF CONTENTS

european space technology harmonisation

WHAT IS HARMONISATION

HARMONISATION SCHEDULE

WHY TO PARTICIPATE

HOW TO PARTICIPATE

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite (usually in ESTEC, NL) with Experts' topics presentations.

GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

Sign up for the 2027.1 KOM on 21 October 2026 !

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite (usually in ESTEC, NL) with Experts' topics presentations.

GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite (usually in ESTEC, NL) with Experts' topics presentations.

GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

ESA-STAR REGISTRATION

european space technology harmonisation

Esa-star is the European Space Agency's system for registration and tendering, which serves as a single access point for your activities with ESA.

TECHNOLOGY CAPABILITIES

Add and update your technology capabilities to ensure that you are considered for Harmonisation topics which match your expertise.

- Go to the **esa-match** module
- Navigate to My Entity Profile and access the **Competences & Capabilities** section
- Edit your capabilities according to the ESA **Technology Tree***

CONTACT INFORMATION

Add and update your points of contact to let us know who to contact to participate to the Harmonisation Consultations.

- Go to the esa-star **Registration module**
- Navigate to the **Contacts** part of the registration sections menu
- Edit your Harmonisation contacts with the role **Entity Capability Responsible***

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite (usually in ESTEC, NL) with Experts' topics presentations.

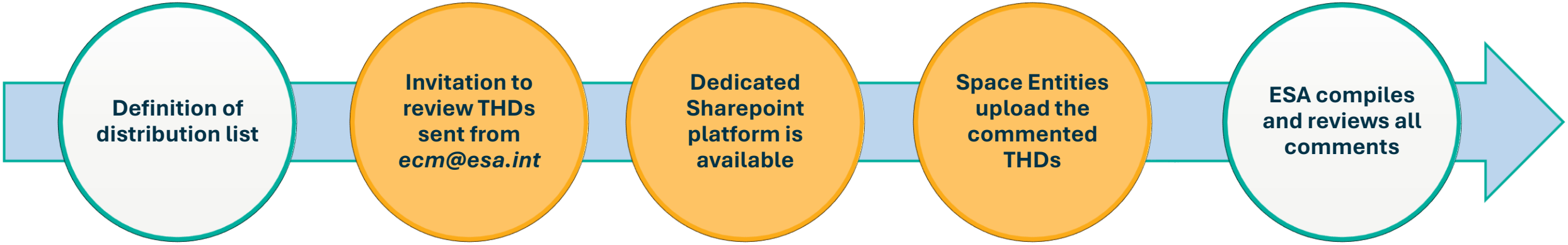
GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

SPACE ENTITIES CONSULTATION SUMMARY

european space technology harmonisation

CONSULTATION WORKFLOW



CONSULTATION HIGHLIGHTS

The 2027 Cycle 1 Harmonisation consultation will be launched in **November 2026** and closed in **January 2027**

The 2027 Cycle 2 Harmonisation consultation will be launched in **March 2027** and closed in **April 2027**

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite with Experts' topics presentations.

2027.1 Harmonisation meeting will be on 23-25 February 2027 in ESTEC !

GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

HOW CAN I CONTRIBUTE TO THE HARMONISATION ?

european space technology harmonisation

Step-by-step view of Harmonisation process.

KICK-OFF MEETING

Online session introducing topics for this year.

REGISTER TO ESA-STAR

ESA's system for registration and tendering, which serves as a single access point.

esa-star Registration

esa-star esa-match

JOIN THE CONSULTATION

THD's review of version 0 through a dedicated Sharepoint.

ATTEND HARMO MEETING

Online or onsite (usually in ESTEC, NL) with Experts' topics presentations.

GET ACCESS TO THDs

Fill the form from our website or contact *harmo@esa.int* from a corporate email

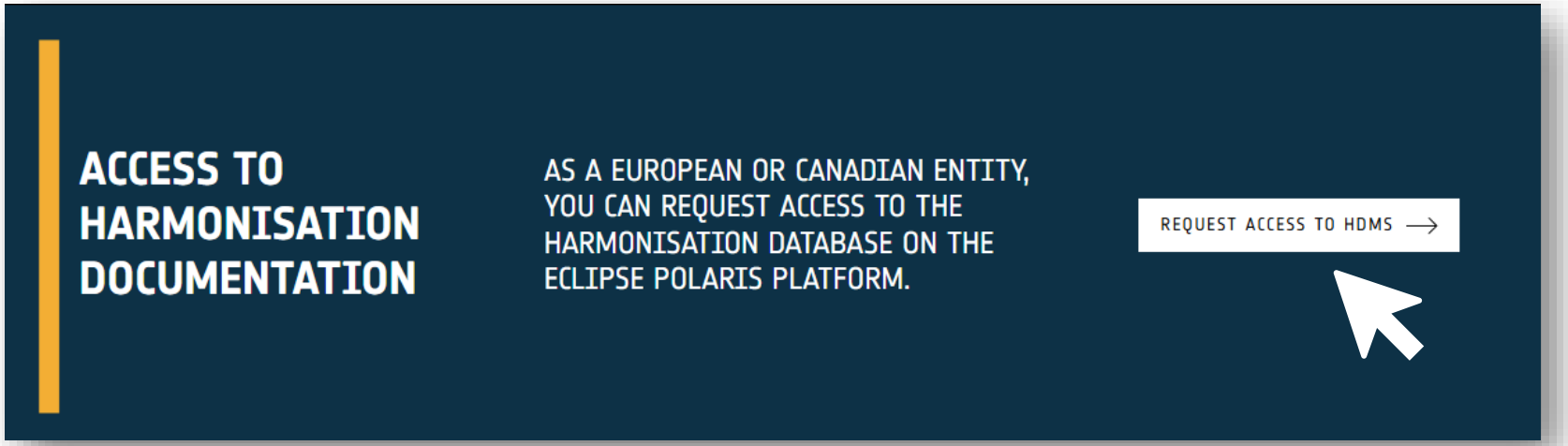
HOW TO ACCESS THE PUBLISHED DOCUMENTS

european space technology harmonisation

You can directly request access to **the published THDs and ESTMP** on the Harmonisation database HDMS by compiling the form on our website https://technology.esa.int/page/harmonization, by clicking on "**REQUEST ACCESS TO HDMS**".

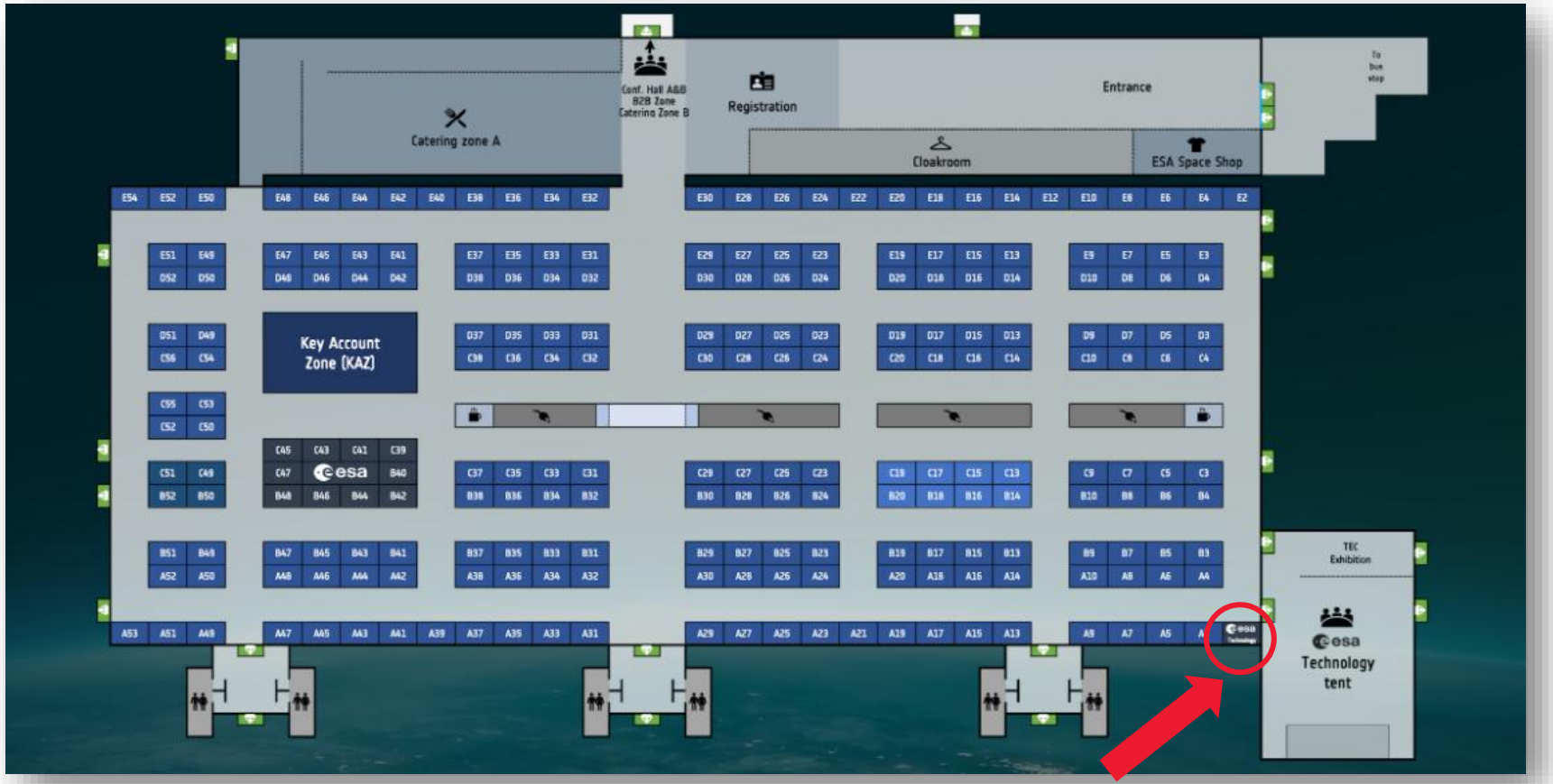
If you encounter any issue, directly contact us at harmo@esa.int.

These documents are available only for European and Canadian entities.



european space technology harmonisation

Come visit us at our booth at the entrance of the Technology Tent:



EUROPEAN SPACE AGENCY

european space technology harmonisation

THANK YOU FOR YOUR ATTENTION!

Contact us:

harmo@esa.int

European Space Technology Master Plan:

estmp@esa.int

Visit our website for more info:

https://technology.esa.int/page/harmonisation