

Chip Happens! Morning Coffee  
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# Introduction to the SPACEECONOMY project – why space needs better chips

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# SPACEECONOMY in the WELEC program of the Strategic Research Council/Research Council of Finland

- WELEC = **Economy and Welfare in an Era of Strategic Competition**
- In the era of strategic competition, key goals include economic and societal stability, resilient operating models, intangible capital, and societies' ability to attract investments
- How, and by what means, can the **economy develop favorably** and build the foundation for well-being under changing conditions?
- The WELEC program examines **productivity**, develops ways to **strengthen it**, and seeks solutions for **renewing the economy and maintaining well-being**
- The WELEC program runs from 2025 to 2031
- Five national consortia: **SPACEECONOMY**, CO2CREATION, GAINS, EPIC-AI, TRANSFORM-AI

# What is Space Economy?

Space activity is an essential, though rather invisible, part of society

We use space applications directly, including:

- Positioning (Galileo, GPS...) *Saves 3-5 billion euros / day!*
- Telecommunications
- Weather information *Saves 1-2 billion euros / day!*
- Timing (including banking transactions, energy grids)

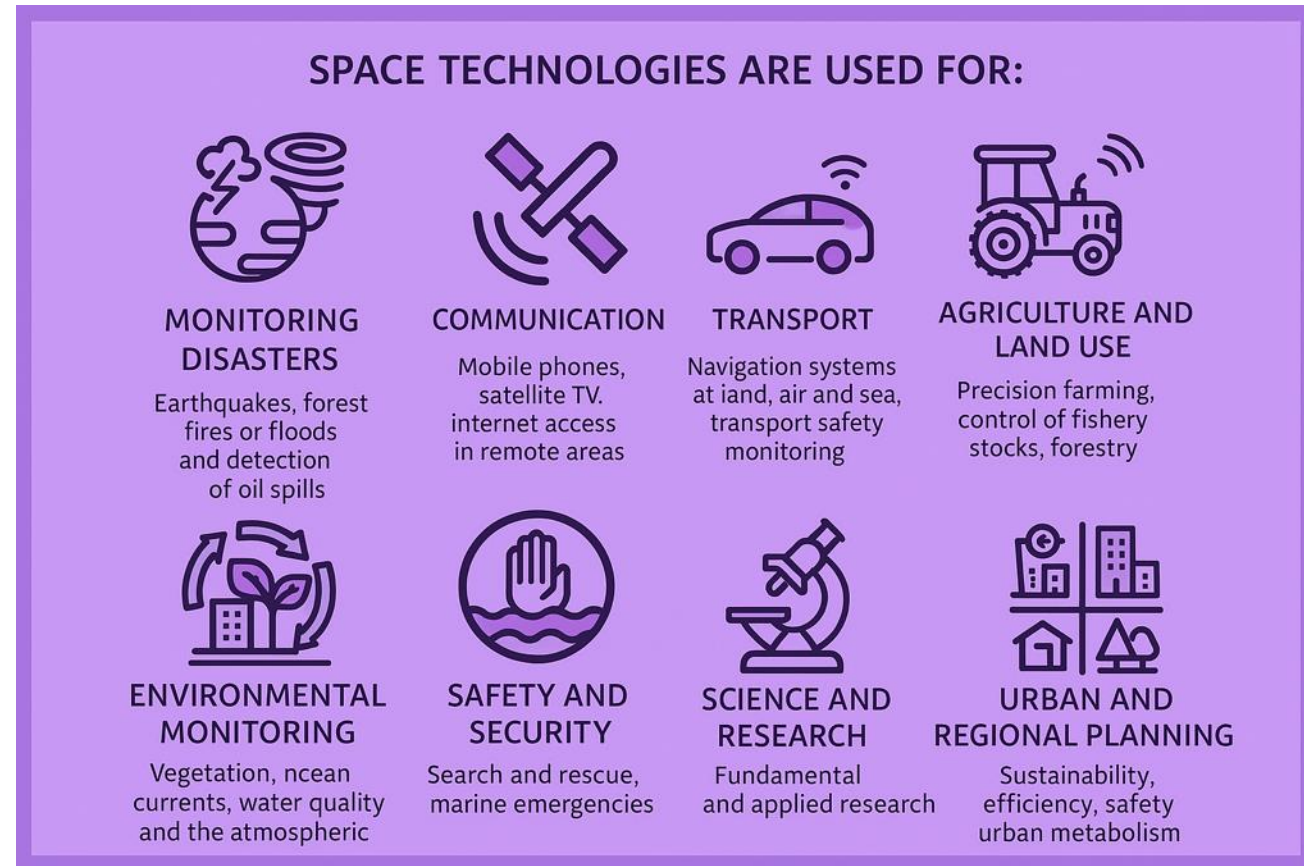
And indirectly, including remote sensing:

- Disaster response
- Security and monitoring
- Environmental monitoring
- Science and research

Part of an increasing number of applications, such as space tourism, electricity production, servers in space, industry, mining, etc.

**The value of the space economy will exceed 1600 billion euros (\$1.8 trillion) by 2035** (WEF/McKinsey)

**High microelectronics demand: electronics are mission-critical**



# On the edge of a new era

More space traffic than ever: an average of one launch per weekday

The cost of access to space has dropped dramatically in recent years:

- 2010 (Ariane 5): \$15,000 / kg
- 2025 (Falcon 9): \$2,700 / kg
- Soon (Starship and New Glenn): apprx. \$100 / kg

The amount of cargo to space is increasing massively:

- 2010: approximately 500 tons
- 2025: approximately 1,500 tons
- Soon: 10–20x
- Estimated 500,000 tons by 2030

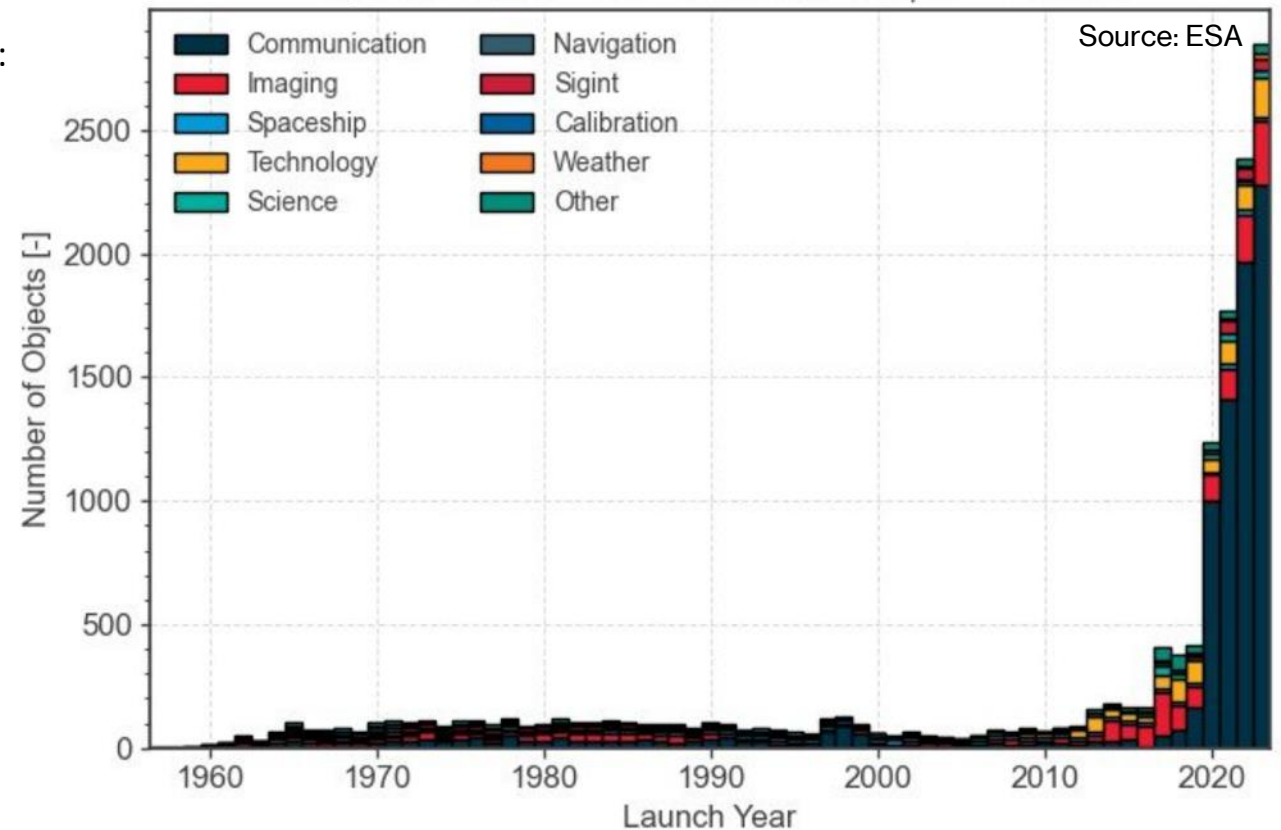
What can you expect? e.g.

- More & different services from space
- Mobile communication via space
- Server farms in space

Why chips matter in space?

- Radiation, thermal cycling, vacuum, vibrations
- Growing need for resilient microcircuits because of autonomy, swarms, LEO, AI onboard

Payload Launch Traffic into  $200 \leq h_p \leq 1750\text{km}$



# New possibilities, new services

## Earth observation for everyone

Value-Added Services, projected to grow the market to \$17.2 billion by 2033, include

- AI-driven analytics for precision agriculture
- urban planning
- disaster response

Smallsat constellations and crowd-sourced data from drones/UAS – both Finnish specialities.

The market expected to reach \$7.2 billion by 2030.



## GNSS advancements benefit all society

### High Accuracy Service

precision agriculture, drone delivery, and surveying.

### Emergency Warning Satellite System

real-time alerts for natural disasters directly to smartphones

### Multi-Frequency and Tilt Compensation Receivers

cm-level accuracy, ideal for GIS fieldwork and construction

### 5G/GNSS Integration for IoT

low-power, real-time positioning in wearables, smart cities, and aerial vehicles

### Resilient signal in Denied Environments

GNSS-alternative navigation for military/EW scenarios, addressing spoofing/jamming – also LEO PNT development

The GNSS market is projected to grow to \$703 billion by 2032, driven by autonomy and IoT.

# Finland became a small space superpower

Finland has been involved in space activities (passively) since the 1970s. Finnish devices have been in space since the 1980s.

## 2017 educational satellites

- Aalto-2, the first Finnish satellite
- Aalto-1, the first officially Finnish satellite

## 2018 first Finnish commercial satellites

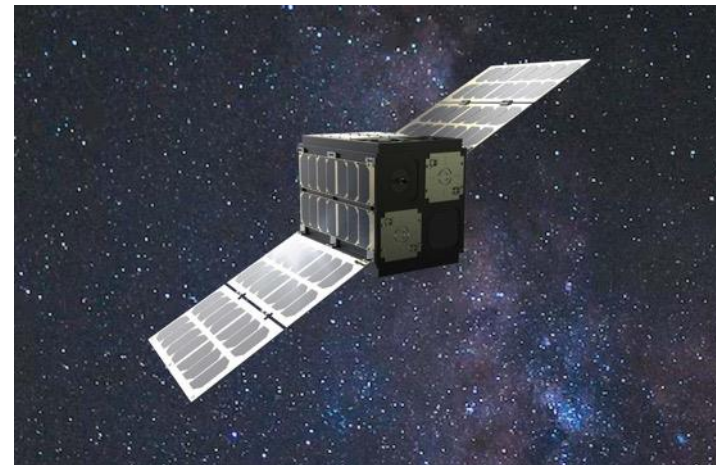
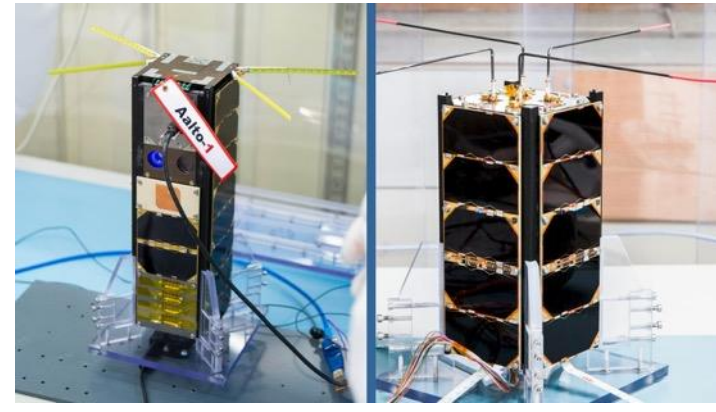
- Iceye X-1 and Reaktor Hello World

## 2025

- 34 satellites in the Finnish space object register (24 still operational. *Compared to Sweden: 20/10.*)
- Over 50 Finnish-made satellites in space

## Future

- Iceye and Kuva Space are building constellations, with over 200 satellites by 2030. Other companies, like Re-Orbit, are expected to join
- Chip-level innovation opportunities → increasing component needs

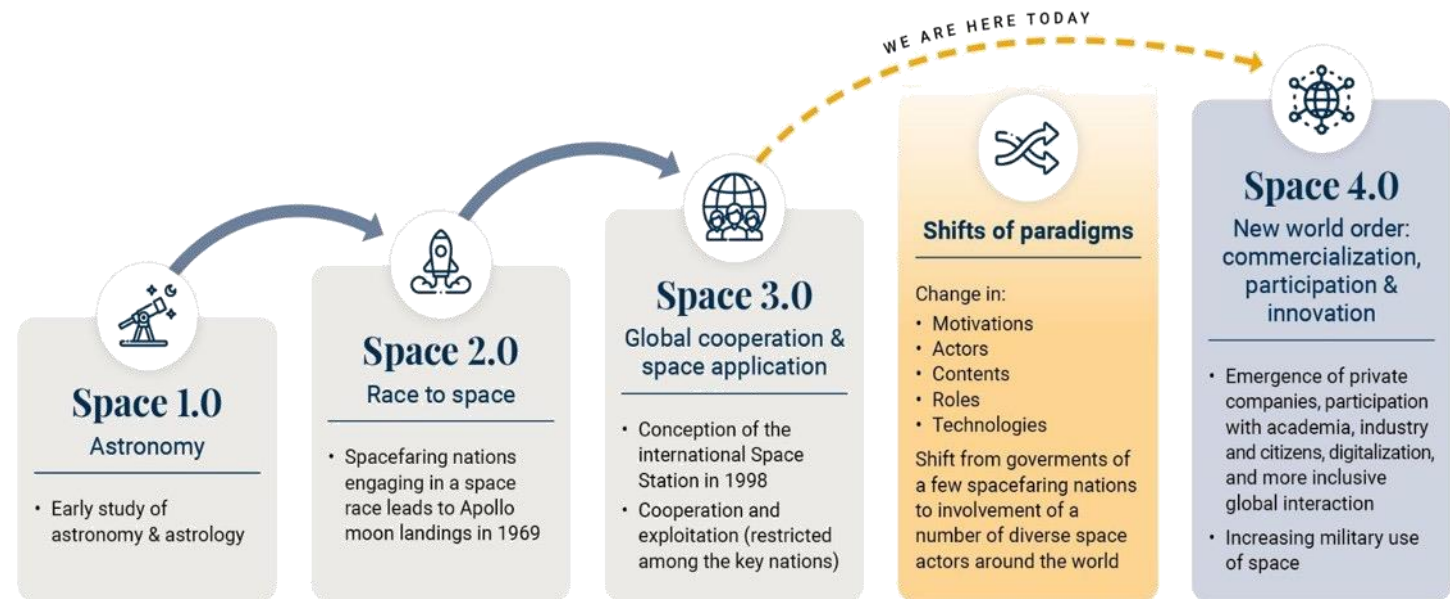


# What is the SPACEECONOMY project?

The academic world laid the foundation for Finland's space activities, including the first satellites and the spin-off companies that emerged from them.

SPACEECONOMY is creating a foundation for a new "new space" by bringing together science, industry, and the public sector to boost the space economy.

- AI-driven EO and GNSS solutions to support decision-making
- Sustainable business and governance models / how do we create value?
- International partnerships and competitiveness
- Ethical and responsible regulation and resilience
- Support for expertise to industry
- Space awareness, and citizen participation
- Focus on data, resilience, business models, regulation



We aim to address the challenges

- Fragmented field and lack of cohesion among actors
- Shortage of experts
- Limited integration of societal and regional perspectives

# What is the SPACEECONOMY project?

The project combines technology and space science, business studies, administration, social sciences, and communication.

The SPACEECONOMY consortium includes:

- Tampere University (coordinator, Heidi Kuusniemi et al)
- University of Vaasa (Helka Kalliomäki et al)
- Finnish Meteorological Institute (Jouni Pulliainen et al)
- University of Helsinki (Minna Palmroth et al)
- Aalto University (Jaan Praks et al)
- University of Turku (Marikka Heikkilä et al)
- FGI/National Land Survey of Finland (Hannu Koivula et al)
- Kupla Productions Oy (Jari Mäkinen)

The first funding period is from October 2025 to September 2028 (3 million euros) with an option for a second period from October 2028 to September 2031 (3 million euros). The funding is provided by the Strategic Research Council of the Research Council of Finland.

It is one of ten projects under the SKILLS and WELEC programs (total funding 29 million euros).

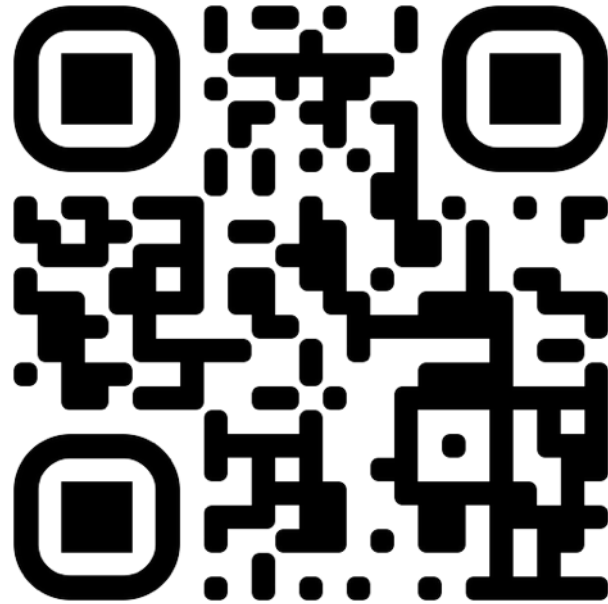


# Way forward - expected results and impact

- National roadmap for growth in Finland's space economy
- Cross-sectoral data ecosystem framework
- Impact assessments
- Policy recommendations and investment strategies (innovation uptake, regulation, governance, sustainability)
- Talent pathways and education models
- Decision-making tools based on satellite data
- Citizen science and co-creation around space-based data
- Enhanced resilience of national satellite infrastructures



# For more information



## Spaceconomy.fi

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The background features a stylized Earth with green and blue continents and oceans. Three satellites are depicted in orbit: one on the left, one on the right, and a rocket launching from the top center. A white line starts from the bottom of the 'E' in 'SPACE' and curves upwards to point at the rocket. The word 'SPACECONOMY' is written in large, bold, white letters with a black outline, underlined.

# **SPACECONOMY**

**Sustainable growth with space-based data, technology and cooperation!**

Join us: business cases, pilots, joint development, educational cooperation, satellite data initiatives etc!