Stratégie de l'ESA sur l'intelligence artificielle et l'ingénierie système

ESA ESTEC
26/11/2025
ESA-TECSFA-HO-2025-003528

ESA AI Strategy Plan – The genesis

- The ESA AI Strategy Plan has been prepared within an ESA-wide taskforce on AI:
  - 30+ members
  - 10 Directorates
- Present the vision and strategy
- Define the organisation
- Identify strategic objectives

- Issue 1.2 has been made available for public distribution on 2nd June 2025


ESA UNCLASSIFIED – Releasable to the Public

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ESA AI STRATEGY PLAN

Prepared by	TaskForce5-AI
	ESA
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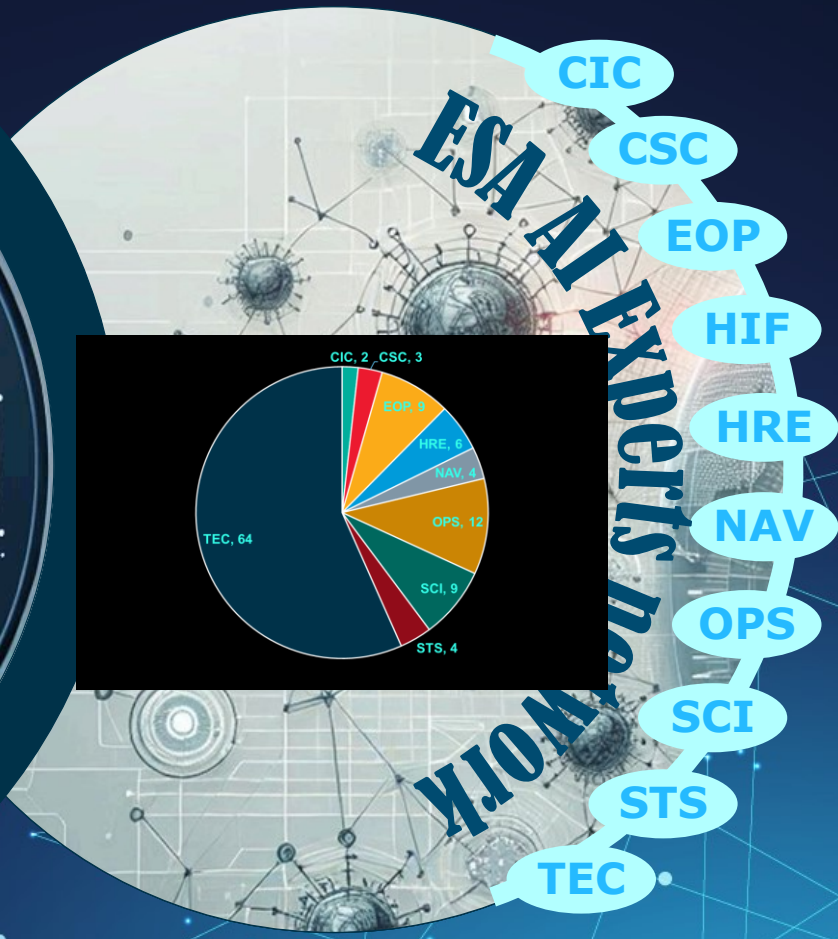
→ THE EUROPEAN SPACE AGENCY

ESA AI strategy plan organisation



AI@ESA strategy implementation

02/24
ESA TaskForce5-AI

05/24
ESA AI expert network

11/24
AI Competence Centre

11/24
ESA AI Strategy Plan

12/24
AISSA THD

06/25
Workplan

11/2025
CMIN25

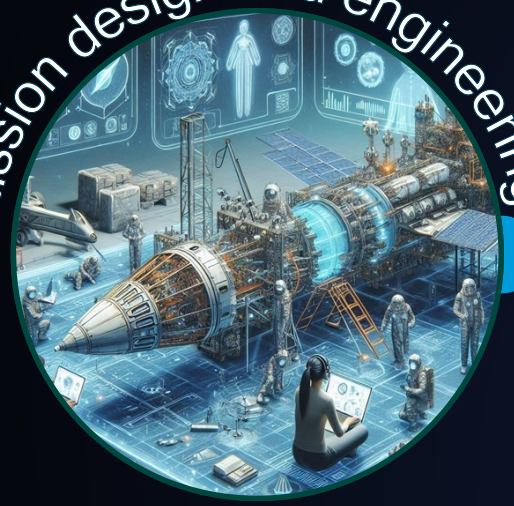
Q1 25
Technology Vision 2040

06-09/25
TDE workplan +GSTP Compendium

Some activities related to System Engineering

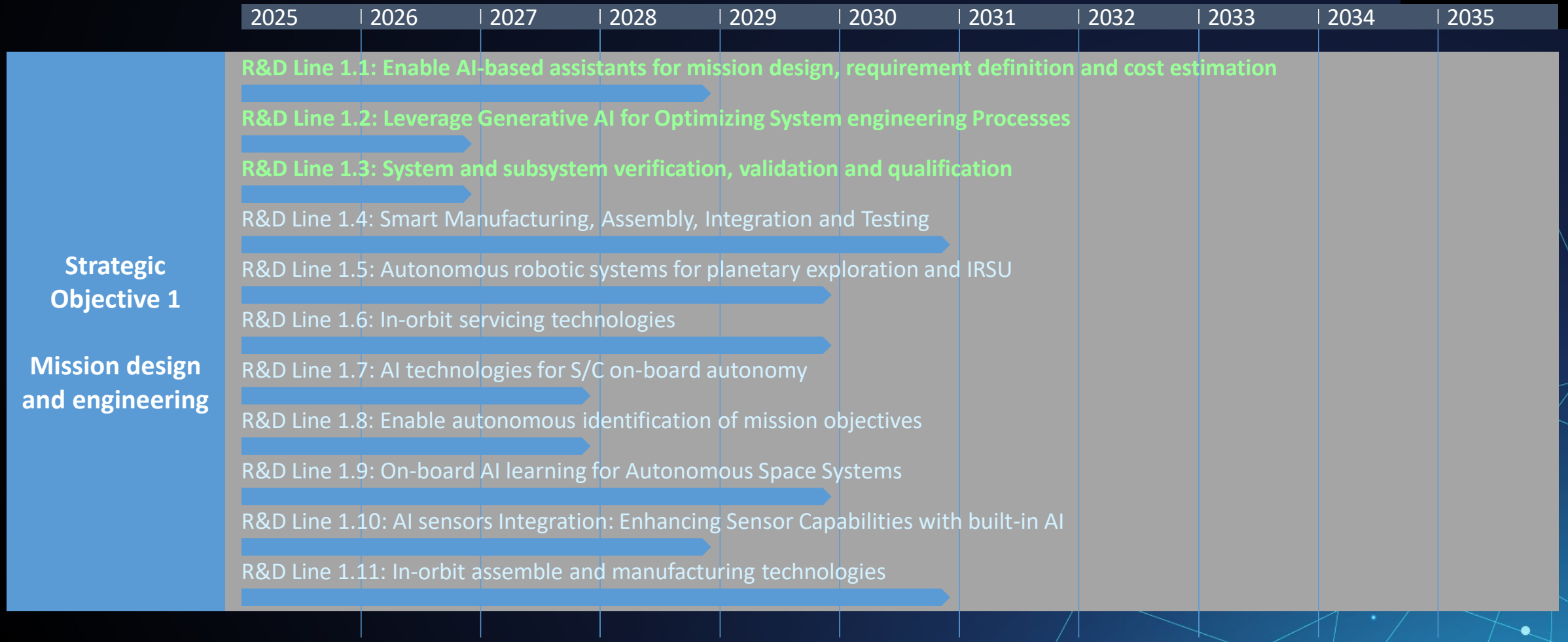
Gravity Assist – 2 projects	• SpaceKG: A Knowledge Graph for technology trends monitoring. • Virtual Assistant for TEB and multi-mission requirements
Internal Research Fellow	• Natural Language Processing, LLMs and Knowledge Graphs
Trainee – Requirements engineering	• LLMs and RAG to support requirement generation and quality assessment
ETD – CodexTec	• LLMs based system to support software engineering processes.
ARTES-FP (CSC) - Intelligence Platform Study	• System-level identification of advanced capabilities enhanced by AI and design of OBC/DH platform to support their execution.
AI4SE	• Requirement flow-down: Similarity analysis between requirements, consistency requirements-architecture: Use a Large Language Model (LLM) as a reasoning engine to verify the model • System architecture: Build Knowledge Graph with past design
CHIME (EOP) – **Ongoing** ENVISION (SCI) – Start**ing**	• Support the CHIME project and CDR with LLM/RAG • Support the EnVision project with LLM/RAG on requirement engineering

AI Harmonisation Dossier – Strategic objectives



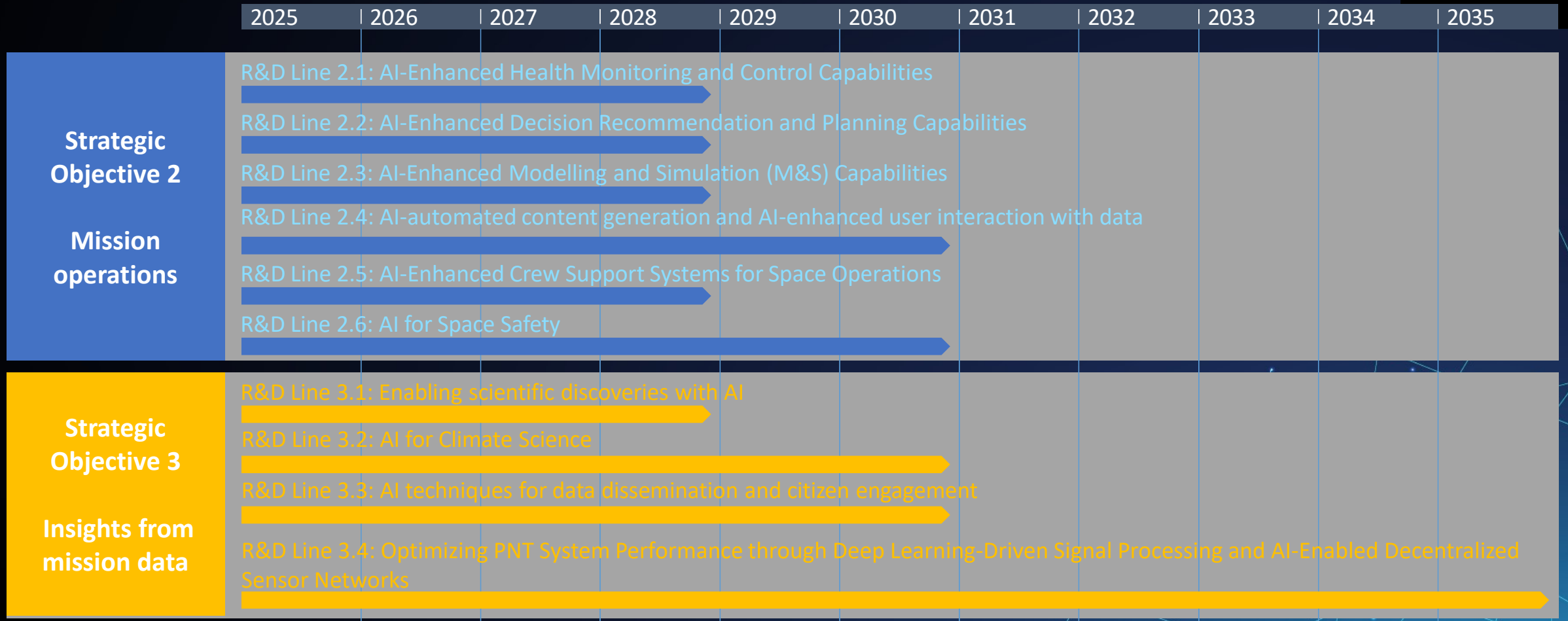
AI Harmonisation Dossier

Roadmap Strategic objective 1



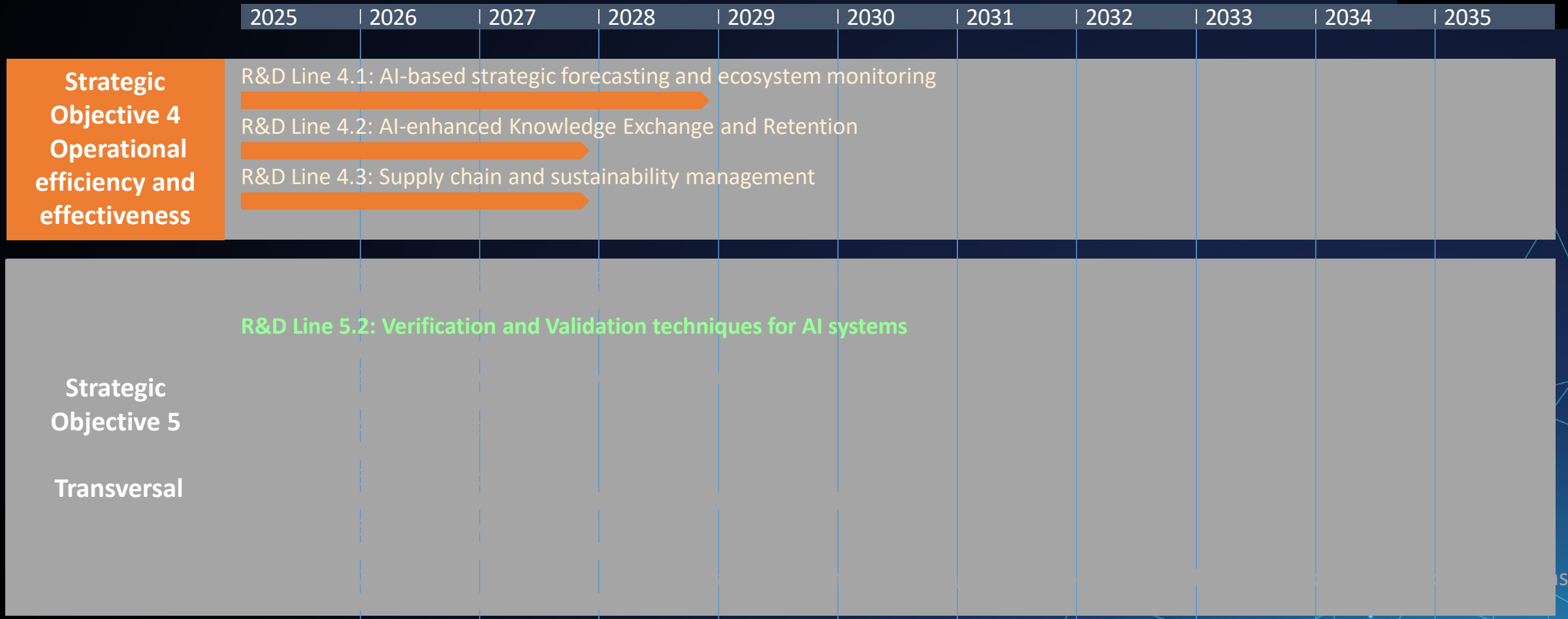
AI Harmonisation Dossier

Roadmap Strategic objective 2&3

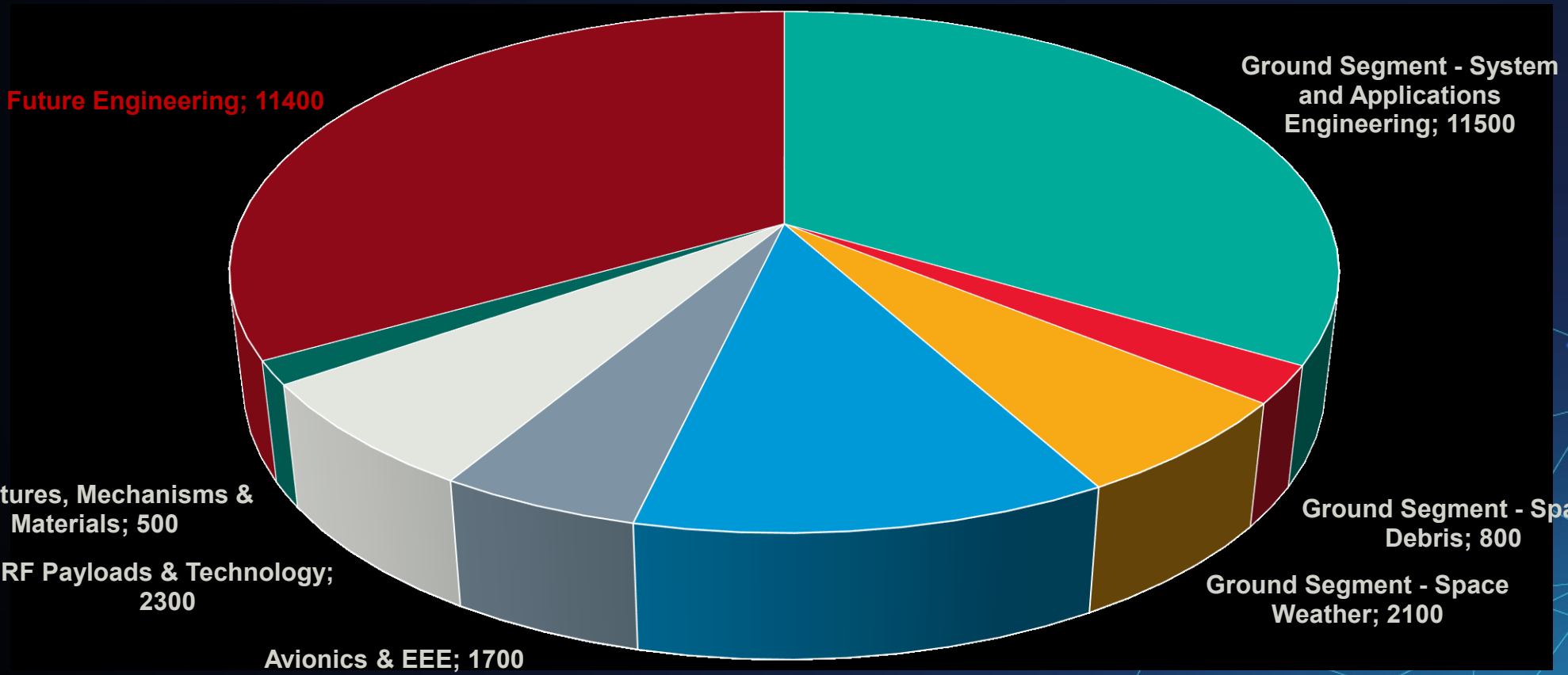


AI Harmonisation Dossier

Roadmap Strategic objective 4&5



GSTP Compendium on AI/Digitalisation



GSTP 2026-2028 related to System Engineering

GT1I-819SF – AI accelerate ontology generation

Budget: 600 k€ - **Duration**: 18 months - **Current / Targeted TRL:** 3 / 5 - **TD** 26

Objective: To accelerate the development of the Space Systems Ontology leveraging Agentic Workflows, Natural Language Processing and Large Language Models.

GT1I-821SF – Generative design for early design phases

Budget: 900 k€ - **Duration**: 24 months - **Current / Targeted TRL:** 3 / 5 - **TD** 26

Objective: To use generative design and AI-based language tools to automate and accelerate early space mission design, enabling engineers to efficiently explore and evaluate a wider range of innovative solutions.

GSTP 2026-2028 related to System Engineering

GT1I-828SF – Intelligent assistant for MBSE and simulation model generation, setting and evolution for mission preparation

Budget: 1800 k€ - **Duration**: 18 months - **Current / Targeted TRL:** 3 / 6 - **TD** 8

Objective: To develop an intelligent system to assist in the generation of system designs (with MBSE) and system simulators for space missions; and mission preparation, including data system and simulator configuration and procedures preparation.

GT1I-830SF – AI-powered assistant for SysML v2: enhancing MBSE

Budget: 600 k€ - **Duration**: 12 months - **Current / Targeted TRL:** 4 / 7 - **TD** 8

Objective: To enable automation and efficiency increase in MBSE processes by developing an integrated and interoperable environment leveraging SysMLv2 textual notation and Large Language Models.

And …

You can always contact ESA to propose other GSTP activities

Through the ESA's Open Space Innovation Platform (OSIP), you can:

- **Propose innovative ideas to be funded through three types of activity:**
  - Co-funded research
  - Study
  - Early Technology Development
    - As part of a campaign or an open channel
- **Propose activities on ARTES, NAVISP, GSTP R&D programmes**

https://ideas.esa.int/

Contact the AI Competence Centre for all aspects related to the use of AI in Space

ai@esa.int

What next?

- **AI-STAR - https://atpi.eventsair.com/ai-star-2025**

What next?

- **SPAICE 2026 – October 2026 at ESTEC**

- **https://spaice.esa.int/2026/**

AI can do more than creating nice pictures