TECHNOLOGY

Discovery/TDE and GSTP

Programme Presentation to the Belgian Actors, Antwerp Expo

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DIRECTORATE OF TECHNOLOGY, ENGINEERING AND QUALITY

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Presentation Outline

- ESA ‘Mandatory Activity’ Technology R&D Elements
  - Discovery Element
  - Technology Development Element

- General Support Technology Programme
  - General Overview
  - Element 1 (Compendia, Frameworks…)
  - Element 2
  - Element 3

- GSTP in the context of the CM-22 Preparation
  - Element 1 2022 Compendia
  - Element 1 Framework, Element 2 AO and Element 3 evolutions
  - New GSTP ‘Components’ and ‘Specific Area’

DISCOVERY, PREPARATION & TECHNOLOGY DEVELOPMENT

Disruptive Ideas

- Fast and Open
- Interactive
- Novelty driven
- Outside driven
- Open competitive
- Low budget
- Commercialisation
- Research projects & early techn. dev.

Discovery

Future Missions

- First baselines
- Pre-phase A/Phase A
- ESA driven
- MBSE base-line
- Mission enabling
- Across all domains
- Open competitive
- LSI consortia
- Studies

Preparation

Technology

- low TRL
- Generic
- Enabling missions
- 2yr Work plans
- SME focus
- ESA driven
- Across all domains
- Open competitive

TDE

- higher TRL
- Enabling missions
- Supporting Competitiveness
- Work plans & industry-driven proposals
- SME focus
- Delegation support
- 3 Elements + components

GSTP

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Discovery Element

Open Science – Open Innovation to discover and explore the disruptive innovation of tomorrow

Introduced ESA's Open Space Innovation Platform (OSIP)

- External ideas driven - Reaching out for best ideas from anybody
- Lowest ever entrance barrier to space innovation
- Inverted logic: first smart idea, then the process
- Fast feedback, engagement and decisions

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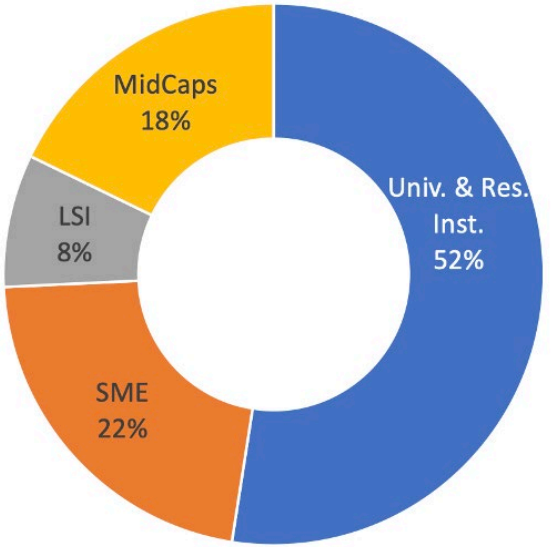
Exploratory first steps funded:

- co-sponsored research, studies and early technology development activities

Integrates Commercialisation objectives of Agenda 2025



-> DISCOVERING TOMORROW'S INNOVATION

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First Steps for Novel Ideas: Discovery Element via OSIP

Your Novel Idea

Your action

- You focus on describing your idea in form of an abstract
- No need for formalities
- Submit any time to Open Discovery Channel on OSIP
- Ideas for future commercially viable activities welcome

OSIP (ideas.esa.int)

- ESA gives you feedback
- ESA channels ideas to best implementation path
- Monthly evaluation for Discovery channel ideas
- Best ideas invited to be matured into proposals

Discovery Contract

- Following competitive evaluation
- Co-sponsored research (<90k)
- Study (<100k)
- Early Technology Development (<175k)

OSIP Channel

- Permanently open
- All novel space ideas welcome

OSIP Campaigns

- Time limited
- ESA defined challenges / topics

GSTP, InCubed, ARTES, NAVISP …

- Programme specific

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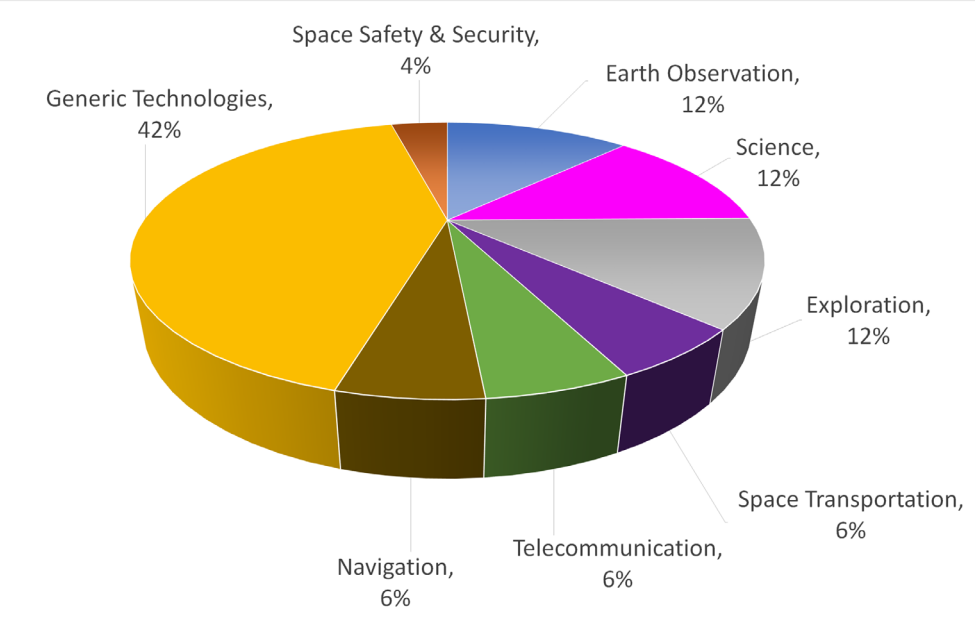
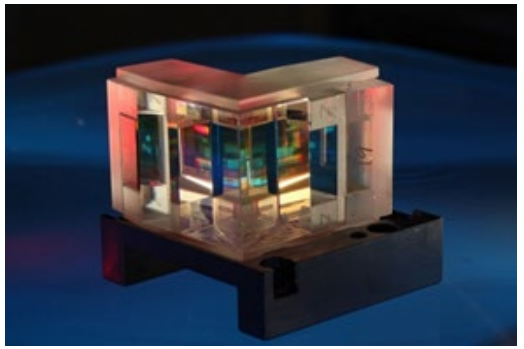
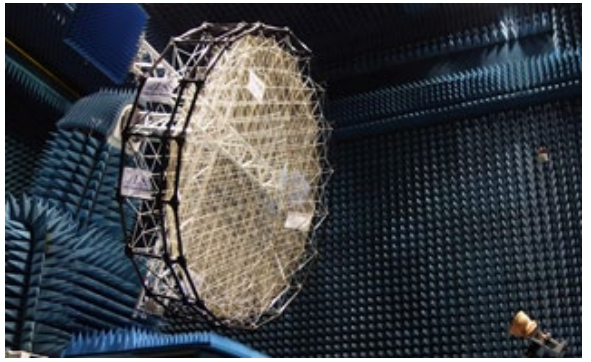
Technology Development Element



- Part of ESA's Mandatory Basic Activities
- First step in the ESA Technology Strategy implementation
- Relies on European Space Technology Harmonisation Roadmaps
- Covers all ESA programmes & technology disciplines

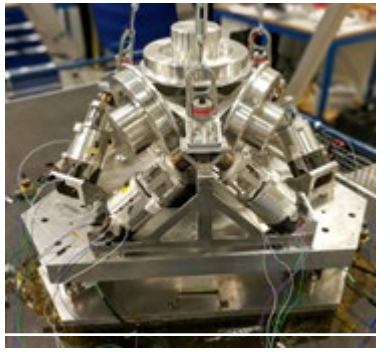


T116-506MM – Miniaturised Spatial Heterodyne Spectromter



T507-407EE - Mesh reflector

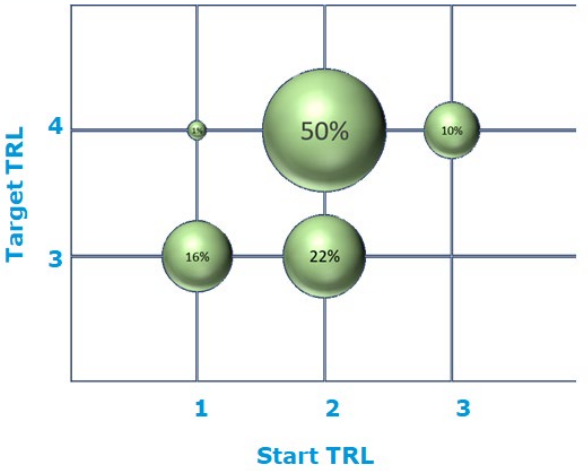
T324-502QT – Inflatable Composite Tank

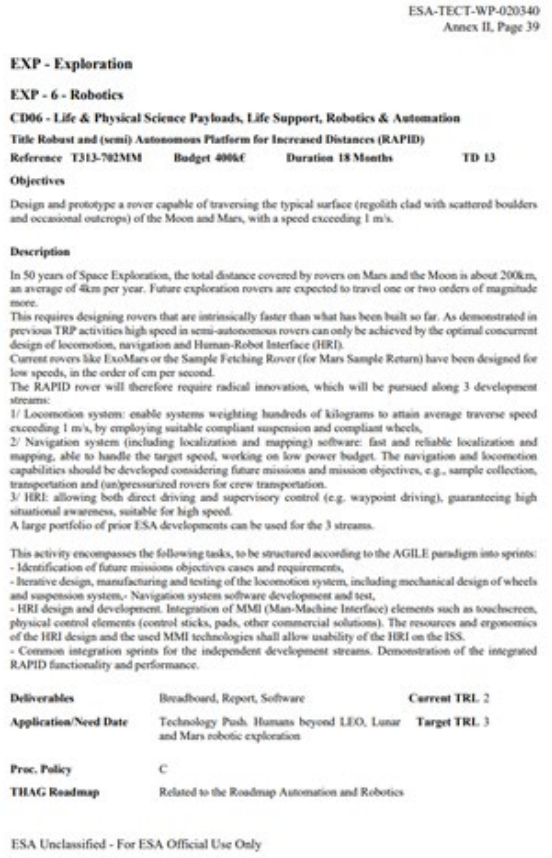


T215-017MS - Microvibration isolation system

Technology Development Element

- Based on 2-year work plans, with yearly updates, ~ 200 activities, ~ 100ME, TRL 1-4 focus
- 94% of all activities in open competition
- WP 21-22 85% Initiated,
- WP 23-24 under finalisation
- see ESA-STAR Publication





ESA-TECT-WP-020340
Annex II, Page 39

EXP - Exploration

EXP - 6 - Robotics

CD06 - Life & Physical Science Payloads, Life Support, Robotics & Automation

Title Robust and (semi) Autonomous Platform for Increased Distances (RAPID)

Reference T313-702MM **Budget** 400k€ **Duration** 18 Months **TD** 13

Objectives

Design and prototype a rover capable of traversing the typical surface (regolith clad with scattered boulders and occasional outcrops) of the Moon and Mars, with a speed exceeding 1 m/s.

Description

In 50 years of Space Exploration, the total distance covered by rovers on Mars and the Moon is about 200km, an average of 4km per year. Future exploration rovers are expected to travel one or two orders of magnitude more.
This requires designing rovers that are intrinsically faster than what has been built so far. As demonstrated in previous TRP activities high speed in semi-autonomous rovers can only be achieved by the optimal concurrent design of locomotion, navigation and Human-Robot Interface (HRI).
Current rovers like ExoMars or the Sample Fetching Rover (for Mars Sample Return) have been designed for low speeds, in the order of cm per second.
The RAPID rover will therefore require radical innovation, which will be pursued along 3 development streams:
1/ Locomotion system: enable systems weighting hundreds of kilograms to attain average traverse speed exceeding 1 m/s, by employing suitable compliant suspension and compliant wheels,
2/ Navigation system (including localization and mapping) software: fast and reliable localization and mapping, able to handle the target speed, working on low power budget. The navigation and locomotion capabilities should be developed considering future missions and mission objectives, e.g., sample collection, transportation and (un)pressurized rovers for crew transportation.
3/ HRI: allowing both direct driving and supervisory control (e.g. waypoint driving), guaranteeing high situational awareness, suitable for high speed.
A large portfolio of prior ESA developments can be used for the 3 streams.

This activity encompasses the following tasks, to be structured according to the AGILE paradigm into sprints:
- Identification of future missions objectives cases and requirements,
- Iterative design, manufacturing and testing of the locomotion system, including mechanical design of wheels and suspension system,- Navigation system software development and test,
- HRI design and development. Integration of MMI (Man-Machine Interface) elements such as touchscreen, physical control elements (control sticks, pads, other commercial solutions). The resources and ergonomics of the HRI design and the used MMI technologies shall allow usability of the HRI on the ISS.
- Common integration sprints for the independent development streams. Demonstration of the integrated RAPID functionality and performance.

Deliverables	Breadboard, Report, Software	**Current TRL** 2
Application/Need Date	Technology Push. Humans beyond LEO, Lunar and Mars robotic exploration	**Target TRL** 3
Proc. Policy	C	
THAG Roadmap	Related to the Roadmap Automation and Robotics	

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Raising Low TRLs – Technology Development Element

ESA identified technology needs

- ESA publishes 2 year TDE work plans based on future mission needs (TECNET) and ESA Technology Strategy
- Across all domains

esastar

Your action

- Look for ITT on esastar
- Form partnerships
- Submit your proposal answering ESA SoW

TDE Contract

- Following competitive evaluation
- TRL 1-4 raising technical activity
- ~500k€ per activity
- Parallel contract

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Remarks: Discovery & Technology Development Elements

- Belgian Entities are active in proposing projects for the Discovery Element and bidding for Invitations to Tender for the Technology Development Element

- Over the 2020-2021 time period,
  - 15 Belgian entities have received (sub)contracts for 16 Discovery Element activities representing 1,6 MEuro
  - 24 Belgian entities have received (sub)contracts for 44 Technology Development Element activities representing 8 MEuro

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GENERAL SUPPORT TECHNOLOGY PROGRAMME

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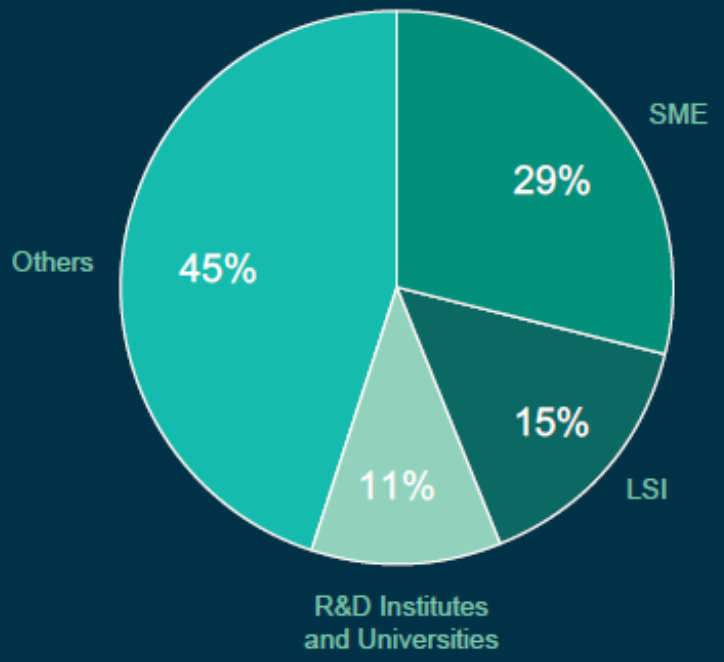
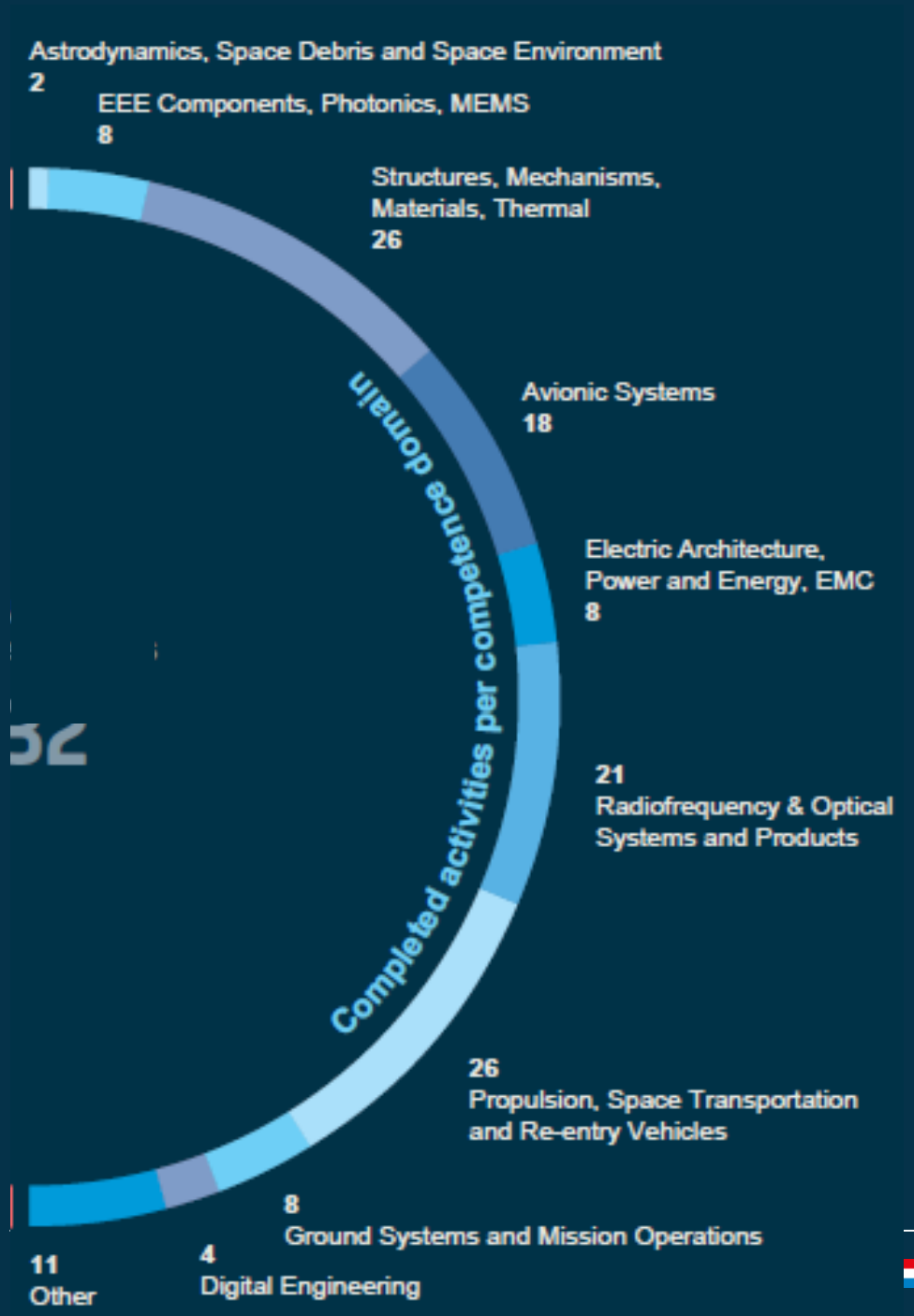
GSTP's mission

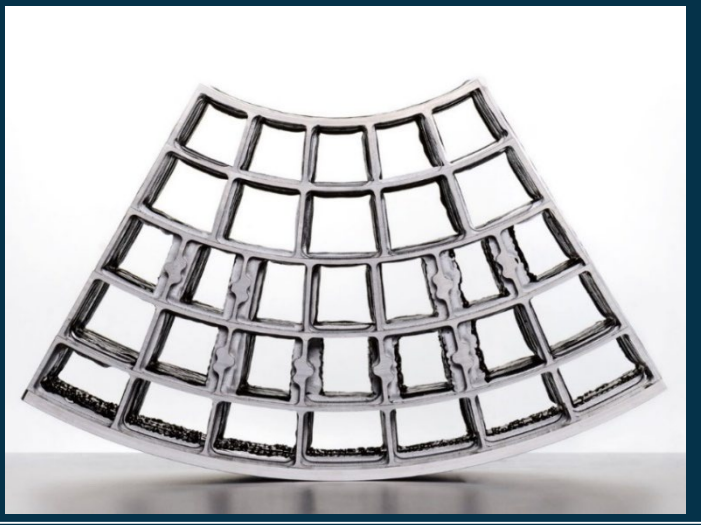


- The GENERAL SUPPORT TECHNOLOGY PROGRAMME has been developing leading-edge space technologies for almost 30 years
  - enabling missions
  - fostering innovation and building capabilities
  - supporting the competitiveness of industry
- GSTP allows companies of all sizes as well as research and academic organisations to perform developments and demonstrations
- GSTP is an optional ESA programme with the participation of all ESA Member, Associate and Co-operating States
  - 26 Participating States in total

GSTP: 2021 at a glance



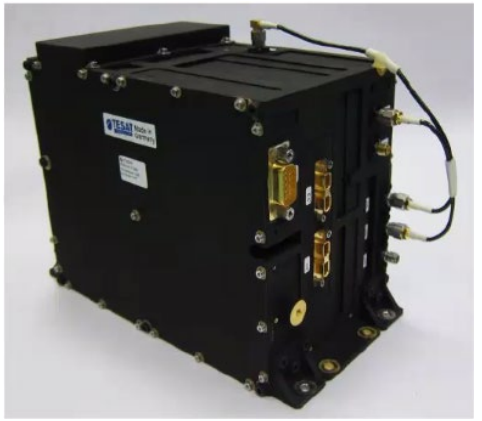
- → 132 technology development & demonstration activities completed
- → 157 technology development & demonstration activities initiated
  - → representing over 130 MEuro in contracts



GSTP Growth


160M€
140M€
120M€
100M€
80M€
60M€
40M€
20M€
0M€
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022*
Period 4
Period 5
Develop
Make
Fly
Proba 3

A few examples of GSTP activities

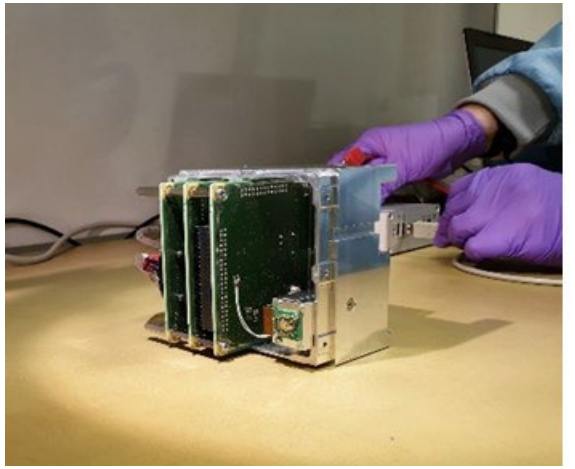


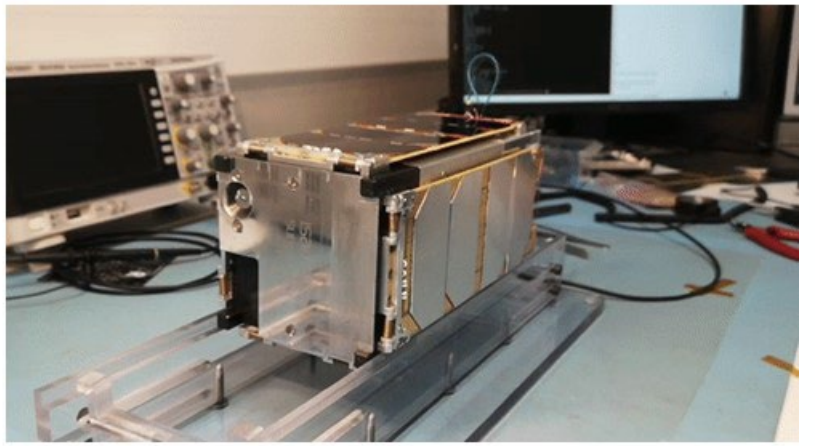
Reconfigurable Telemetry Transmitter

- Covers X- and Ka- bands selected
- Very flexible design, key parameters (frequency, symbol rate…) could be changes without hardware impact
- Data rates up to 2Gbps
- New generation under development
- Use on all Copernicus missions

X-ray Flux Monitor

- Demonstrating miniaturised space weather instruments for use in future operational missions.
- Sunstorm is a '2-unit' CubeSat, hosting an innovative solar X-ray spectrometer called the X-ray Flux Monitor for CubeSats (XFM-CS) that will detect coronal mass ejections from the Sun.
- August 2021 - VEGA Flight VV19





A few examples of GSTP activities

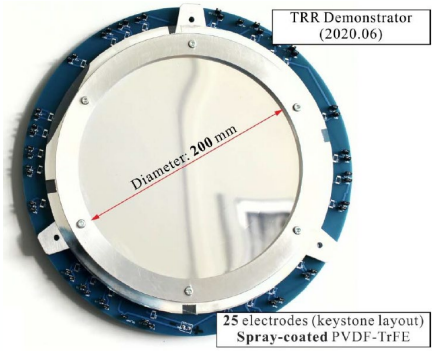
Additively manufactured Compliant Mechanism

- Innovative lattice structure
- Mass reduction could reach at least 50%
- Presented in 14 conferences
- 2 Patents:

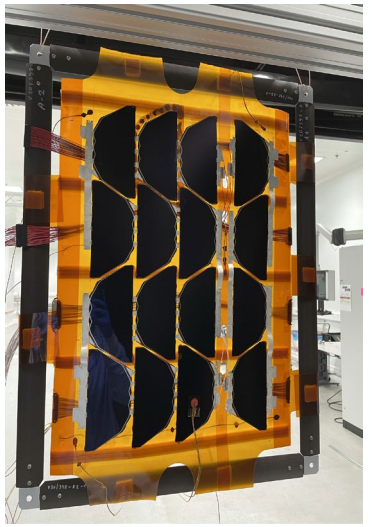
Additively manufactured metallic structures developed have been qualified for flight and are being integrated in JUICE.

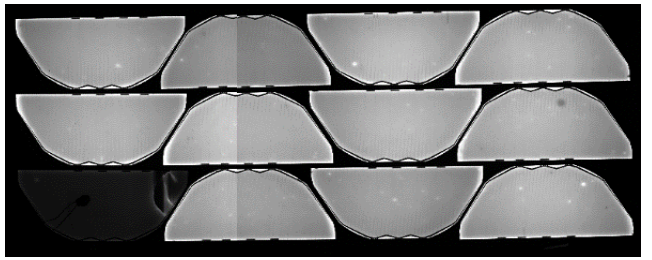
Examples of GSTP activities in Belgium

- Over the 2020-2021 time period,
  - 58 Belgian entities have received (sub)contracts for 51 GSTP Element activities representing 63 MEuro




Optical testing of the breadboard

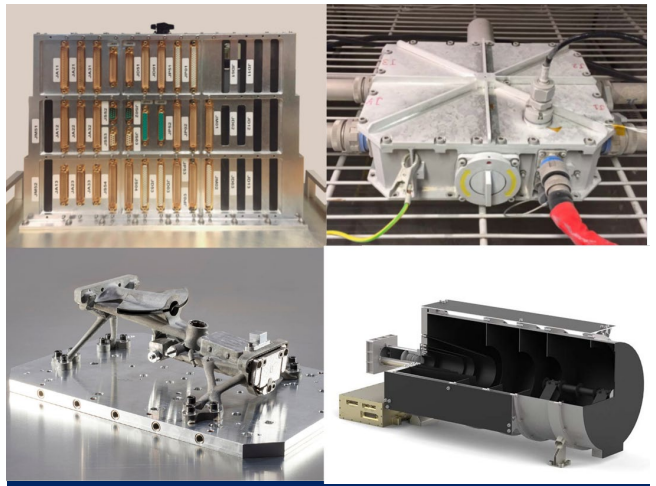





PPSoM (aka mosaic)


ADARx (aka AsteRx-m3/i3)

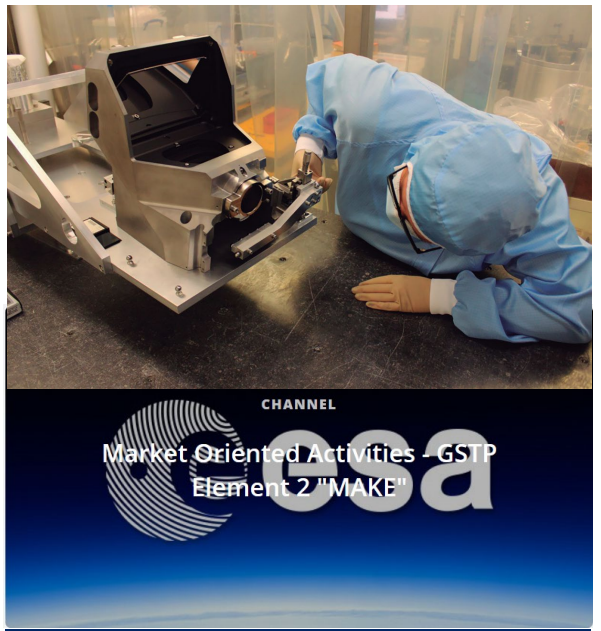
GSTP Structure



ELEMENT 1: DEVELOP

Supports technology developments up to qualification, capacity building & ESA technology aims.

Compendia, Work Plan, Frameworks

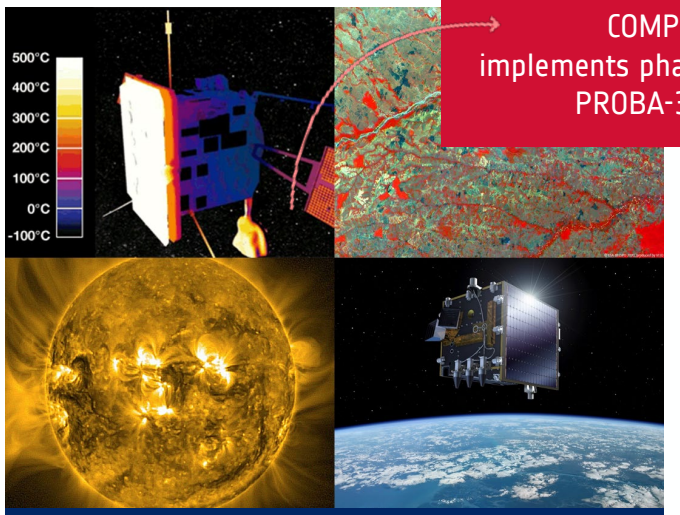


ELEMENT 2: MAKE

Industry initiated and driven co-funded activities to strengthen competitiveness

COMPONENTS

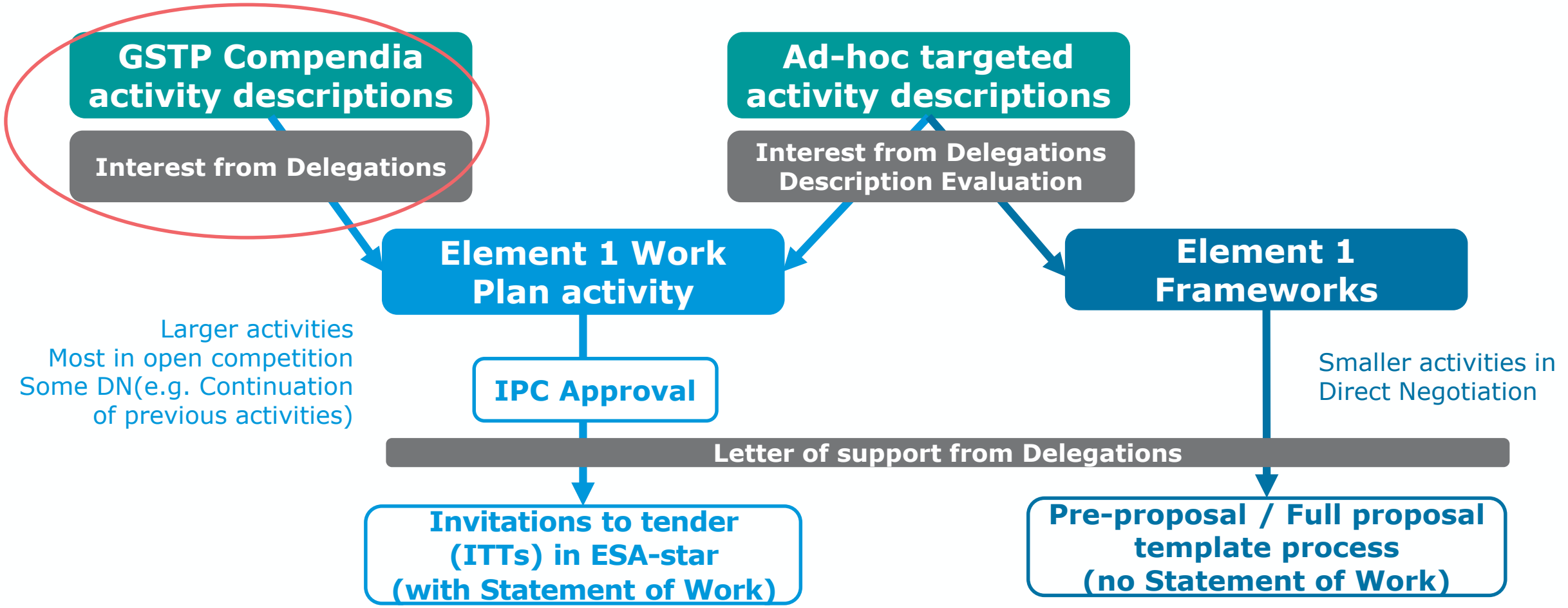
PRECISE FORMATION FLYING COMPONENT
implements phases C/D/E of the PROBA-3 mission



ELEMENT 3: FLY

implements in-orbit demonstrations of technologies in need of acquiring flight heritage

GSTP Element 1

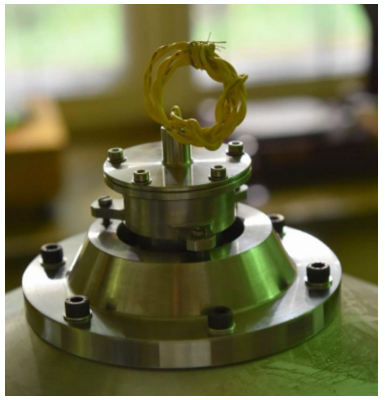


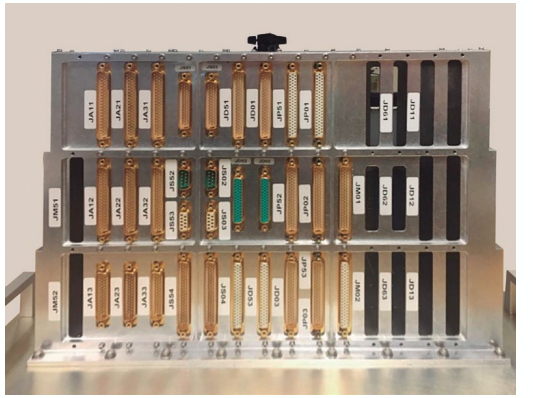
GSTP Element 1

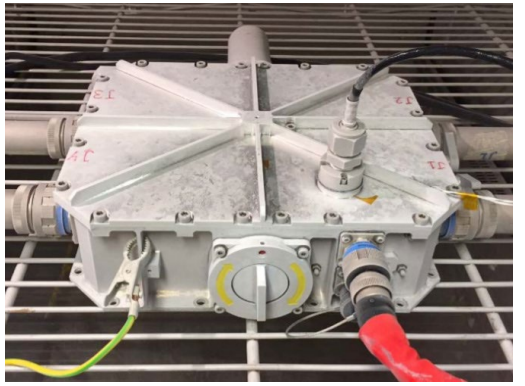
COMPENDIA

- **Published every 3 years with ~150 activities.**
  - Compilation of **top priority activity proposals**.
  - Covering all technology domains and selected technology areas.
- Activity proposals and selection of activities made by representatives of the technical and application domains and internally coordinated. **For specific areas industry validates the activities.**
- Procurement in Competition

- **The objective of the Compendia:**
  - **To trigger discussions among industry and Delegations of the GSTP Participating States.**
    - Activities supported are included in the GSTP WP.
  - **Inspiration for targeted activities.**





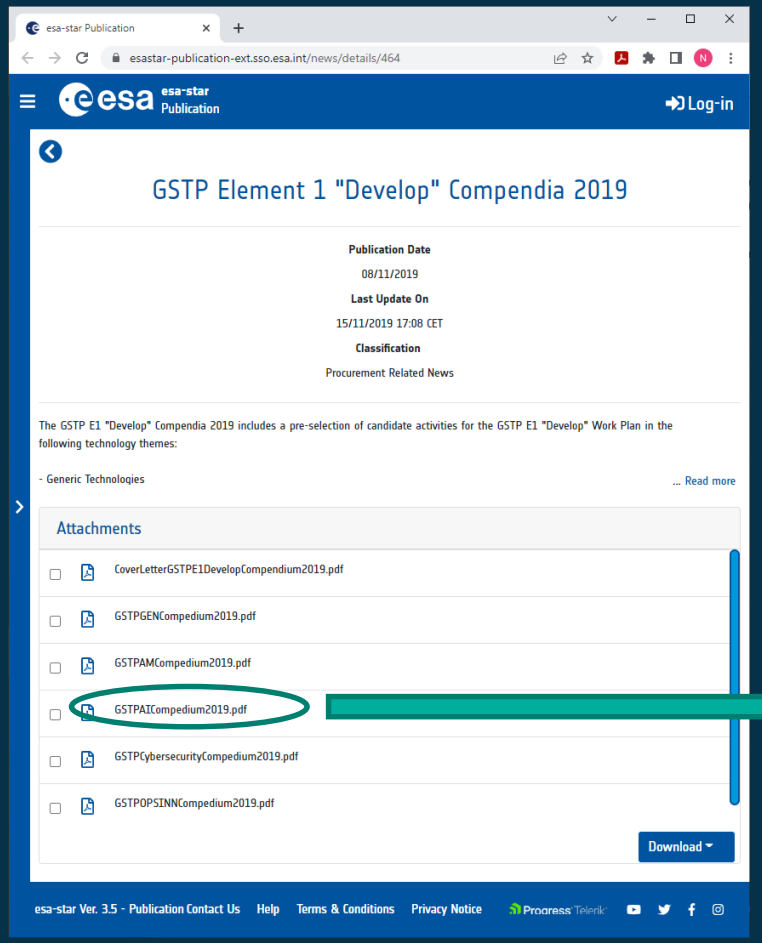


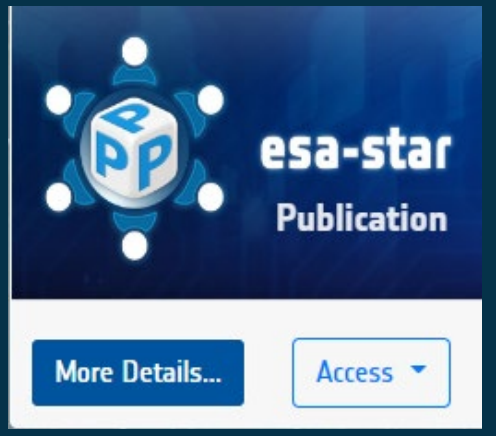
GSTP Element 1: Compendia 2019

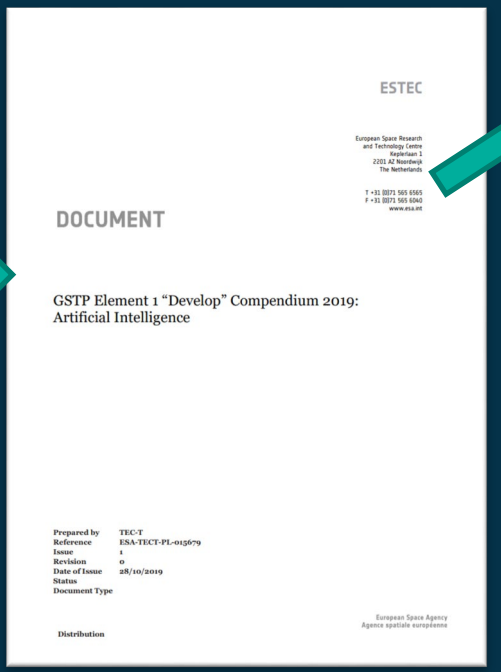
From COMPENDIA 2019 to the GSTP Element 1 Work Plan

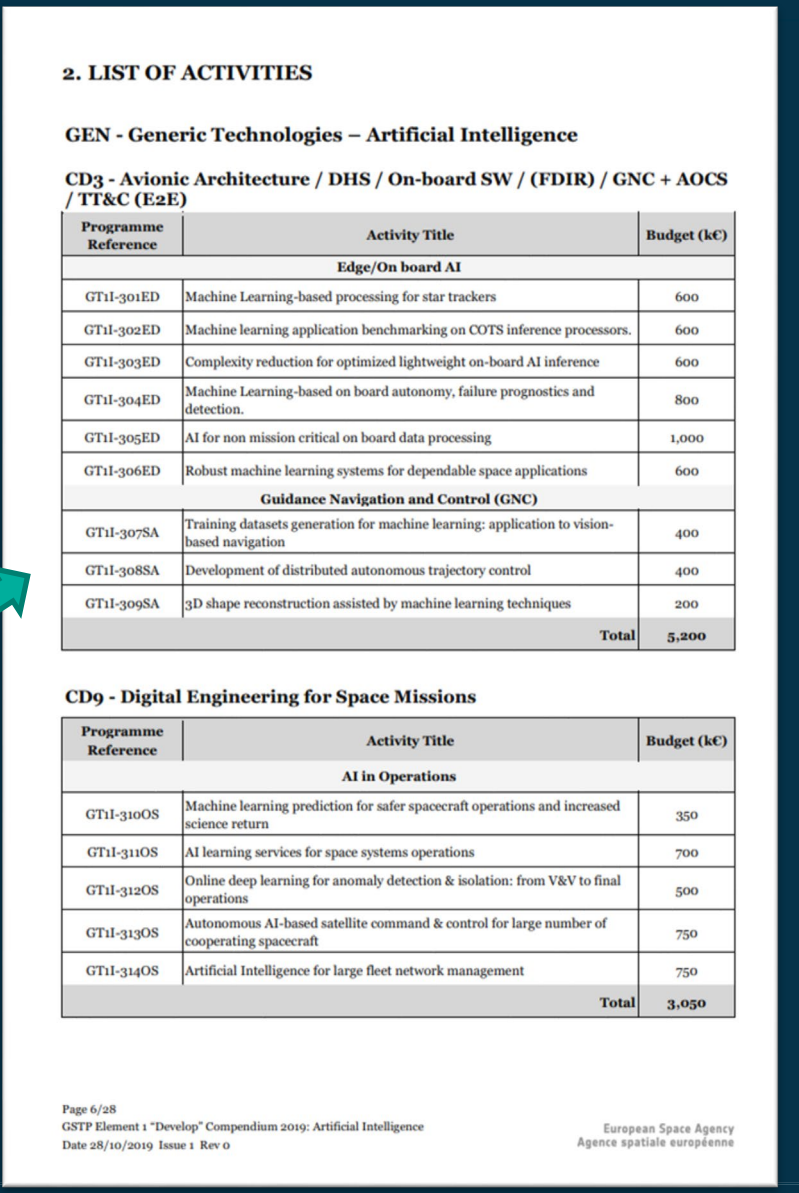
- Generic Technologies — 33 activities
- Selected Technology Areas
  - Artificial Intelligence — 7 activities
  - Cybersecurity — 8 activities
  - Advanced Manufacturing — 15 activities
  - Operations Innovation — 9 activities
- Note
  - The Compendia 2019 remains a relevant source of activities to implement
  - It is also good source of ideas for tailored activities

GSTP Element 1









2. LIST OF ACTIVITIES

GEN - Generic Technologies – Artificial Intelligence

CD3 - Avionic Architecture / DHS / On-board SW / (FDIR) / GNC + AOCS / TT&C (E2E)

Programme Reference	Activity Title	Budget (k€)
	Edge/On board AI	
GT1I-301ED	Machine Learning-based processing for star trackers	600
GT1I-302ED	Machine learning application benchmarking on COTS inference processors.	600
GT1I-303ED	Complexity reduction for optimized lightweight on-board AI inference	600
GT1I-304ED	Machine Learning-based on board autonomy, failure prognostics and detection.	800
GT1I-305ED	AI for non mission critical on board data processing	1,000
GT1I-306ED	Robust machine learning systems for dependable space applications	600
	Guidance Navigation and Control (GNC)	
GT1I-307SA	Training datasets generation for machine learning: application to vision-based navigation	400
GT1I-308SA	Development of distributed autonomous trajectory control	400
GT1I-309SA	3D shape reconstruction assisted by machine learning techniques	200
	Total	**5,200**

CD9 - Digital Engineering for Space Missions

Programme Reference	Activity Title	Budget (k€)
	AI in Operations	
GT1I-310OS	Machine learning prediction for safer spacecraft operations and increased science return	350
GT1I-311OS	AI learning services for space systems operations	700
GT1I-312OS	Online deep learning for anomaly detection & isolation: from V&V to final operations	500
GT1I-313OS	Autonomous AI-based satellite command & control for large number of cooperating spacecraft	750
GT1I-314OS	Artificial Intelligence for large fleet network management	750
	Total	**3,050**

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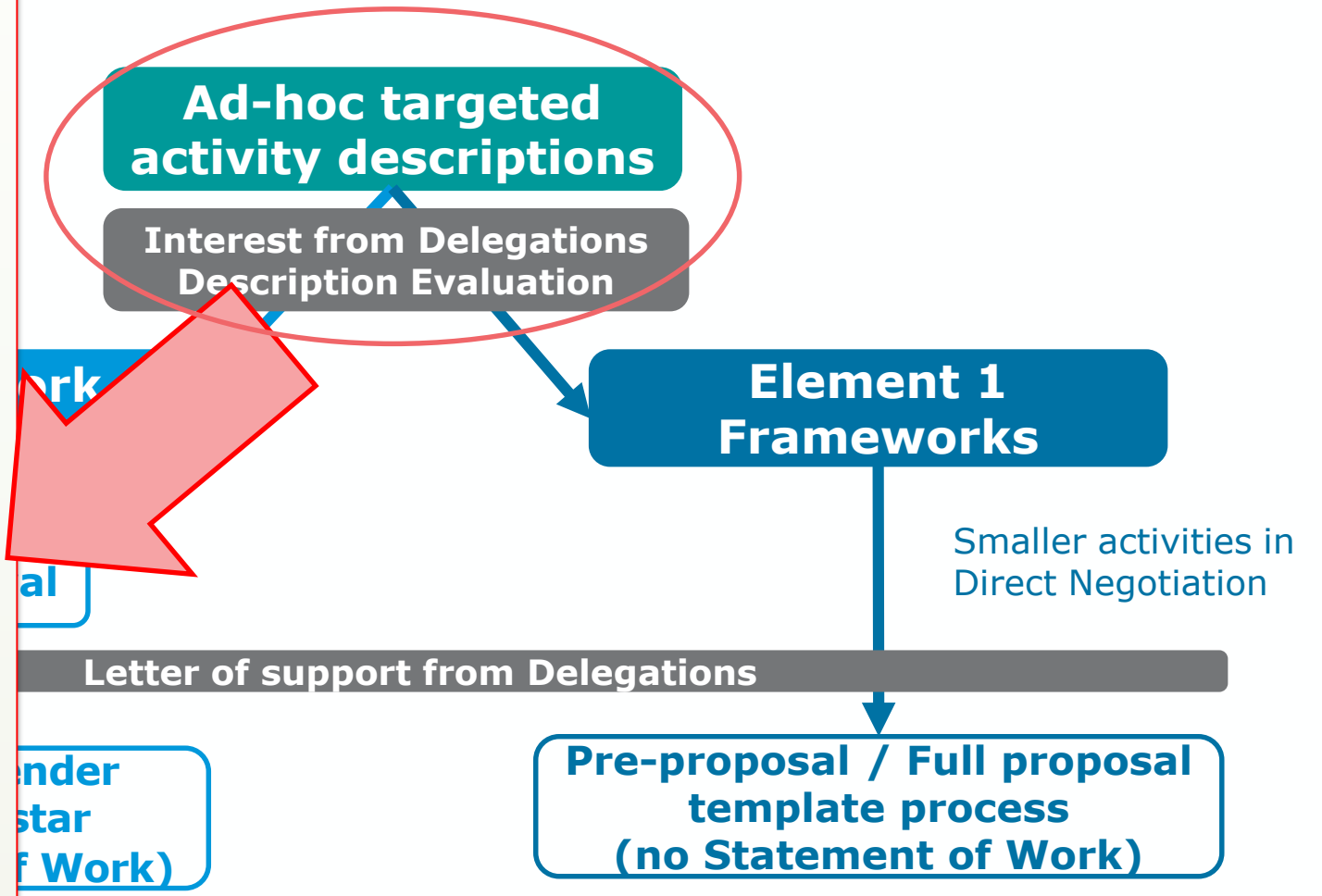
GSTP Element 1 "Develop" Compendium 2019: Artificial Intelligence
Date 28/10/2019 Issue 1 Rev 0
European Space Agency
Agence spatiale européenne

https://esastar-publication-ext.sso.esa.int/news/details/464

GSTP Element 1

GSTP Criteria – Description Evaluation:

- Programmatic: TRLs, Application, Consistency of scope /deliverables /TRLs
- Continuation of previous activities (TDE, frameworks ...)
- Innovation? Competitiveness? Enabling mission?
- Industrial sustainability / Building Capabilities
- Interest from Delegations / National Strategy + Funds Availability



GSTP Element 1

FRAMEWORKS

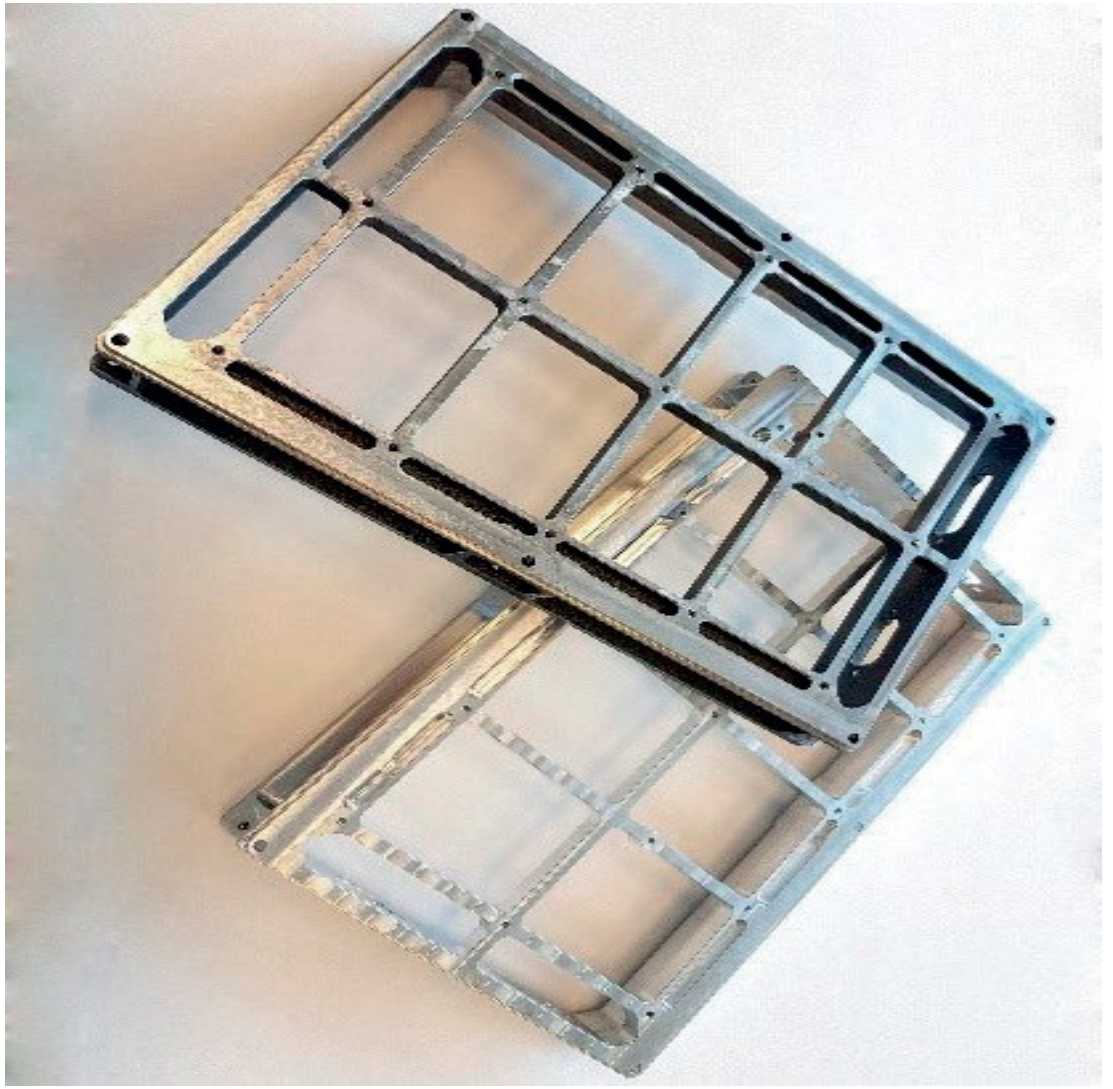
De-Risk and Building Block: used in 21 Participating States
63 activities were committed (€16m) in 2021

Activities: supported on a case-by-case basis or via tailored calls

De-Risk and Building Block: Published as an OSIP Channel and on ESA-STAR, easing access to templates and information and also streamlining the procurement process

Advanced Manufacturing and **Quantum Technologies**

See ideas.esa.int for **De-Risk and Building Blocks Channels**



Element 1 Frameworks

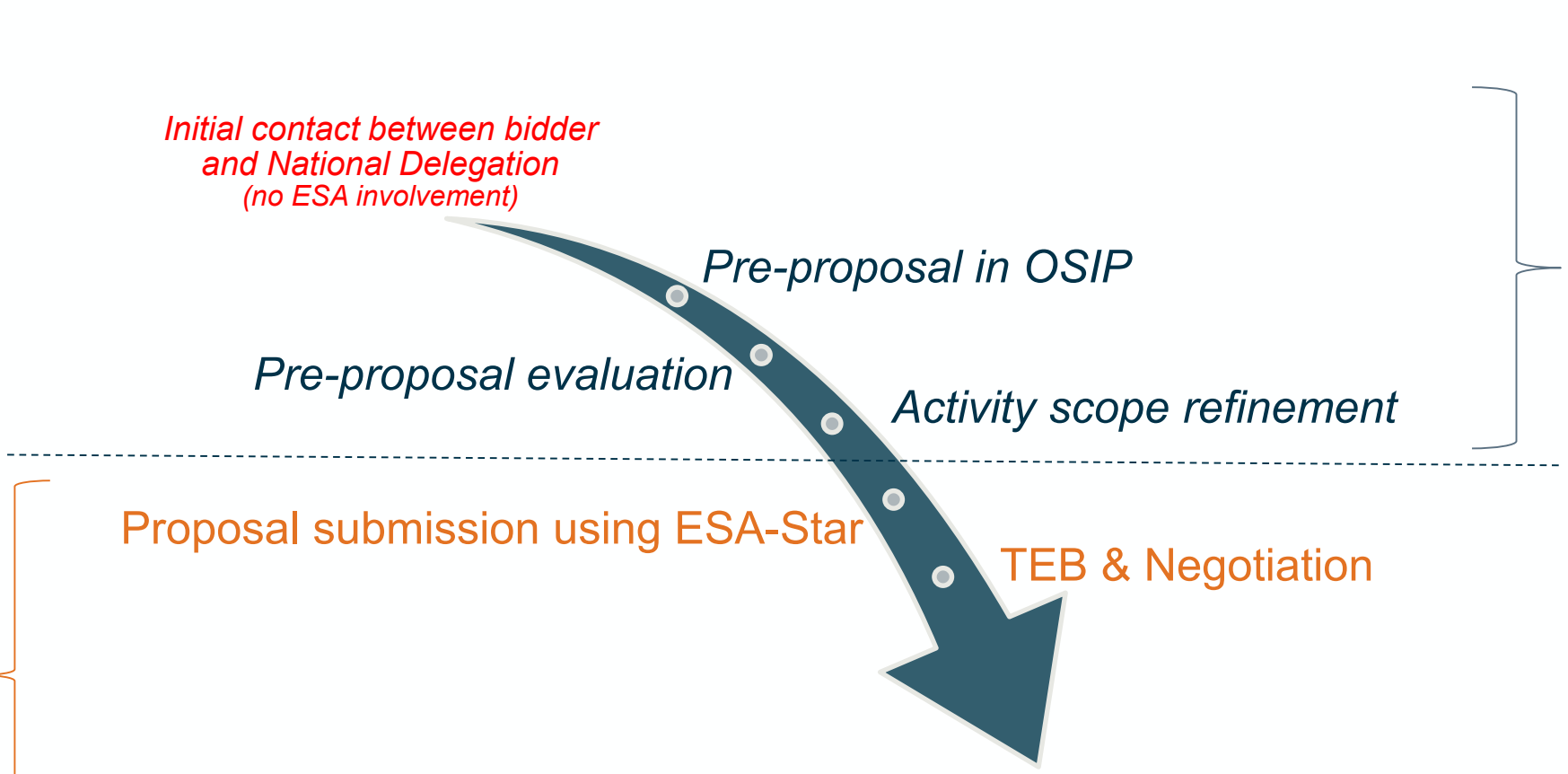
Procurement using a template	Follow-on using a template	~40 de-risk initiated every year
• Max budget 200k€ • Max Duration 9 months	• No budget limit • No duration limit • ~ 35% de-risk are continued	• >200 de-risk so far • ~ 35 M€ overall budget

G617-241TA, Assessments to prepare and de-risk technology developments

GT17-137TI, Building Block Framework

Procurement using a template	~20 activities initiated every year
• Max budget 500k€ • Max Duration 24 months	• 100 activities so far • ~ 43 M€ overall budget

Framework procurement process



Not-Official ESA procurement

Communications allowed with ESA Technical Officer and GSTP

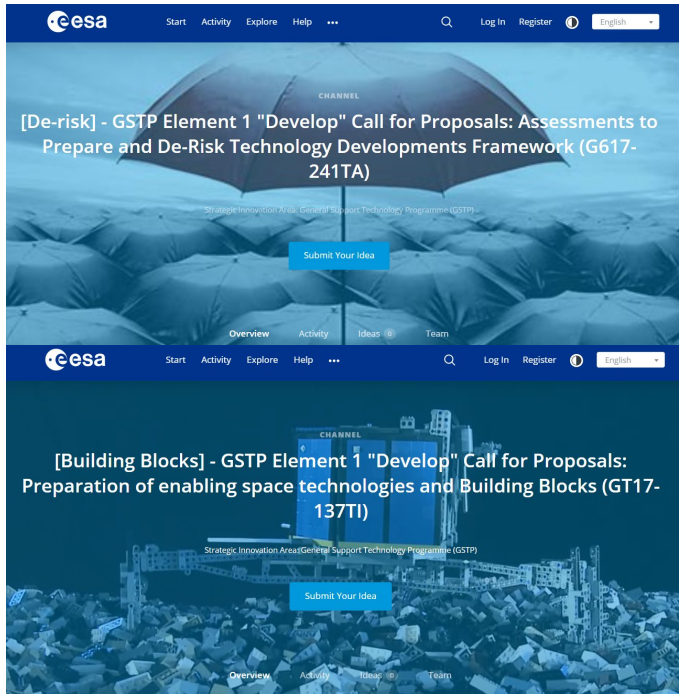
Official ESA procurement

Communications allowed only through ESA assigned Contract Officer

Frameworks procurement process

Pre-proposals → Evaluation → Full Proposal

ESA-star



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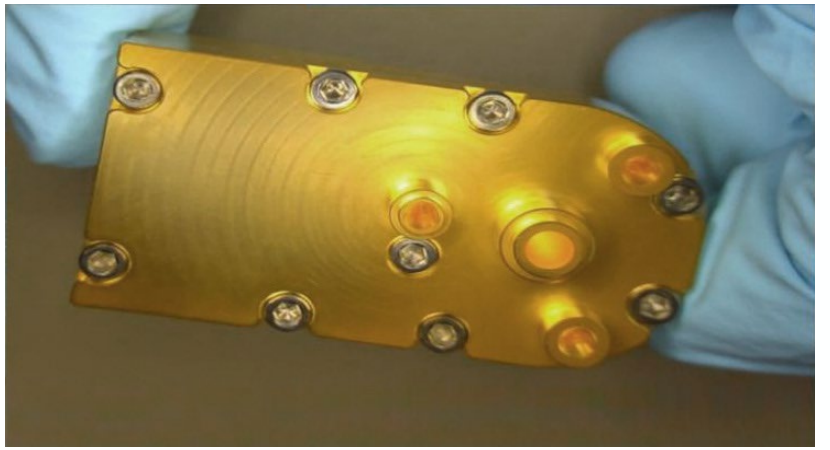
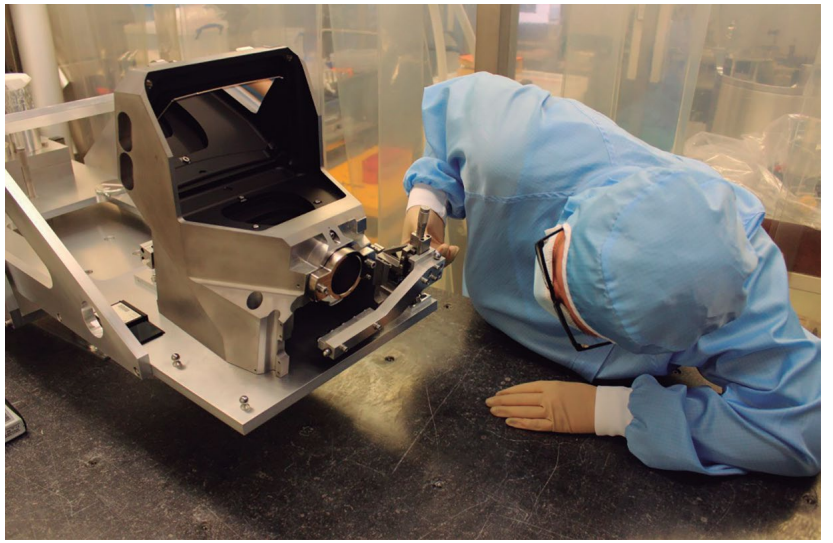
PRE-PROPOSAL EVALUATION CRITERIA

- Clear and credible definition of the technical objectives, key requirements, technical steps and risks to be addressed in this activity.
- Clear indication of the application and potential users of the technology.
- Clarity of the management approach and the adequacy of the proposed costs with the work to be performed
- Clear information about Cost to Completion

Element 2 Make

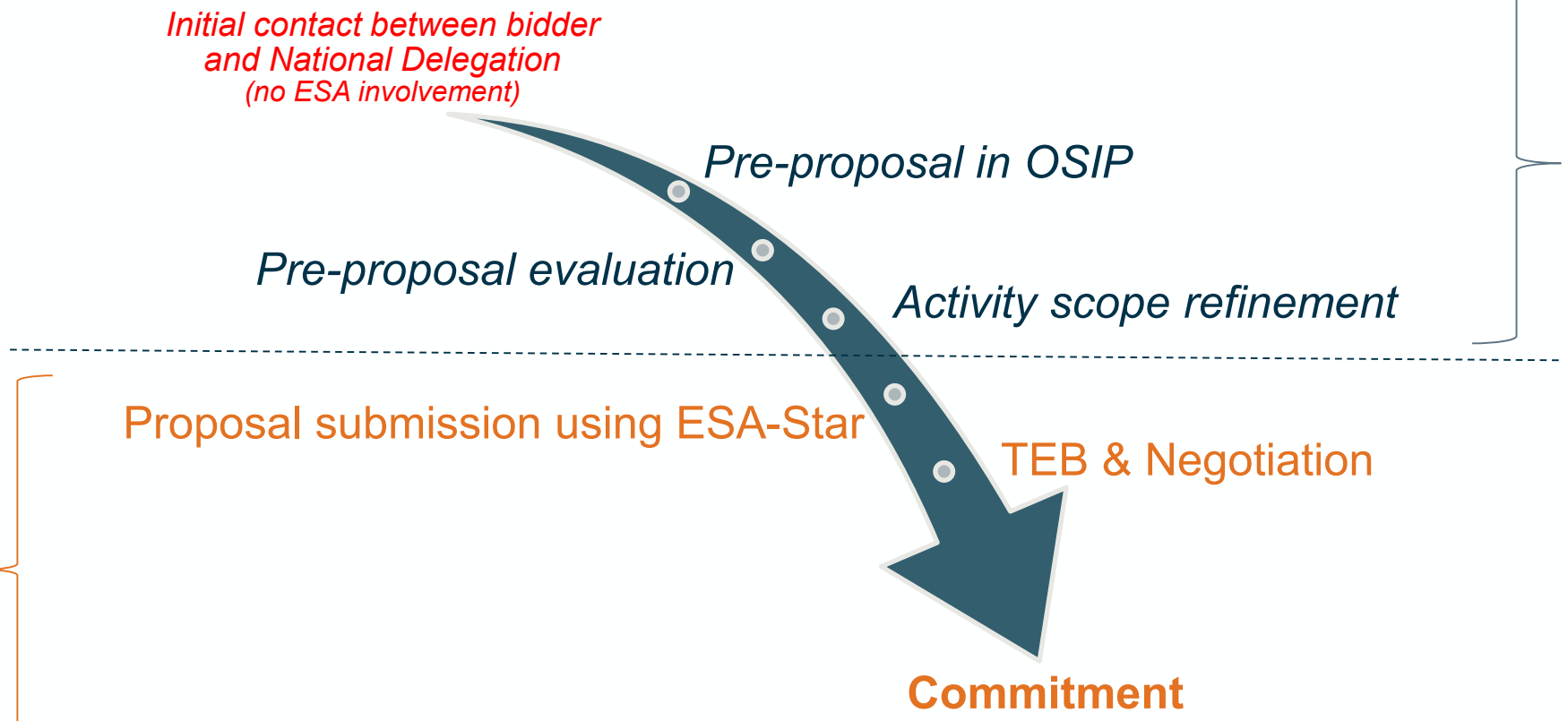
- Dedicated to Industry initiated and driven co-funded activities to strengthen competitiveness
- **Current structure** operational since 2020
- **3 segments**
  - Market Oriented Opportunities,
  - Strategic Opportunities
  - Implementation of National (commercial) Priorities
- **Use of the Element 2 has significantly increased (three-fold) as of 2020**
  - 28 activities committed in 2021 (€33m)





Permanent Open Call in ESA-Star

E2 procurement process



Not-Official ESA procurement

Communications allowed with ESA Technical Officer and GSTP

Official ESA procurement

Communications allowed only through ESA assigned Contract Officer

GSTP Element 3 Fly

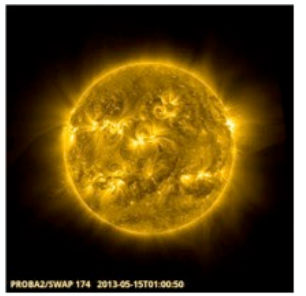
Facilitate Technology Demonstrations

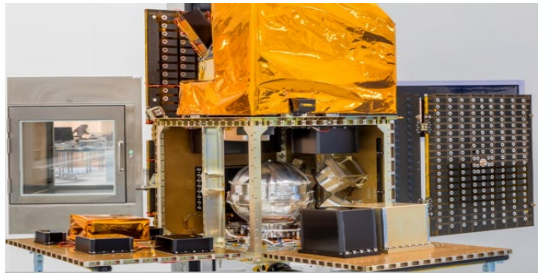
Main objectives related to Element 3 are to

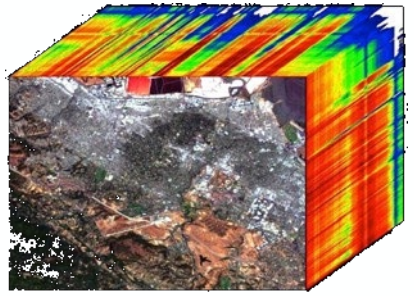
- ensure the successful implementation of the missions/In-Orbit Demonstrations currently in preparation
- identify/prepare new mission/IOD opportunities and
- Offer 'on-ground' demonstrations

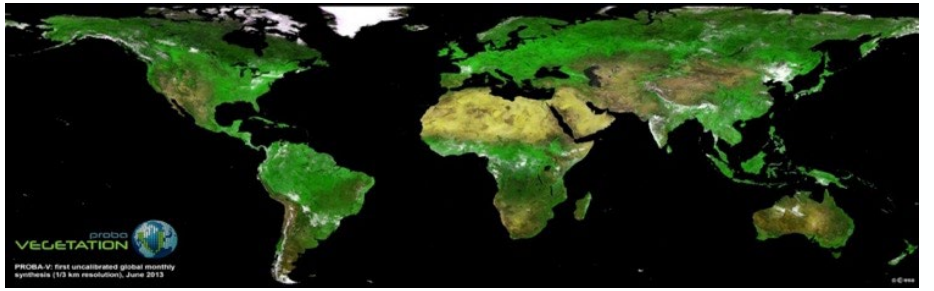
Opportunities cover:

- Demonstration of technology (e.g. platform units, Li-ion batteries)
- Demonstration of techniques (e.g. ADS-B, hyper-spectral, …)
- First demonstrations of potential capabilities









GSTP Element 3 Fly

Technology Demonstrations

Recently launched satellites being commissioned

PICASSO and SIMBA launched in 2020

RadCube and Sunstorm launched in 2021

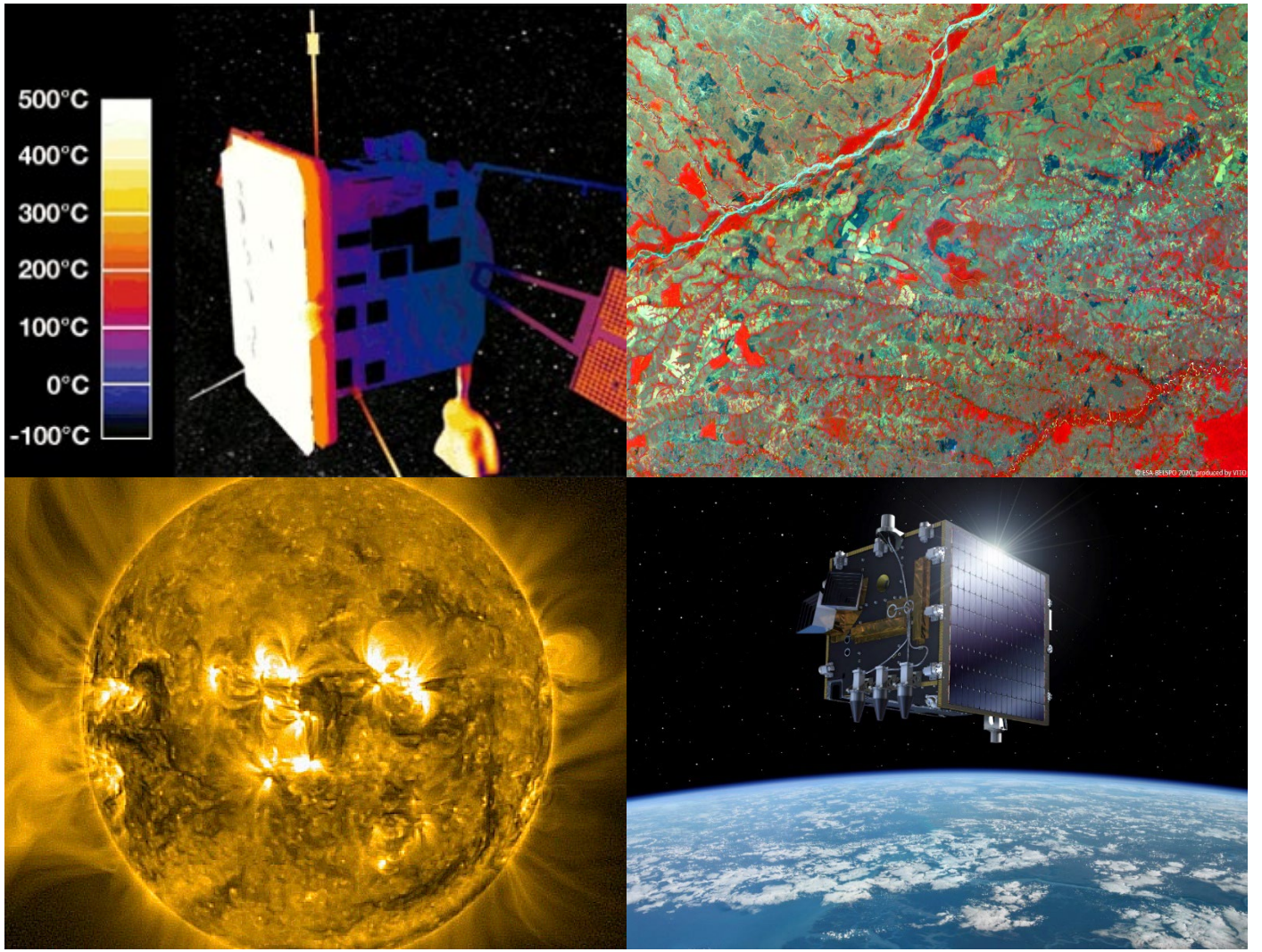
Examples of projects in development and in preparation

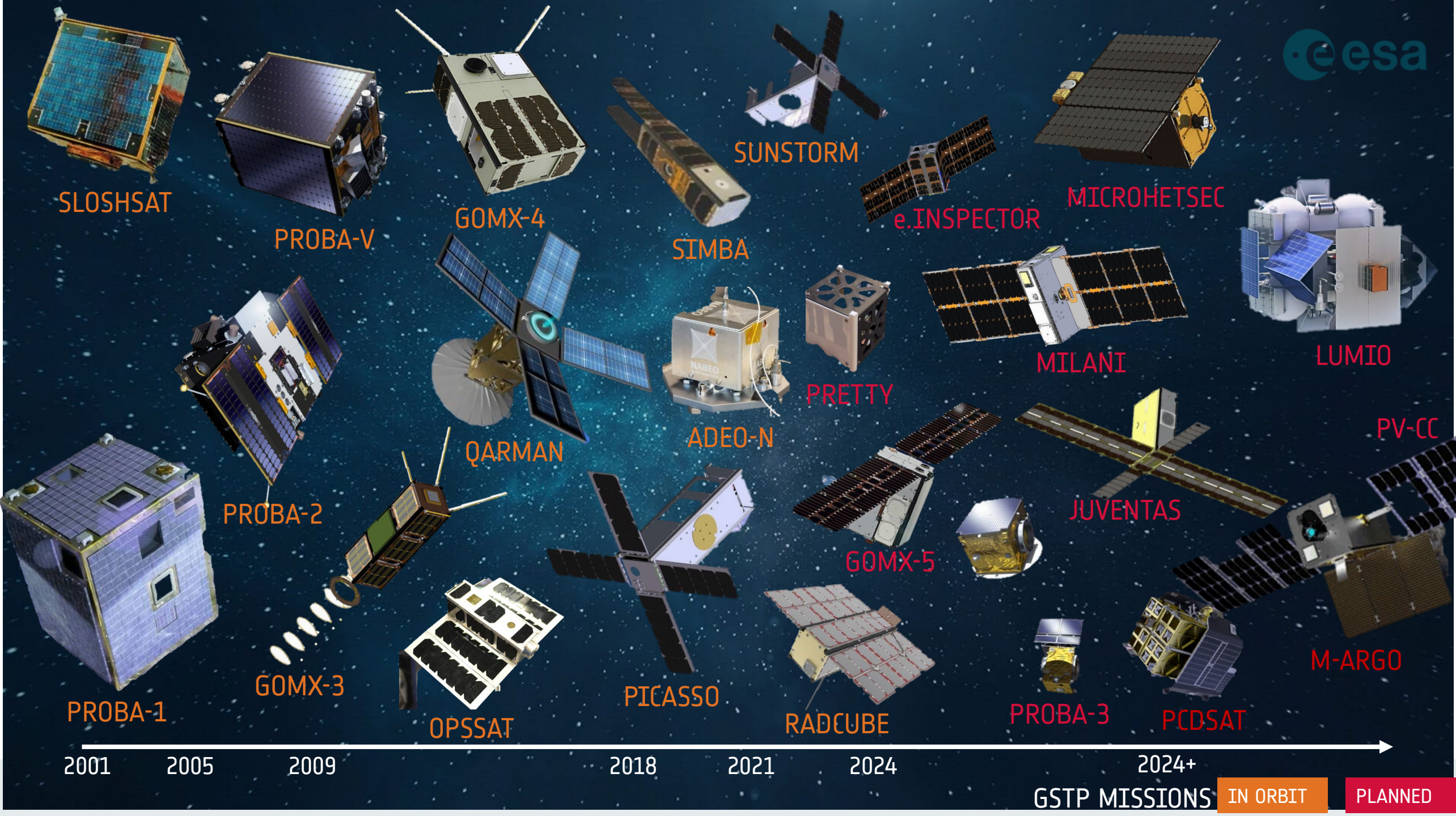
PRETTY cubesat

GOMX-5

Proba V-CC

Cubespec




SLOSHSAT
PROBA-V
GOMX-4
SUNSTORM
SIMBA
e.INSPECTOR
MICROHETSEC
LUMIO
MILANI
PRETTY
ADEO-N
QARMAN
PROBA-2
PROBA-1
GOMX-3
OPSSAT
PICASSO
GOMX-5
JUVENTAS
PV-CC
M-ARGO
RADCUBE
PROBA-3
PCDSAT
2001
2005
2009
2018
2021
2024
2024+
GSTP MISSIONS
IN ORBIT
PLANNED

Raising Technology Maturity & Preparing for Flight: GSTP

ESA identified technology

- GSTP Elements 1 & 3: ESA initiated Work Plan activities from GSTP Compendia (published in esastar news)
- GSTP Elements 1 & 3: *ad-hoc* activities (e.g. TDE follow-on)

Industry proposed technology

- Outline proposals submitted:
  - GSTP Element 1: De-risk channel (OSIP)
  - GSTP Element 2: Industry initiated (market-oriented) proposals (OSIP)

Your action

esastar

esa esa-star Publication

- Look for ITT on esastar
- Support letter from delegation
- Submit proposal answering Statement of Work (SoW)

Your action

esastar

- Submit full proposal without SoW
- Support letter from delegation
- ESA evaluation

Your action

GSTP Contract

- Higher TRL technical activity up to in-orbit demonstration (IOD)
- 0.5-5M€ per activity

Element 1 DEVELOP	Building capabilities
Element 2 MAKE	Co-funded, competitiveness
Element 3 FLY	IODs

ESA UNCLASSIFIED - For ESA Official Use Only

GSTP in the context of CM-22

- While **no major structural changes** are foreseen to GSTP's 3 main Elements
  - New activities are in preparation with emphasis placed on technology areas identified in the Technology Strategy and ESA Agenda 2025: In-orbit Servicing technologies, Advanced Propulsion, Artificial Intelligence, Digitilisation and Quantum Technologies
  - Elements and the related Programme procedures are being enhanced taking into account the evolution of the current context
  - A **Specific Area** on Cybersecurity (Compendia activities, C-SOC…) is being continued and a new **Specific Area** is proposed on Space-based Solar Power

- **Two additional components are proposed:**
  - EEE Space Component Sovereignty for Europe
  - EuropeaN Devices Using Radioisotope Energy

GSTP Element 1: Compendia 2022 with new activities

Compendia 2022: *Under preparation*

ESA Driven:

- Generic Technologies, including Advanced Propulsion and In-orbit servicing

Industry Driven:

- **Artificial Intelligence** - Edge/AI on Board, GNC, Mission Operations
- **Digitalisation** - Data Management, MBSE, Simulation, Digital Twin
- **Quantum Technologies** – Quantum Electronics, Atomic physics (Sensor, Computation, Cryptography), Quantum Optics, Quantum Metrology
- **Cybersecurity**, as part of a Special Cybersecurity area that includes the C-SOC, being continued in GSTP

ESA Agenda 2025

ESA Technology Strategy

- Publication in November 2022
- First activities in WP Feb 2023

esa-star Publication

GSTP Element 1: Compendia 2022 with new activities

Current Status (still in preparation)

- **Generic Technologies, including Advanced Propulsion and In-orbit servicing**
  - EEE Components, Photonics, MEMS: 9 activities
  - Structures, Mechanisms, Materials, Thermal: 9 activities
  - Avionic Systems: 10 activities
  - Electric Architecture, Power and Energy, EMC: 10 activities
  - Radiofrequency & Optical Systems and Products: 9 activities
  - Propulsion, Space Transportation & Re-entry Vehicles 9 activities
  - Ground Systems and Mission Operations: 9 activities
  - Digital Engineering: 8 activities
  - Astrodynamics, Space Debris & Space Environment: 6 activities

- **Industry Driven (50 activities):**
  - **Artificial Intelligence:** 18 activities (GNC, Edge/AI on Board, Mission Operations, Digital Eng.)
  - **Digitalisation:** 16 activities (Data Management, MBSE, Simulation, Digital Twins…)
  - **Quantum Technologies :** 7 activities
  - **Cybersecurity :** 14 activities (Avionic systems, RF, Mission Operations, Digital Engineering)

GSTP Element 1: Expansion of Frameworks

Expansion of frameworks, supporting product portfolios

Existing frameworks will further evolve in order to foster timeliness and to meet a larger range of needs:

- further streamlining the De-risk and Building Block procurement process
- accommodating contracts up to 1 M€ in the Building Block framework
- further leveraging thematic frameworks

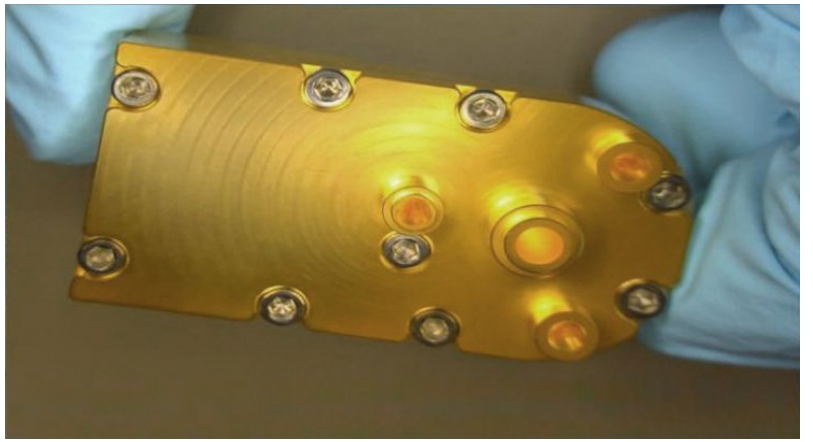
It is also foreseen to expand the frameworks, by creating **'a product portfolio framework'**

- a SME or Mid-Cap company may perform technology developments in several steps to improve a selected product family over a multi-year period

GSTP Elements 2 and 3

Supporting competitiveness and facilitating technology demonstrations

- **For Element 2,** the new structure is operational since 2000 and the use of this element has since significantly grown.
  - The types of targeted opportunities and developments have expanded. And the **range of the entities** applying for Element 2 has become larger.
  - The AO procurement and execution processes are being adapted building on this experience to better address the evolving context.
- **For Element 3, key targets include**
  - ensuring the successful implementation of existing missions/IODs,
  - preparing new mission/IOD opportunities
  - expanding and enhancing the demonstration approach

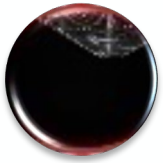


EEE Space Component Sovereignty for Europe


Ultra Deep Sub-Micron


Wide Band-Gap Power and RF


Photonics


Solar Cells


Packaging, PCB and Electronic Assembly


Test Facilities

Facilitate sustainable European supply chains

Aim: facilitate a sustainable **European supply-chain** for state-of-the-art, high-value European EEE Components in a timely manner

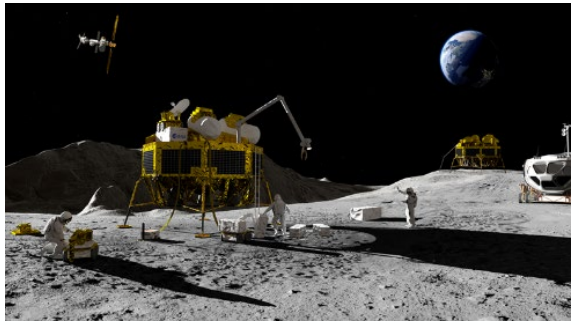
A key objective is to implement an **end-to-end plan** for each **Technology Line**.

To be implemented in **strong synergy** with European Space Component Coordination/Component Technology Board and ESA Harmonisation roadmaps. **Synergies and coordination** with ESA Member State national programmes and European Commission (EC) activities will be pursued

Implementation principles based on approach used for GSTP Element 1

Advance Procurement may be implemented subject to Supply Chain needs and market prospects (< 15% of total activity cost or < 2-year product supply)

EuropeaN Devices Using Radioisotope Energy (ENDURE)



The aim is to deliver an end-to-end European operational capability for RPS heat and power systems by the end of this decade

Phase 1 (GSTP Component) Objectives

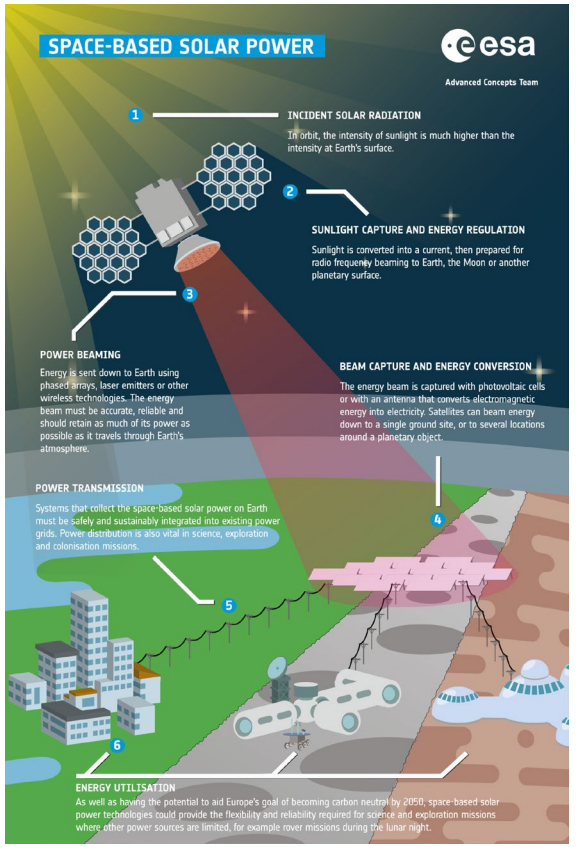
- **Establish an operational Am-241 fuel production capability** capitalising on previous developments and European / National partner capabilities
- **Mature radioisotope power system technologies**
  - Radioisotope Heating Unit (RHU and ELHS) (3-10 ThW and 200 ThW)
  - Radioisotope Thermal Generator (RTG) (10eW)
  - Radioisotope Stirling Generator (RSG) (100eW)

Implementation principles based on the GSTP Element 1 Develop approach
Work plans shall be structured according to technology lines

Element 1 Specific Areas: Cybersecurity

- A Specific Area is to be continued for **Cybersecurity**, supporting the CSOC development and hosting technology developments in the following areas:
  - Avionic Systems
  - Radiofrequency & Optical Systems and Products
  - Ground Systems and Mission Operations
  - Digital Engineering

Element 1 Specific Areas: Space Based Solar Power



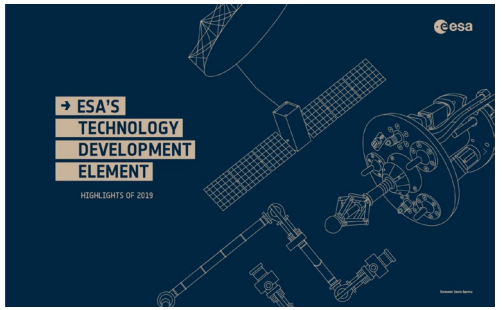
- A Specific Area is proposed to allow some systems studies and address **Space-based Solar Power** related technology development activities in the following areas
  - Solar Cells and Solar Generators
  - Power Management and Distribution
  - Power Conversion DC-RF
  - Beam Forming and Steering and Wireless Power Transfer
  - Large structure assembly, manufacturing and modelling
  - On-orbit servicing

Some Links

esastar-publication-ext.sso.esa.int

The procurement portal is a source for:

- Registration of new companies to do business with ESA
- Invitations to tender
- News/Events/Procurement related announcements



ideas.esa.int

CHANNELS

Open Channels for Your Ideas

Open Space Innovation Platform (ideas.esa.int) channels for submitting pre-proposals and outline proposals

https://www.esa.int/Enabling_Support/Space_Engineering_Technology/Shaping_the_Future

Includes contact info, news, events, annual reports...

Summary

Discovery, TDE and GSTP

- Discovery Element: available for your ideas for co-sponsored research, studies & early technology Development
- Technology Development Element: roughly 100 Open Competitions per yearl 2023-24 Work Plan

- GSTP offers Work plan activities in Open Competition (coming notably from the GSTP Compendia) and the possibility to Propose 'ad-hoc activities', in Element 1 (notably Frameworks), the Element 2 AO and Element 3

GSTP in the context of the CM-22 Preparation

- **GSTP Element 1 2022 Compendia:** under preparation
- **Frameworks** will further evolve to foster timeliness, to meet a larger range of needs and accommodate contracts up to 1 M€ (Building Block framework); it is also foreseen to create **'a product portfolio framework'**
- GSTP Element 2 AO processes are being adapted to better address the context and the increased use
- **For Element 3, key aims are** implementing existing missions/IODs, preparing new ones and expanding the demonstration approach
- **Two additional components are proposed** (EEE Space Component Sovereignty for Europe and EuropeaN Devices Using Radioisotope Energy) and **one additional Element 1 Specific Area proposed**

Thank You