

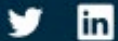
ESA's concept for a High-End Computing capability for Space

Agenda 2025 will bring European space to the next level

To meet our ambitions for a green, digital, safe and inclusive Europe and world, Europe needs to step up its game in space.



Josef Aschbacher
ESA Director General



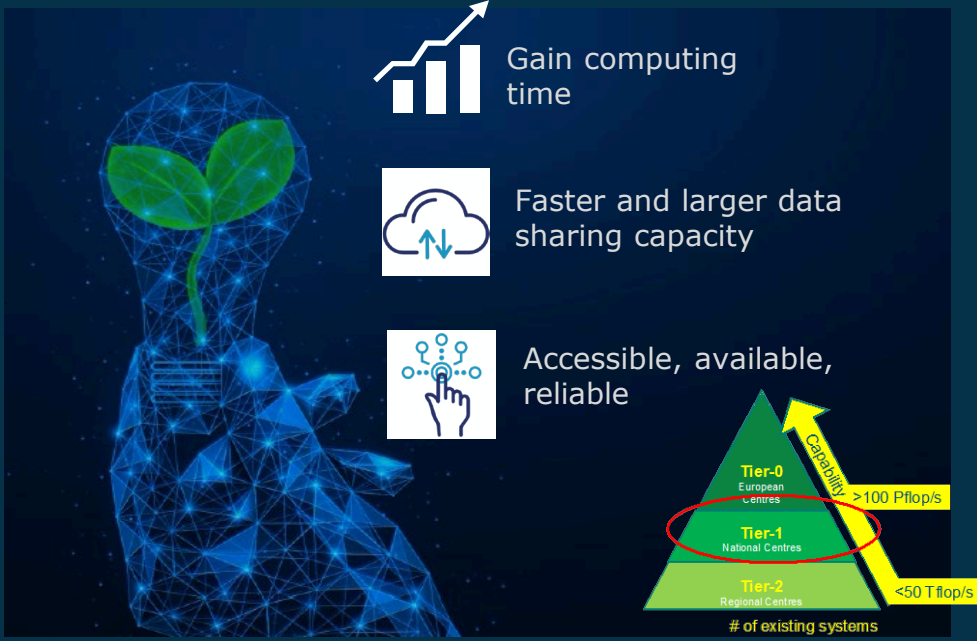
ESA will...

- use both its space and non-space information to the benefit of society, **using AI, latest data analytics technology**
- transform vast sets of climate data from space into digital twins: **'what if' simulations**, testing of policy effectiveness, and **support decision-making**
- Support competitive and **innovative commercial space** companies, transforming big data and connectivity into smart information products and commercial services. **Speed up innovation** cycles.
- Supplement **ESA's role** with that of a risk taker in areas with **commercial growth potential**.
- **Simplify access** in particular for start-ups, SMEs, mid-caps, and New Space companies, allowing them to integrate supply chains ...

Objective: connect Space & Supercomputing – a new capability to advance the European Space sector

→ A Space High Performance Computing Capability

- Shared among all ESA programmes = basic capability offered by the Agency
- Critical enabler for start-ups, SMEs
- Scalable as needs evolve: 2023-25 (ramping-up & validate), 2026-28 (consolidate)
- Responds quickly to growing digital innovation in the new space sector
- Improves the quality of information: understand, use, make decisions
- Strategic link with Member States & EU: interconnect, share capacity, drive space innovation



Large variety & growing needs: Results from 2 independent studies, 2021, ESA and industry/SMEs

Digital Twins
e.g. Earth

ML
applications

Earth system
modelling

Operational
processing

Climate
Change
Initiative

Mission Data
Processing

Science Data
Exploitation

Space Safety
and Security
Programme

ESA GNSS
Science
Support Centre

Mission Data
Systems

Mission
Analysis

Simulations

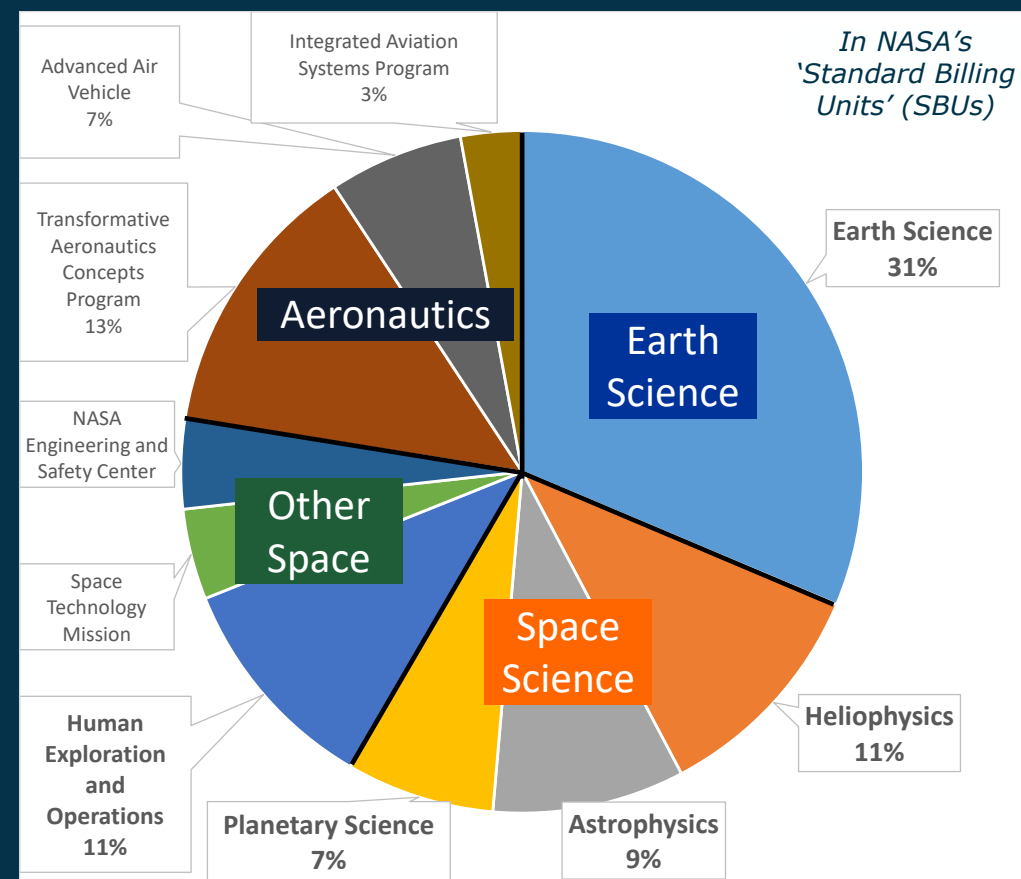
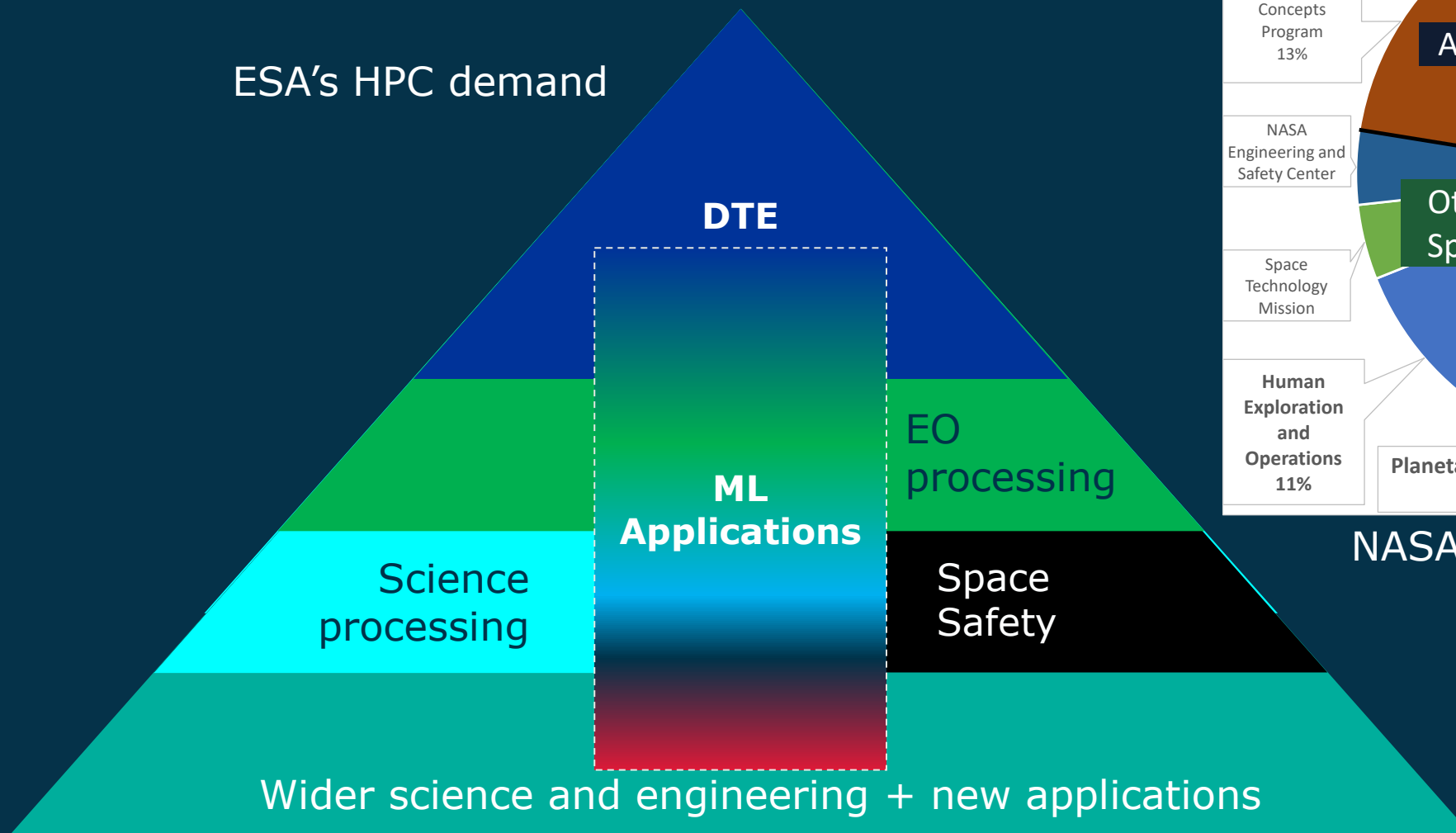
Engineering
Tools

Internal
Research

Science Data
Exploitation

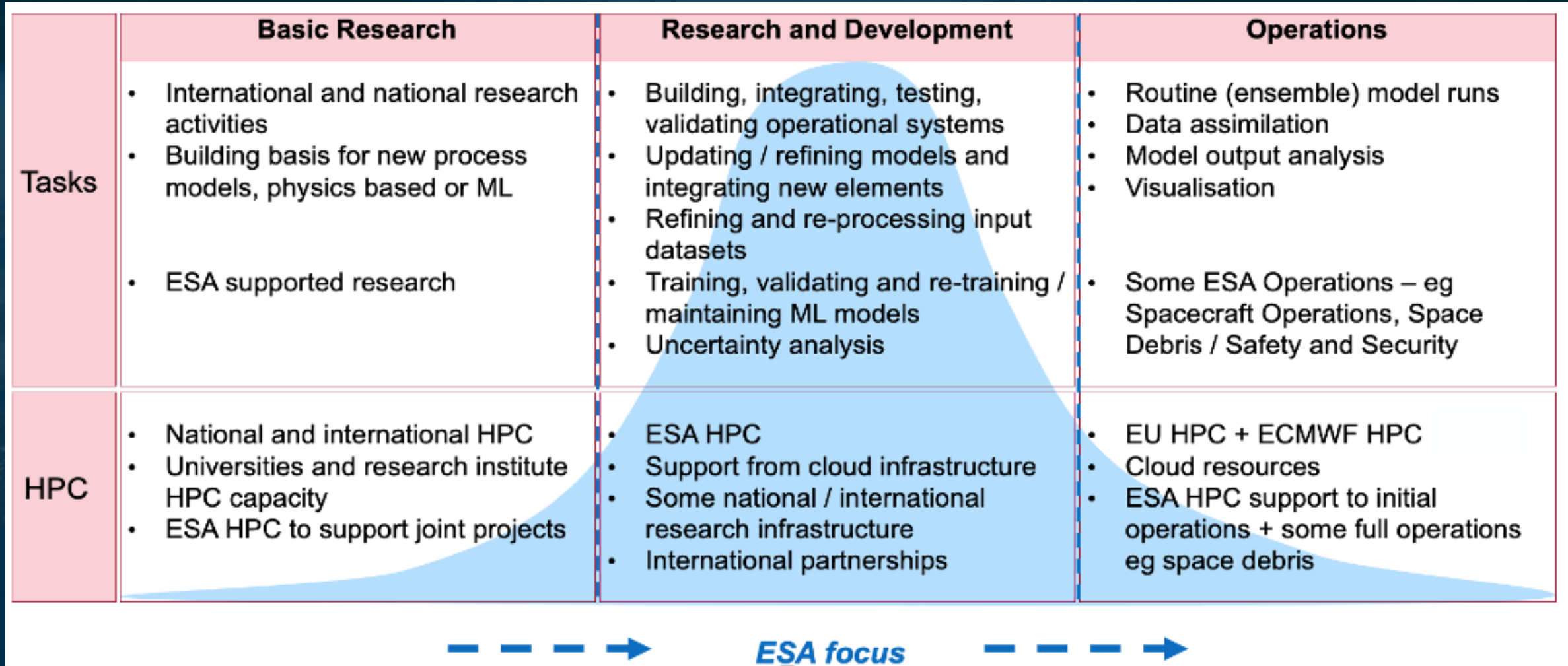
ESA's vs NASA's needs

ESA's HPC demand



NASA's 2020 HPC demand



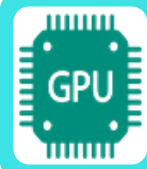



What are the needs – until 2025?

CPU and GPU supporting classical and AI based computing

LOW

 62 000 cores

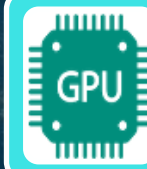
 1056 GPUs


 60 PB storage

11,7 Peta Flops Peak capacity

HIGH

 123 000 cores

 2048 GPUs

 100 PB storage

22,6 Peta Flops Peak capacity

- ESA internal HPC Task force in place with all Directorates to mature the requirements, define operating model and derive technical specifications → Oct 2022
- DG's proposal & iteration with Member States towards CM22 → Nov 2022
- Prepare the procurement (L0) → Q1/2023
- Pre-operations → Q1/2024 (L0+10)
- Start of user onboarding → Q2/2024 (L0+14)