

Up next:

# SPACE TRANSPORTATION IN EUROPE



**Toni Tolker-Nielsen**

Acting Director of Space Transportation  
European Space Agency (ESA)

initiated by



organised by



Agenda:

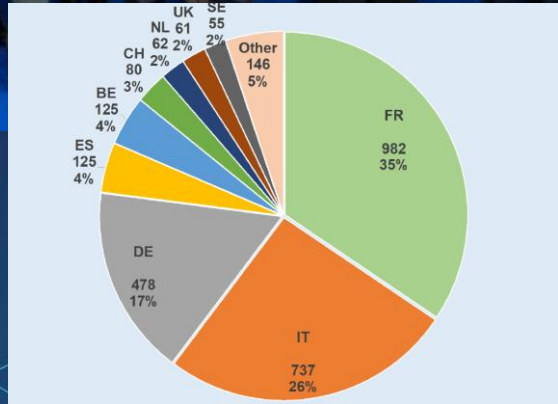
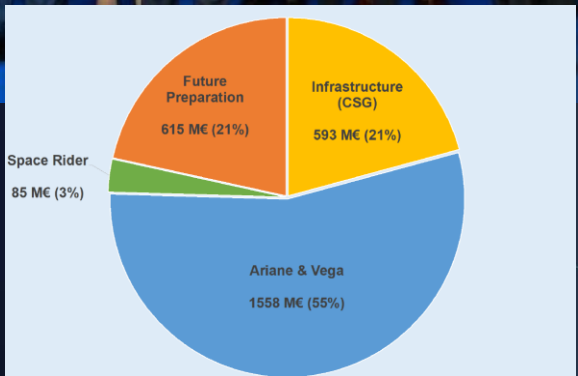
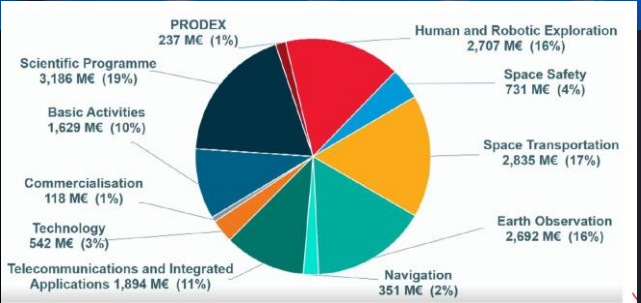
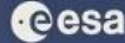


# ESA CM22: Europe success !



## Council Meeting at Ministerial Level

Paris, 22-23 November 2022



# Space Summit 2023



## Ministers lift Europe's Ambitions for a Green & Sustainable Future, Access to Space and Space Exploration



ESA UNCLASSIFIED – For Official Use



→ THE EUROPEAN SPACE AGENCY

# Space Summit 2023 – Main Outcomes

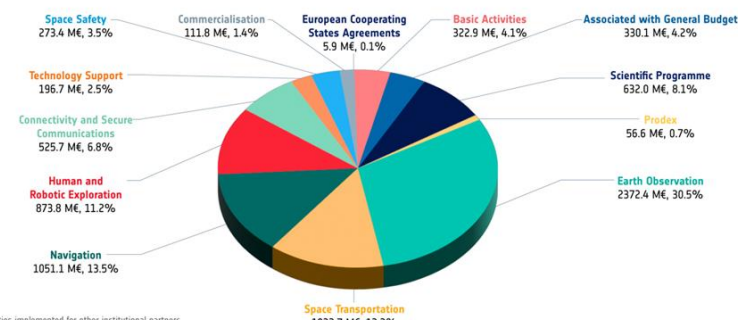


## ESA driving European space ambitions: small steps, big vision

- ESA driving space for our Green Future
- Guaranteeing Europe's access to space:

1. Stabilised exploitation of Ariane 6 and Vega C
2. European launcher challenge and preparation of the future
3. Launch complexes at Europe's spaceports
4. Vega commercialisation and exploitation

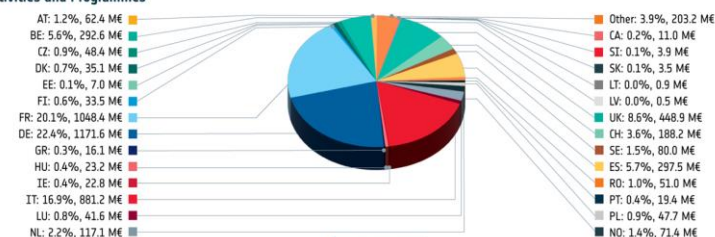
ESA BUDGET BY DOMAIN FOR 2024: 7.79 B€\*



\*Includes activities implemented for other institutional partners

BUDGET 2024

ESA Activities and Programmes



BUDGET 2024 BY FUNDING SOURCE

TOTAL: 7.79 B€ (+10% vs. 2023)

TOTAL: 5.23 B€

Income from Eumetsat 15%, 116.4 M€

Income from EU 23.4%, 1822.6 M€

Other income 10.5%, 821.2 M€

Income from MS for ESA programmes and activities 64.5%, 5024.9 M€



# The European launcher family

- The **Ariane** and **Vega** launch vehicle families are overseen by ESA and guarantee European autonomous access to space.
- Their development and successful exploitation is an example of how space challenges European industry and provides precious expertise.
- Ariane is one of the most successful launcher series in the world. Joined by **Vega** (since 2012), they are launched from Europe's Spaceport in French Guiana.



# Urgency to Act now

## Space sector is undergoing a profound & accelerating transformation

- **Growing public & private investment:** new players, increasing budgets, entrepreneurial approaches
- **Urgent societal needs:** climate, security, competitiveness, energy, digital, autonomy etc.
- **Commercialisation:** towards >1 trillion-euro space economy
- **Disruption:** reusable launchers, mega-constellations, connectivity revolution, AI, quantum etc.
- **Space race:** in exploration and security & dual use

➔ **Europe shall define clear, ambitious long-term goals in a coherent strategy**



# The Big Picture



## At the 2040 horizon Space Transportation will be driven by several elements:

- Permanent human presence around and on the moon.
- Robotic (and human) exploration of the Solar System, Mars and beyond.
- In orbit assembled Science missions
- Civil applications: Earth Observation, Communication, PNT, large infrastructures such as in-orbit data centres...
- Security and Defence Applications
- Missions for micro gravity research and manufacturing
- Active debris removal
- .../...



## ESA building the Space infrastructure for future orbital economy as technology and business enabler & partner



*“You cannot **start an interesting Space company** today from your dorm room. The price of admission is too high and the reason for that is that the infrastructure doesn’t exist. So the mission is to **help build that heavy lifting infrastructure** that future generations will be able to stand on top of the same way I stood on top of the U.S. Postal Service.”*

*Jeff Bezos wants to build the Infrastructure for Space start-ups* 

# Space mobility is already here ...



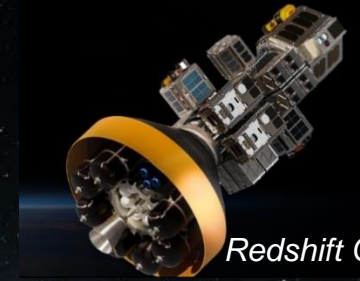
ION Carrier MkII



Space Van



Colibri



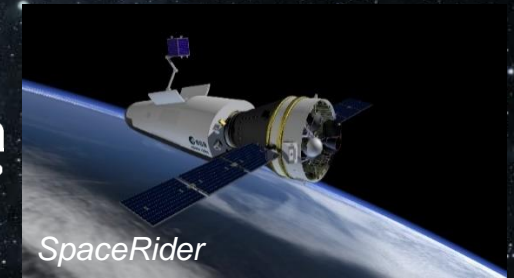
Redshift OTV



IOSHEX



## European in-space transportation vehicles



SpaceRider



EROSS - MVP-1



ASTRIS Kick-stage



Nyx Earth



Reliant

... and access to space offer is increasing...

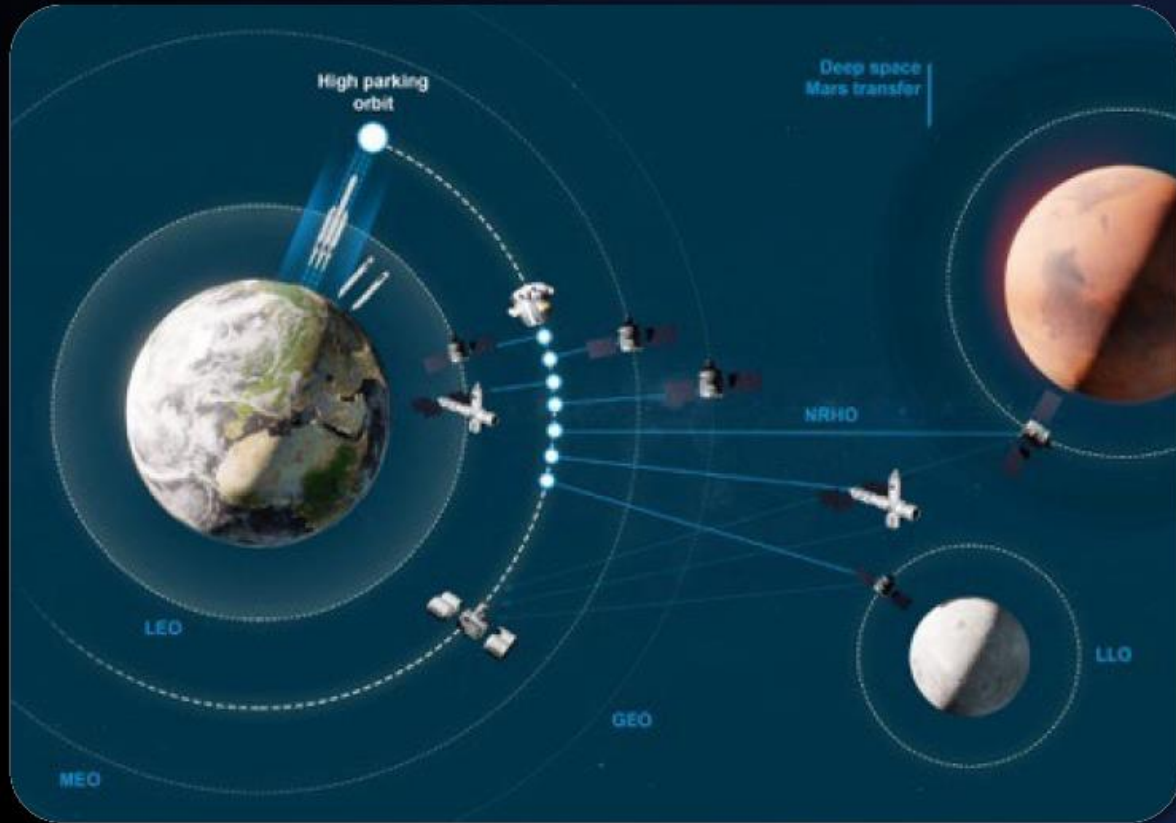
## Micro-Launcher private ventures in Europe



## Resilience and Security

Interoperable, multi-destination space transportation solutions (incl. reusable heavy lift)

Next Generation secure connectivity and PNT solutions



Commercial in-orbit services (e.g. edge computing, refuelling, assembly, debris removal etc.)



# ... relying on a transformed European ecosystem

**New role and players:** NewSpace Primes, Accelerators, VC, Investment banks, EU with HaDEA/EUSPA, Brokers, Academia...

**New services/products:** in propulsion (cycle, propellants...), reusability (upper stage, in space), in space transportation (space logistics) and on ground (tracking, operations, brokerage)

## New procurements:

From...

- Direct negotiation
- Launch Systems hands-on
- Development V
- 100% ESA-funded development
- Captive industrial base
- ECSS...

...To

- Competitive tender
- Space Logistics hands-off
- fail-fast & hardware-rich
- service procurement
- open architecture & private initiative
- Agility with moving targets....





# TRANSFORMATION

Player - Product - Procurement

towards a **Space Transportation ecosystem** for Europe