

FFG Austrian Research Promotion Agency  
Aeronautics and Space Agency

## **PNT OVERVIEW: AUSTRIAN PERSPECTIVE**

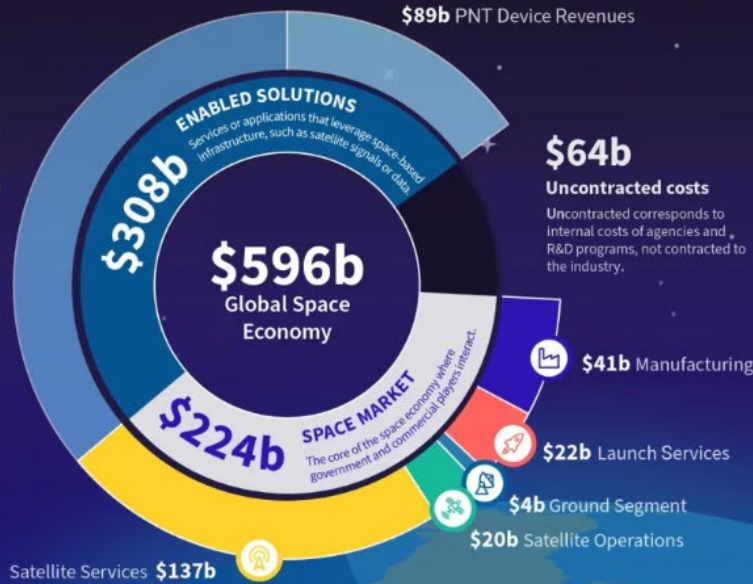
Vienna, January 28th 2025

# **AUSTRIAN PERSPECTIVE**

## **GLOBAL AND EUROPEAN PERSPECTIVE**

# 2024 Space Economy Valuation

in USD



## Space Market by Application



## Space Market by Region



Regional segmentation is excluding ground segment market value

Source: Novaspaces, Space Economy Report, 2024

NOVAPACE

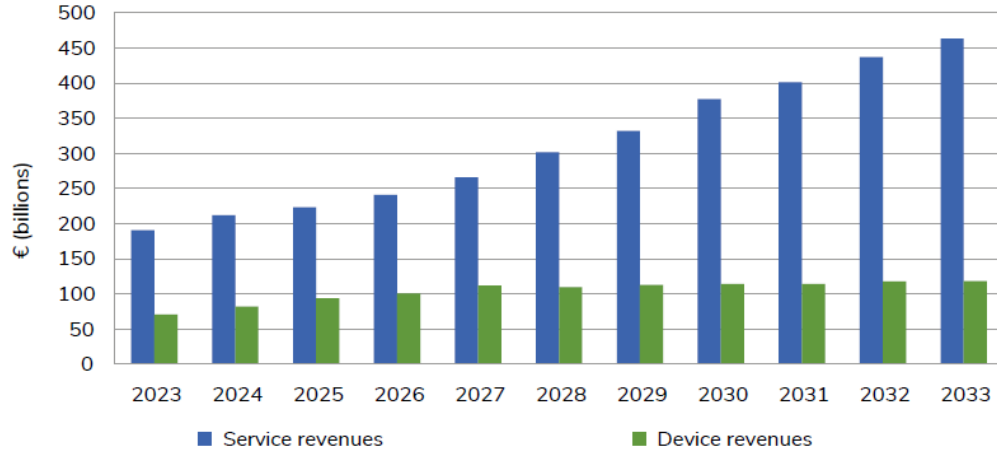


EDITOR'S SPECIAL  
Resilient societies

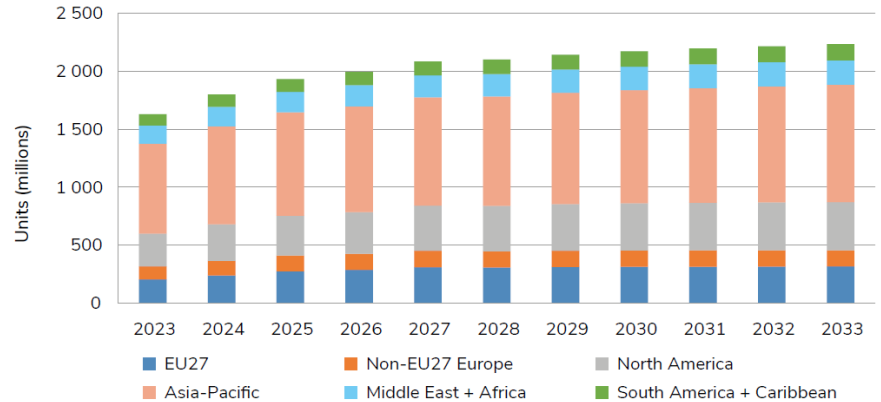
#EUSpace 



## Revenue from GNSS devices sales and services



## Shipments of GNSS devices by region



# GNSS demand world map



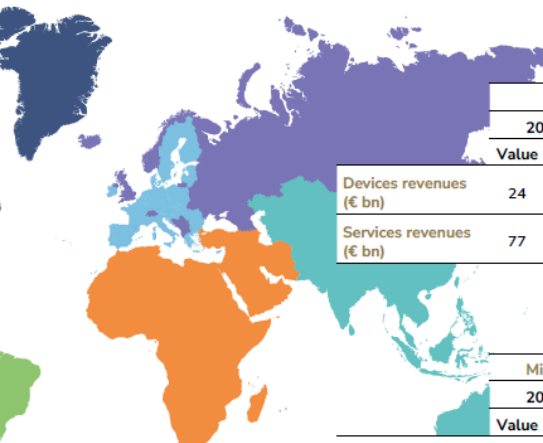
	European Union (EU27)			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	16	23	27	23
Services revenues (€ bn)	32	17	54	12

	Global	
	2023	2033
	Value	Value
Devices revenues (€ bn)	71	119
Services revenues (€ bn)	191	463

	Russia & Non-EU27 Europe (Non-EU27 Europe)			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	6	8	13	11
Services revenues (€ bn)	9	5	23	5



	North America			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	20	28	35	29
Services revenues (€ bn)	44	23	74	16



	Asia-Pacific			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	24	34	34	29
Services revenues (€ bn)	77	40	218	47

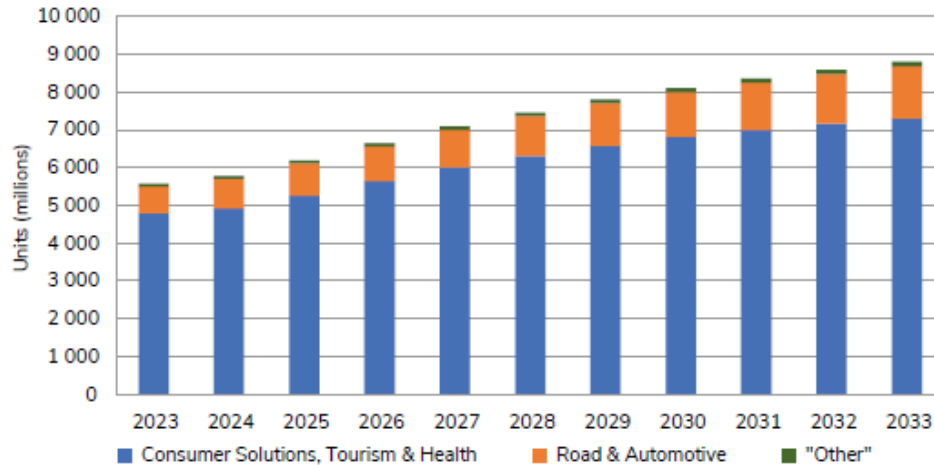


	South America & Caribbean			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	2	3	5	4
Services revenues (€ bn)	10	5	29	6

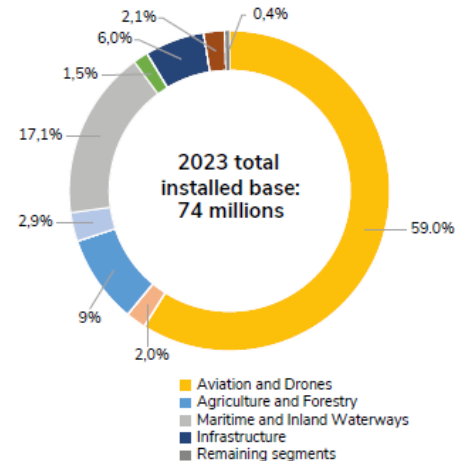
	Middle East & Africa			
	2023		2033	
	Value	%	Value	%
Devices revenues (€ bn)	3	4	5	5
Services revenues (€ bn)	19	10	65	14



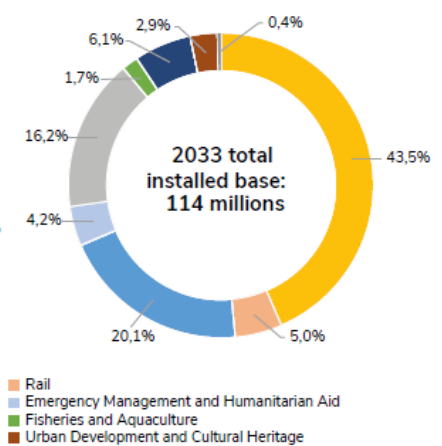
## Installed base of GNSS devices by segment



Installed base of "Other" by segment (2023)

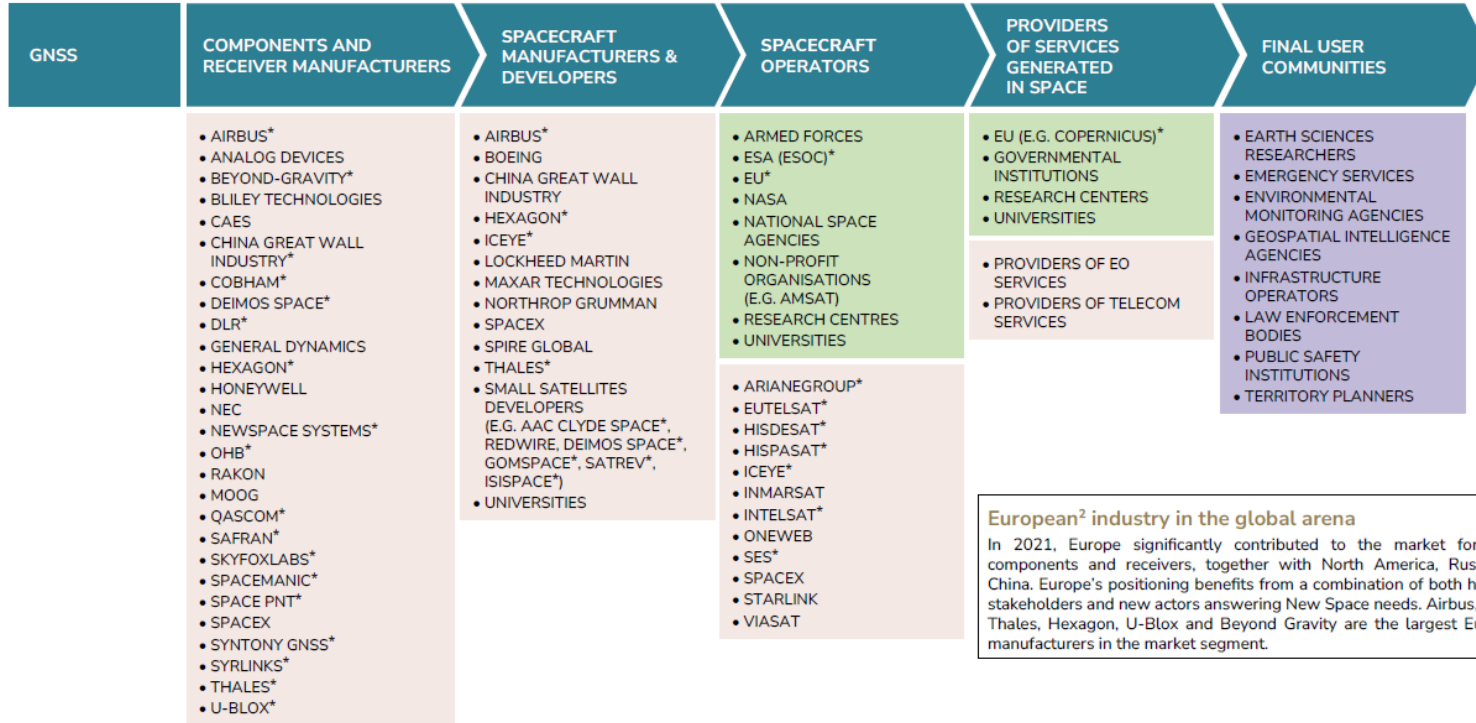


Installed base of "Other" by segment (2033)



\* Remaining segments includes Space, Insurance and Finance, Energy and Raw Materials

# Space-borne GNSS Value Chain<sup>1</sup>

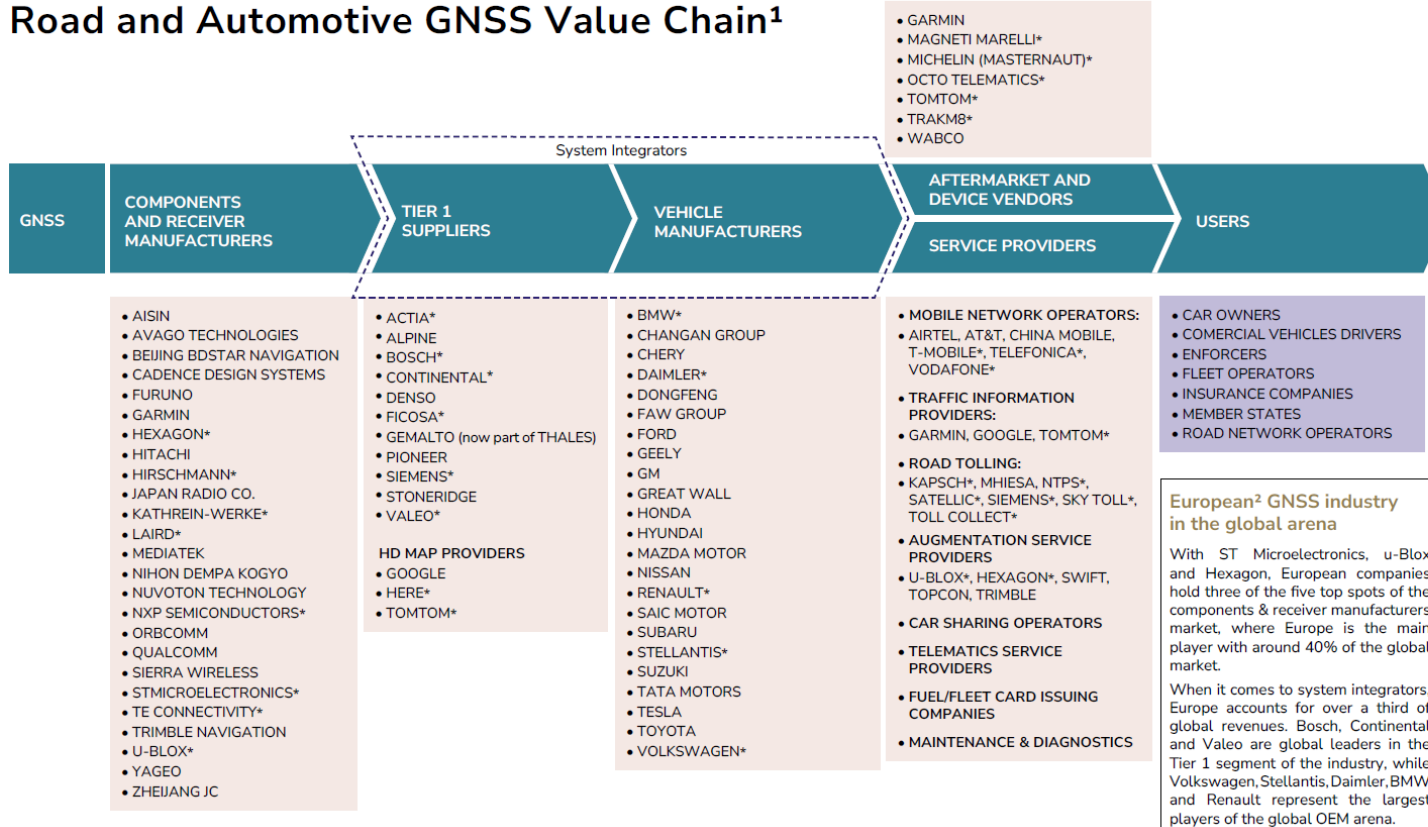


**European<sup>2</sup> industry in the global arena**  
 In 2021, Europe significantly contributed to the market for GNSS components and receivers, together with North America, Russia and China. Europe's positioning benefits from a combination of both historical stakeholders and new actors answering New Space needs. Airbus, Safran, Thales, Hexagon, U-Blox and Beyond Gravity are the largest European manufacturers in the market segment.





# Road and Automotive GNSS Value Chain<sup>1</sup>



## AUSTRIAN PERSPECTIVE

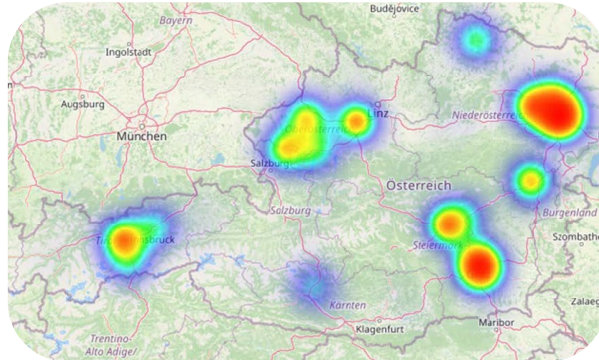
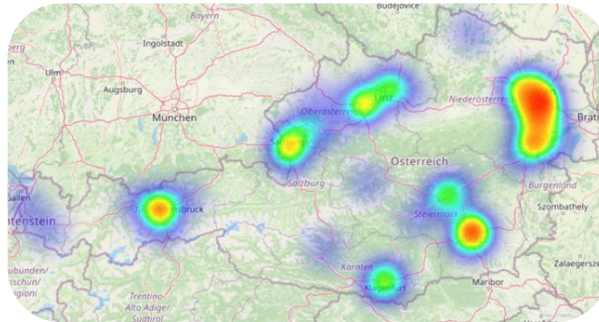
# USER SEGMENT IN AUSTRIA: ROUGH ASSESSMENT OF GNSS DEVICES FOR PNT

- Mobilität: Auto, Fahrrad, Flottenmanagement etc...: ca. **12 Mio. GNSS Empfänger**
- Tablets, Digital Cameras, Portable computers, Sport & Wearables, Personal tracking devices, Low-Power Asset Tracking Devices, Smartphones: ca. **9 Mio. GNSS Empfänger**
- Luftfahrt und Drohnen: ca. **150.000 GNSS Empfänger**
- Landwirtschaft: ca. **12.000 GNSS Geräte**
- Rettungsdienste und Katastrophenschutz: ca. **5.000 GNSS Empfänger**
- Forstmaschinen: ca. **300 GNSS Empfänger**
- Infrastruktur: (Digital Cellular Network, Professional Mobile Radio, Public Switched Telephone Network, Data Centre, Small cells, Construction Operations): ca. **9.000 Empfänger**
- Banken und Finanzwirtschaft: ca. **800 Empfänger**
- Eisenbahn: Asset Management, Passenger Information Systems, Enhanced Command & Control Systems, Driver Advisory System, Trackside personnel protection system: ca. **3.500 Empfänger**



# „HEATMAP“ OF AUSTRIAN SPACE ACTIVITIES 2022

## NUMBER OF ACTORS INCOME / BUDGETS



Companies and R&D  
institutions:  
min. **150**

Income:  
min. **209 Mio. €**

Employees:  
min. **1300**

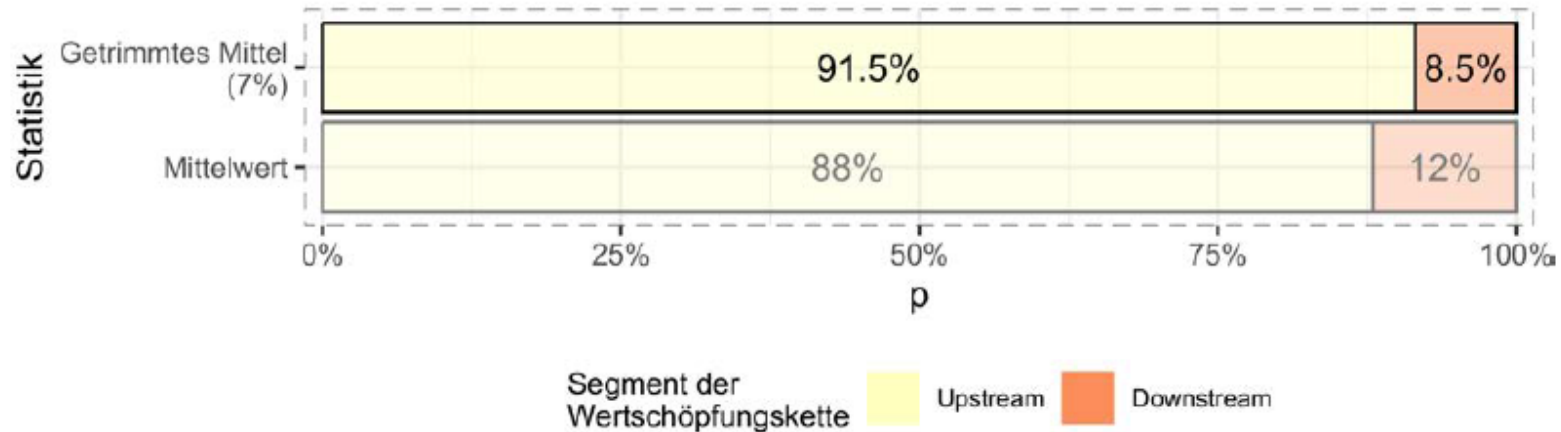


## UPSTREAM ACTORS

## DOWN STREAM ACTORS

# INCOME DISTRIBUTION UP/DOWNSTREAM IN AUSTRIA 2022

Abbildung 23: Prozentuale Verteilung der Weltraumeinnahmen nach Upstream und Downstream in der Wertschöpfungskette (klassische und robuste Schätzung)

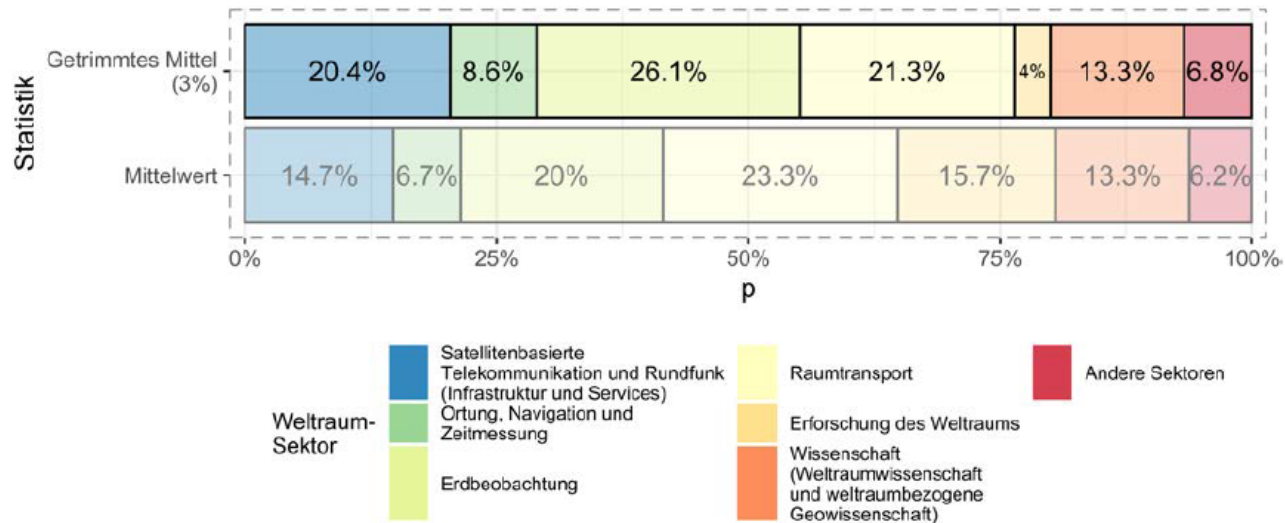


Nur Faktorstufen mit mindestens 5 Weltraumeinnahmen grösser Null dargestellt

Quelle: Eigene Darstellung FHNW

# INCOME DISTRIBUTION OF SECTORS IN AUSTRIA 2022

Abbildung 29: Prozentuale Verteilung der Weltraumeinnahmen nach Teilsektoren (klassische und robuste Schätzung)



Nur Faktorstufen mit mindestens 5 Weltraumeinnahmen grösser Null dargestellt

Quelle: Eigene Darstellung FHNW

# POTENTIAL USE CASES IN AUSTRIA: COPYRIGHT PROF. MOELLER

- **GNSS mapping / tracking:** Location mapping (e.g. of boundaries, infrastructure, vegetation) is increasingly being carried out with low-cost equipment (e.g. smartphones) and by user groups that have no surveying experience. In addition to traditional surveying companies, software companies have the opportunity to generate new platforms (e.g. apps) and cloud services for this purpose, such as the services offered by Meridia ([www.meridia.land](http://www.meridia.land)).
- **Software defined radios (SDR):** These allow the cost-effective construction of station networks, more flexibility in data evaluation, as the GNSS data no longer needs to be processed in the field and new signals/services can be integrated simply through software updates. In addition, new applications (e.g. GNSS reflectometry) can be generated that are not possible with existing hardware. It should also be mentioned that SDR GNSS could conceivably be used on satellites, e.g. to detect interference transmitters in Austria.
- **Utilisation of GNSS signals as a ‘signal of opportunity’:** GNSS meteorology and GNSS reflectometry enable the use of GNSS signals for environmental monitoring. The ‘health status’ of agricultural land can be monitored using GNSS stations at the edge of the field. GNSS is used as a meteorological sensor for better weather forecasting, e.g. for predicting energy yields from renewable sources (wind/solar). Not only fixed stations, but also the use on moving platforms (drones, ships, trains) are conceivable as possible data sources.
- **GNSS-supported driving:** The Galileo High Accuracy Service improves positioning accuracy, and OSNMA and other encryption technologies provide greater robustness for safety-critical applications. LEO constellations open up new possibilities for positioning thanks to higher signal strength, faster PPP convergence time and better coverage (e.g. in urban areas and alpine valleys). The prerequisite for this is proper integration and/or fusion with other sensors. The accumulation of spoofing attacks in the last year has shown that existing systems are not sufficiently prepared in an emergency. There is an opportunity here to work on better integration and, if possible, to support this by setting up national testbeds.



# POTENTIAL USE CASES IN AUSTRIA: COPYRIGHT PROF. MOELLER

- **Performance tracking:** Not only competitive athletes are very interested in tracking their performance, but also many amateur runners and bikers. Until now, it has not been possible to derive performance parameters such as 'wattage' or incline from GNSS data. This will change with new technologies such as HAS and LEO-PNT, which will improve tracking and real-time analysis.
- **Autonomous flying:** What could still be prevented during the Olympic Games will soon become a reality: air taxis. In addition, companies such as Metomatics are building measuring drones that can autonomously ascend to altitudes of up to 6 km and have received the necessary authorisations in Switzerland and other countries around the world. GNSS is an important component in this context. Current developments to make GNSS more robust and safer will help to ensure that more drones will also receive authorisations to fly autonomously in Austria. If not as taxis, then at least for recording data and transporting materials.
- **Crowd sourcing:** Via Google Maps and similar apps, we are used to traffic jam reports and similar services based on the exchange of user data. Campaigns such as the one organised by ETH (<https://www.camalot.org/>) have shown that the quality of smartphones is already so good that we can use GNSS raw data to create very dense monitoring networks. This is not only about pure positioning, but also about combining and analysing at observation level, e.g. for position improvement and reduction of multipath effects, distance determination or estimation of atmospheric parameters.
- **Machine learning approaches:** Great potential for analysing and (pre-)selecting GNSS signals, detecting and reducing error influences, improving evaluation algorithms, e.g. for faster ambiguity resolution and sensor fusion.

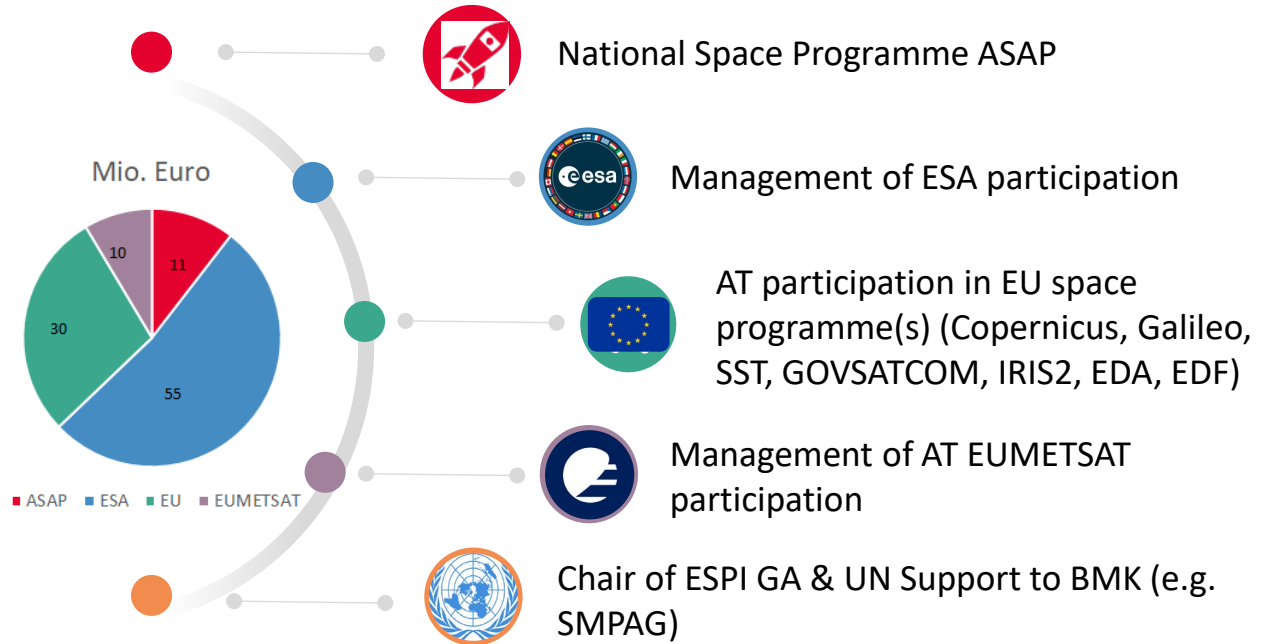
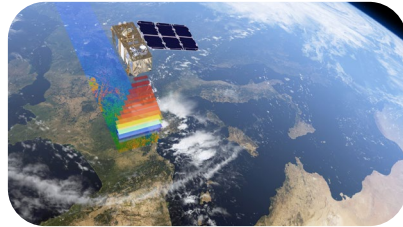


## **SPACE STRATEGY 2030+** **PEOPLE, CLIMATE, ECONOMY**

- ✓ Sustainable development on Earth and in space
- ✓ Competitive space sector with high added value and sustainable jobs in Austria
- ✓ Scientific excellence for space and Earth exploration
- ✓ Space for all areas of life
- ✓ Talent and diversity for space
- ✓ Space dialogue with citizens

<https://austria-in-space.at/de/austria-in-space/weltraumstrategie.php>

# FFG AERONAUTICS AND SPACE AGENCY

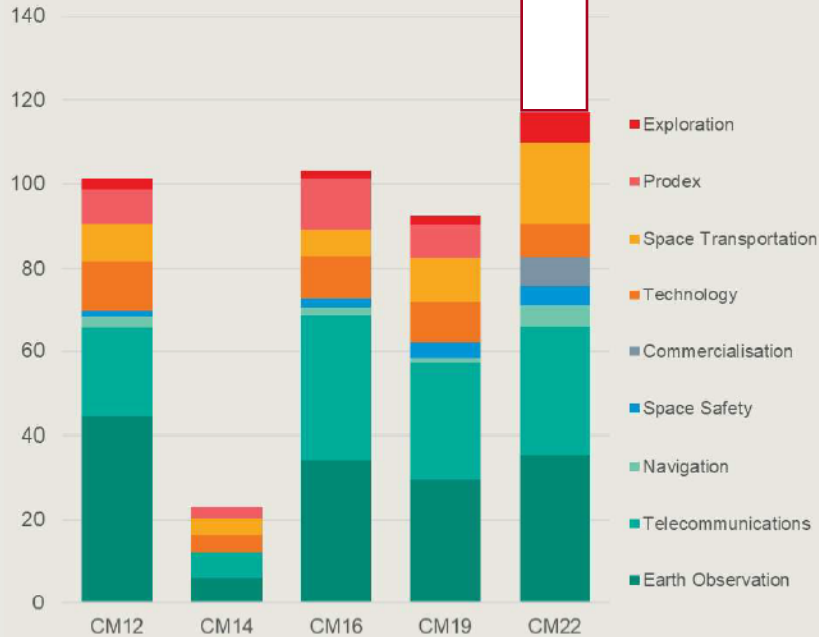


## ESA CM Subscriptions

2012	2014	2016	2019	2022
189M€	23M€	194M€	190M€	229M€

## Subscriptions to Optional Programmes

259M€



GDP (Source: Eurostat, ESPI, ECB exchange rate)

National Space Expenditure (Source: Euroconsult, ESA; EUMETSAT)

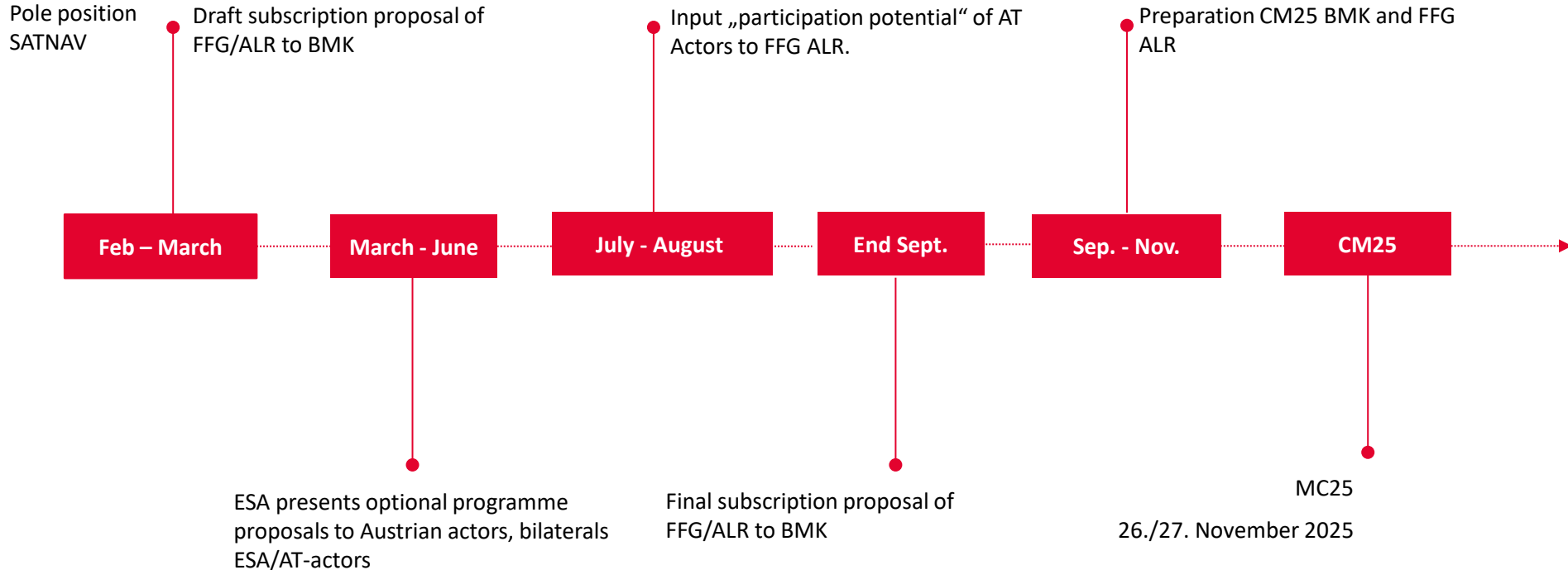
ESA Contributions & Subscriptions (Source: ESA, ESPI)

(The figures are presented in mixed economic conditions: economic conditions of the Ministerial year or current economic conditions when applicable)

## ESA NACHZEICHNUNG 2023

ZEICHNUNG BEI DEN ESA  
MINISTERKONFERENZEN (ENTSPRICHT  
ROLLIERENDER MITTELBINDUNG FÜR  
ZUMEIST **3 JAHRE**)

# PREPARATION OF ESA MINISTERIAL CONFERENCE 2025 IN AUSTRIA



# Thank you!

Austrian Research Promotion Agency

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