

General Support Technology Programme (GSTP) & Discovery, Preparation & Technology Development

Status and Outlook

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The M-NLP, multi-Needle

used to sample the in-situ

Langmuir Probe, will be

extraordinarily line leve

space weather

Agenda

→ ESA's Technology Programmes

→ Discovery, TDE overview

→ GSTP overview

→ TDE outlook

→ GSTP outlook

strategy for the coming

years, and spans from

Innovative

Propulsion

GOMX-3

nanosatelites focusing on high-speed data downlink

GOMX-4 ESA's biggest operation nanosatellite constellations, Launched SABRE The next generation hypersonic propulsion engine that will change how we access space and conduct orbital missions

Clean Space

ESA's cross-cutting

initiative that aims to

of the environmental

Friction Stir

Welding

contribute to the reduction

impact of space activities

less residual stress and

same time reduces cost

distortion that at the

Reusable technologies

Electric Propulsion Alternatives Micro-colloid Thruster. IFM Nano Thruster, etc.



CARMAN Built for the purpose of studying the atmospheric re-entry process and the associated aerothermodynamie

are one way we can

contribute to more

Quantum is a pioneering mission that will influence Reuse and upgrade how telecom satellites are of Space Antenna manufactured in Europe Re-erection of the 15-metre-high Perth Atom interferometry Antenna at Santa Maria in chamber, active alignment Azores, Portugal, with the system for quantum purpose of providing stability laser control tracking services and facilitating the downlink of Earth Observation data

> White Thermal Coating of bone - covering 80% of SolarOrbiter launched in

Monitoring climate



PICASSO (3U) Studying the atmosphere EEE Electrical, Electronic and Eletromechanical (EEE) components are the fundamental building blocks

BRAVE FPGAS Field Programmable Gate Arrays (FPGAs) are versatile components that implement a wide range of



for Giant Telescopes A mirror that can be deformed to counteract image quality decreases caused by deformations itself for engineering by the space environment

ADEO

The Drag Augmentation



Ice Cube Thruster A fingernall-length space thruster chip running on the greenest propellant of

Miniature X-Ray Flux monitor onboard SUNSTORM

that will measure X-rays in a new way, gathering more information based on both

ESA explore the use of machine learning for navigation tasks, and enhancing the spacecraft



A CubeSat investigating a

PRETTY



NORM is the Norwegian measuring energetic charged particle radiation in space will fly on the new

Discovery, Preparation, Technology Development (TDE), General Support Technology Programme (GSTP)



Disruptive Ideas

- Taking risks
- Low budget
- Fast and Open
- Novelty driven
- Commercialisation
- Research, studies and tech.dev.
- Outside driven (OSIP)
- Open competitive

Discovery

Future Missions

- Solid baselines
- (Pre-)Phase A
- For all domains
- MBSE, ODebris, LCA
- Commercialisation
- ESA-driven
- Open competitive

Preparation

Technology Raising

- All ESA applications
- Enabling missions
- Low TRL
- 2yr work plans
- ESA driven
- Open competition

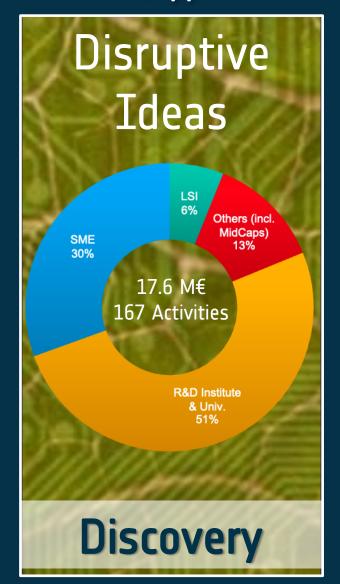
- Enabling missions
- SupportingCompetitiveness
- Higher TRL
- Work plans and industry-driven proposals
- SME focus
- Delegation support
- 3 Elements

TDE

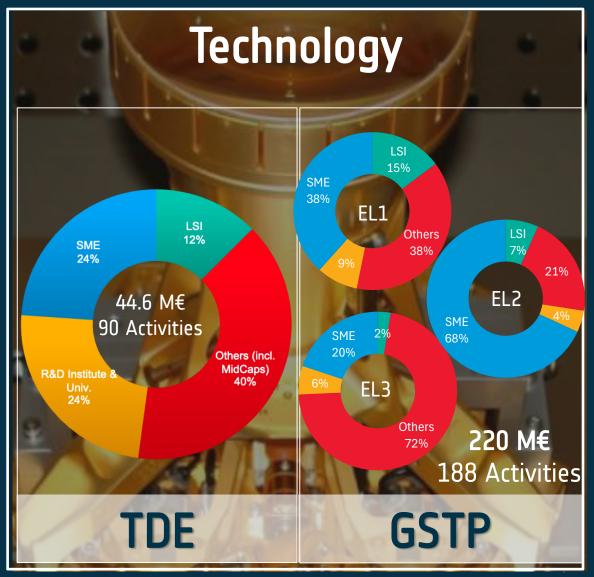
GSTP

Discovery, Preparation, Technology Development (TDE), General Support Technology Programme (GSTP)









Discovery Element: Howe to participate?



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 Contracts

- 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

→ DISCOVERING TOMORROW'S INNOVATION

Technology Development Element (TDE)

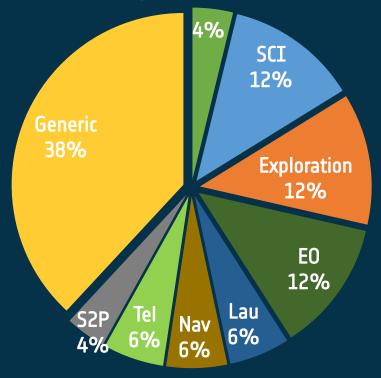
- Part of ESA's Mandatory Basic Activities.
- → All ESA Member States contribute.
- → Covers all ESA programmes, applications & technology disciplines.
- → First step of the implementation of ESA Technology Strategy.
- → Activities defined by ESA experts. Industry inputs always welcome
- → Relies on European Space Technology Harmonisation Roadmaps.

- → Based on 2-year work plans, with yearly updates, ~ 200 activities, ~ 100m€, TRL 1 4
- → 94% of all activities in open competition.
- → Around 50% of the contracts are awarded to SME or R&D Institutes.





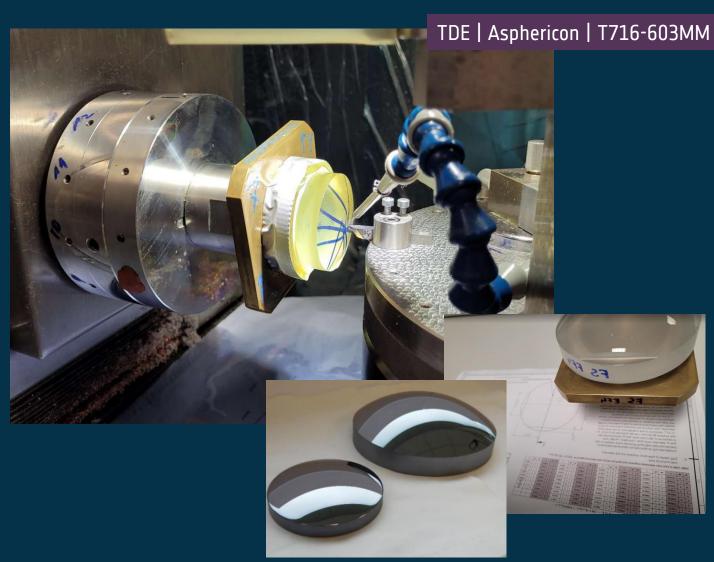




ACHIEVEMENTS — Optical polishing techniques



Several TDE activities have worked on manufacturing techniques to improve polishing of aspherical and free-form lenses, which will in turn improve performance in optical systems. One of these is using infrared polishing techniques on brittle materials that are tough to get smooth.



TDE: How to participate?



ESA identified technology needs

- ESA published 2-year
 TDE work plans.
- Based on future mission needs (TECNET).
- Across all domains.



- Look for ITT on esastar Publication.
- · Form partnerships.
- Submit your proposal answering ESA statement of work.

Your action

TDE Contract

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

esa

General Support Technology Programme (GSTP)'s mission



- → For more than 30 years, the GSTP has been developing leadingedge space technologies that enable missions and support the competitiveness of European industry.
- → GSTP allows companies of all sizes as well as research and academic organisations to perform technology developments and demonstrations
 - Building capacities, fostering innovation and creating and improving products and services.
- GSTP is an optional ESA programme with the participation of all ESA Member, Associate and Co-operating States.
 - → 27 Participating States in total

GSTP Structure





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



Industry initiated and driven cofunded activities to strengthen competitiveness.



On-ground and in-orbit demonstrations of technologies in need of acquiring in-orbit validation.



GSTP Element 1 Develop

Compendia 2022-2025 implementation

	Compendia activities in the E1 Work Plan	Compendia activities TOTAL	Share
Generic Technologies	31	86	36%
Artificial Intelligence	11	21	52 %
Cybersecurity	8	14	57 %
Digitalisation	7	15	47%
Quantum	4	7	57%









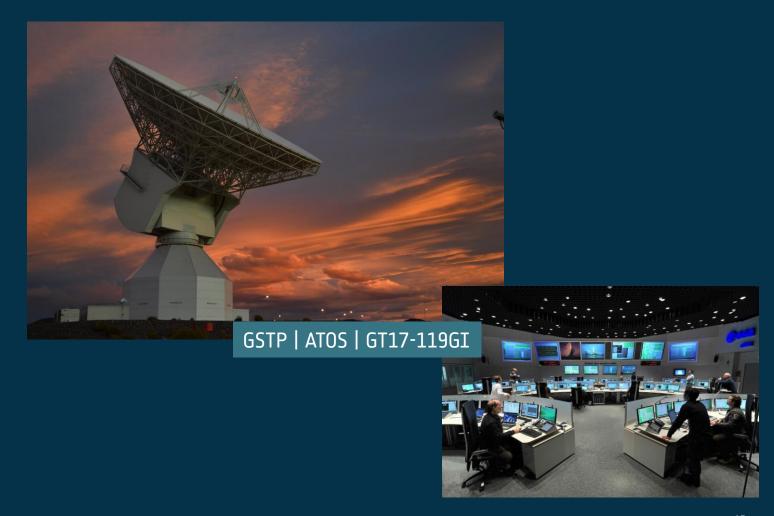




ACHIEVEMENTS — Real-time flight status



As the monitoring and control system at ESA's Operations Centre nears obsolescence a new service is needed for missions in space to receive real-time communications and **status** updates. The replacement, EGS-CC, requires additional components to make sure it offers equivalent and, hopefully, improved infrastructure.



GSTP Element 1 Building Block and De-risk Frameworks



- > Preparation of Enabling Space Technologies And Building Blocks
- Assessments to prepare and de-risk technology developments

Procurement using a template

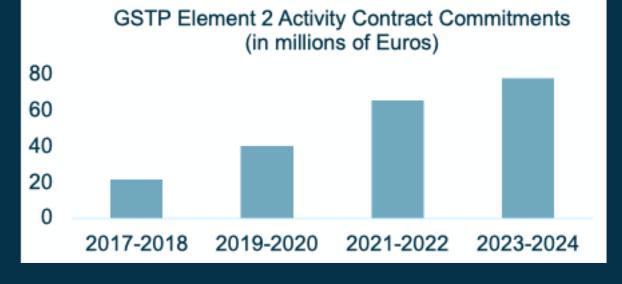
- Max budget: €1 M (BB), €250 K (De-risk)
- Max duration: 24 months (BB), 9 months (De-risk)
- BB Framework improved in the context of CM22 and the maximum activity funding level extended to 1000 KEuro
 - Allowing faster procurements for larger activities
- De-risk framework improved in 2023 and the maximum activity funding level extended to 250 KEuro
- De-risk channel on OSIP (ideas.esa.int) evolved to bring together the main and thematic de-risk frameworks
- IPC approved the application of COOPERATIVE AGREEMENTS for DE-RISK activities <250 Keuro





GSTP Element 2 Make

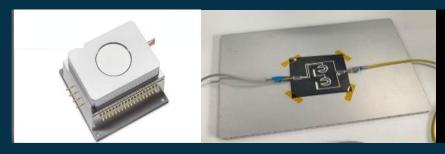
Industry-driven market-oriented activities







- Growing use following major evolution in 2019-2020
- Tailored Calls for Proposals:
 - Produkt Initiative call (Germany): Product developments target mid-Class missions
 - 'idea' (Q1/2024) to 'contract' (Q3/2024) for most of the 15 activities
 - Calls in Denmark and Spain
- Support to production process and industrialization





- Develop and validate innovation and improvements for production process
- Number of activities increased to 10-15 per year

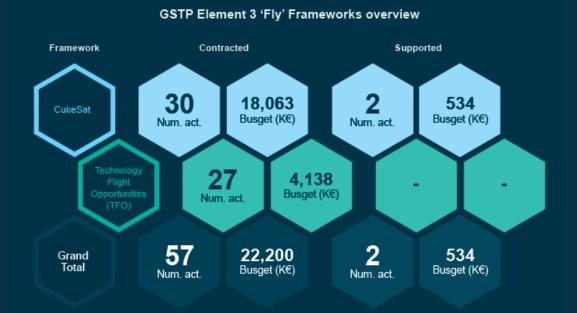
GSTP Element 3 Fly

Facilitating Technology Demonstrations

Main objectives:

Demonstrating technology, techniques and capabilities.

- Successful implementation of missions and IODs
- Preparation of new mission/IOD opportunities.
- Enhancement the demonstration approach.







Outlook 2025: Technology Development Element (TDE) General Support Technology Programme (GSTP)

Directorate of Technology, Engineering and Quality



TDE OUTLOOK: TDE 26-27

- A TDE Workplan for 2026-2027 period will be published in Sep. 2025
- Volume ~100 M€ (depending on LOR for BA)
- Focussed on TRL 1-4
- Covers all ESA activities, such as:
 - ESA Vision 2024
 - Voyage 2025
 - JTF Recommendations on critical space technologies



GSTP OUTLOOK: Speed and Focus

Compendia Al, Quantum, Cybersecurity

Standardised subsystems & platforms Sustainable Space, Propulsion



In Orbit Demonstrations (Competitiveness, Innovation, Capacity Building)

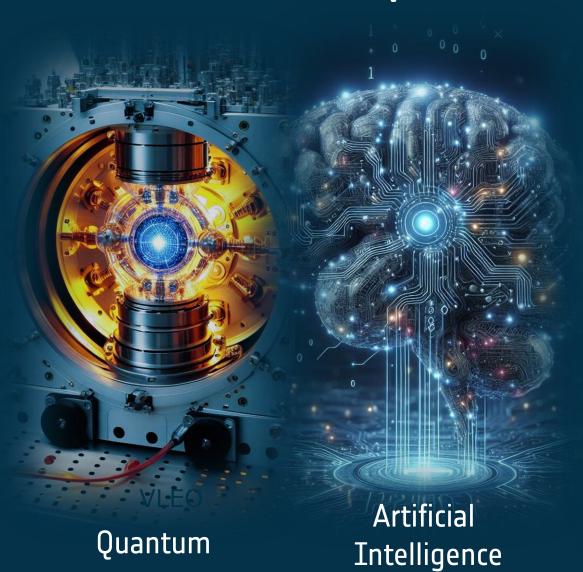


ESA driven technology developments (Work Plan, Frameworks)



Industry driven developments to strengthen competitiveness

GSTP Outlook: Preparation of Compendia 2026/2028





- Sustainable Space
- Innovative Propulsion

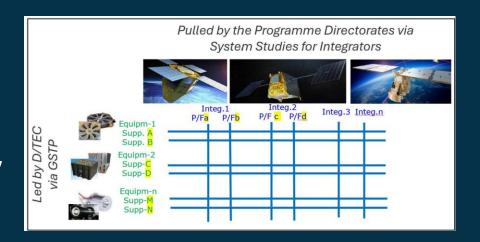


GSTP Outlook: LEO Mid-Size Sats

Competitiveness for LEO Mid-size Sats - MIND - Mid-size sats INDustrialisation

- Support the European industry for the development of subsystems (or subsystems' elements) needed to provide European sovereign platform architectures for operations in LEO, by 2028 and for mid-size satellites (100 to 500 kg // 200W to 2kW TBC)
 - Enhance European competitiveness for LEO applications, to serve European needs, but not only.
 - Support technology development for a LEO platform envelope suitable to a variety of applications and business cases, being institutional (Projects); commercial or of strategic interest to ESA's nations (national agencies)
 - > Therefore, bringing the volume necessary to allow for drastic supply chain cost reduction, thanks to serialisation.

What this initiative IS:	What this initiative IS NOT:
For satellites integrators and PF primes → to improve their competitiveness on all markets	Limited to ESA missions
Payload agnostic (as much as possible)	Aimed at a specific application domain
Aimed at established & New Space industry	Only aimed at big primes
Promote interoperable equipment to enable 'dual+' sourcing with architecture & design flexibility	Developing a standard / unique European Platform
Federating and ensuring compatibility & inter-operability	One size fits all solution
About Industrialisation and Competitiveness	About Standardisation / 'SAVOIR-like'



Cost efficiency

Faster development

Progressive adoption

Take Away





- Registration of new companies.
- Invitations to tenders.
- News/Procurement related announcements
- TDE WP

 IMPLEMENTATION 2025





- Channel and Campaign.
- Entry to Discovery
 Element.
- Submission of preproposals and outline proposals for GSTP.



Activities Portal

- Running activities
- Visibility on interim
 results and publications
- Managed by the contractor
- Simplified interaction with ESA



shaping the future

- TDE/GSTP information.
- TDE/GSTP achievements summary.
- Annual reports and highlights.



Nebula Public Library

The knowledge bank of ESA's R&D programmes

- Discovery, Preparation,
 TDE and GSTP
- activities achievement summary





Thank you

More at: https://esa.int/Future

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