ESPI

European Space Policy Institute

15th ESPI Autumn Conference

European space solutions for European ambitions: Why does Europe need European satellites?

5-7 October 2021
Online

Supported by:

esa

FFG
Promoting Innovation.

Federal Ministry
Republic of Austria
Climate Action, Environment, Energy, Mobility, Innovation and Technology

Image Credit: ESA

Event Proceedings

PROGRAMME

Session 1: Green Deal for space - Green Deal in space? European ambitions and solutions for sustainable development on Earth and in space

Opening speaker:

- Andreas Geisler, Head of the Aeronautics and Space Agency

Keynote speakers:

- Henriette Spyra, General Director for Innovation, Technology and Space, Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology
- Isabelle Duvaux-Béchon, Acting Head of the Foresight, Strategy and Coordination Department & Head of the Strategy and Development Office, European Space Agency

Panellists:

- Francois Raffenne, Manager for Strategic Planning and Analysis, ArianeGroup
- Simonetta Cheli, Head of Strategy, Programme and Coordination Office, ESA Earth Observation
- Emmanuel Pajot, Secretary General, EARSC
- Luca Rossettini, CEO and Founder, D-Orbit
- Alain Bories, Director for Strategy and Corporate Development, OHB

Session 2: Which European space infrastructure for the new digital age? European ambitions and solutions for secure connectivity, digital transformation, and technological sovereignty

Keynote speaker:

- Rodrigo da Costa, Executive Director, EUSPA

Panellists:

- Guillaume de la Brosse, Policy Assistant to DEFIS Director General, European Commission
- David Bertolotti, Director for International and Institutional Affairs, Eutelsat
- Elodie Viau, Director for Telecommunications, ESA
- Wolfgang Roehrig, Head of Information Superiority Unit, Capability, Armament, and Planning Directorate, European Defence Agency
- Dr. Nicolas Capet, CEO and Founder, Anywaves

Session 3: Which space industrial strategy to face new global challenges? European ambitions and solutions for industrial autonomy and economic resilience

Keynote:

- Andre Hubert Roussel, President, Eurospace

Speakers:

- Andreas Buhl, Country Manager, RUAG
- Geraldine Naja, Director for Industry, Procurement and Legal Services, ESA
- Tero Vauraste, Regional Director Europe, Iceye
- Riadh Cammoun, Vice President for Public and Regulatory Affairs, Thales Alenia Space
- Dr. Olga Stelmakh-Drescher, Chief Policy and Government Relations Officer, ExoLaunch

Closing speech:

- Geneviève Fioraso, Chair of ESPI Advisory Council, Former French Minister in charge of space

European Space Policy Institute

PROCEEDINGS

Why does Europe need European satellites?

A report based on the 15th ESPI Autumn Conference.
This event was organized by ESPI with the support of ESA, FFG, and BMK.

Session 1: Green deal for Space - Green Deal in Space?

Setting the scene

In December 2019, the European Commission unveiled the European Green Deal, which is multifaceted in its policy areas, but seeks to reach three overarching goals for the EU: carbon neutrality by 2050 (1), decoupling economic growth from resource use (2), leaving no person and no country behind (3). The Green Deal encompasses several other EU policies such as the EU Biodiversity Strategy, the Farm to Fork Strategy, the EU Offshore Renewable Strategy, the EU Strategy for System Integration. The Green Deal was then turned into a binding legislation, the European Climate Law, which entered into force in June 2021. The Law also outlines a 55% emission reduction target for 2030. The Law includes progress monitoring mechanisms, for which space will surely be able to contribute.

The Green Deal is both a challenge and an opportunity for the space sector. Space is a key contributor to the Green Deal and plays an important role in unlocking a green transition. However, space also has an environmental footprint, both in terms of Greenhouse Gases (GHG) emissions and space debris.

Space as a contributor to the Green Deal on Earth

The speakers highlighted the essential role space plays in implementing the Green Deal and the key contribution of the European Space Programme to several objectives. The space sector at large contributes through Earth Observation as more than half of Essential Climate Variables (ECVs) can be measured from space. For instance, the Copernicus Atmosphere Monitoring Service (CAMS) and the ESA Climate Change Initiative (CCI) provide essential data on GHG emissions. The Copernicus Land Monitoring Service (CLMS) provides data on land use and land cover, which are essential to monitor forest fires, drought, flood risk or food security. Additionally, Navigation can provide critical information to optimize farming practices such as reducing the use of fertilizer, water, and other resources. PNT can also support wildfires monitoring and assist in climate disaster response. Satellite communications can support smart mobility and smart cities.

Furthermore, the European Commission and ESA are also developing a digital twin earth, which is a virtual replica of the Earth that can simulate the state of climate change and provide forecasts. This type of initiative requires an overwhelming amount of data, including space-based data. Speakers converged on the difficulties of institutions and industries to attract and retain certain skills, in particular in AI and machine learning, which will be essential to develop projects like Destination Earth. Data processing capabilities are essential to turn space-based data into actionable information.

Speakers also outlined that institutional markets are changing and that agencies are increasingly looking to buy data from private companies instead of only operating satellites. For instance, in July 2021, EUMETSAT's governing council has approved the acquisition of data from the start-up Spire Global. EUMETSAT will process the data to integrate it to its weather forecast models.[1] Some speakers have highlighted that a more service-oriented approach is needed, where public actors provide a set of essential requirements for space-based data and let space companies come up with innovative

[1] Europe's meteorological satellite agency makes first commercial data acquisition, Space News, 2021

solutions. Additionally, new actors will increasingly use space-based data in case of climate-related disasters such as insurance companies.

The Green Deal in space: addressing challenges related to space sustainability

While sustainability on Earth is now a political and economic priority for citizens and policymakers, outer space has become increasingly crowded in the past three decades, raising sustainability and safety challenges for policymakers.

The space sector has undergone profound changes in the past decades, with an increasing number of new actors and a surge in satellite launches. The space sector is now partly driven by the launch of mega-constellations, which creates opportunities for businesses, institutions, and users, but also significantly impacts the sustainability of the orbital environment. According to ESA, more than 34,000 space debris of more 10 cm as well as 900,000 debris between 1cm and 10 cm are currently in orbits.[2] Speakers highlighted that space stakeholders now have to balance environmental sustainability with economic and strategic considerations. Speakers agreed that the development of Space Situational Awareness (SSA) capabilities as well as Space Traffic Management (STM) would contribute to both space sustainability as well as European strategic autonomy.

Space debris also offer potential business opportunities in the field of in-orbit services. While there is not a strong business case for de-orbiting at the moment, life extension services have been proved feasible and commercially viable following the demonstration conducted by the Northrop Grumman's Mission Extension Vehicle (MEV).[3]

Speakers converged on the fact that space debris was a global issue calling for international solutions. However, speakers identified market and regulatory needs as well as actions that could be implemented at the European level in order to contribute to a more sustainable orbital environment and enhance European strategic autonomy:

- Market pressure is increasing. Several insurance providers are increasingly worried to provide coverage due to the higher risk of collisions, which leads to more expensive premiums. Collision avoidance capabilities will become necessary, and they will eventually be provided by non-European companies if Europe is not taking action. In this context, the public sector plays an important role since they can support businesses by fostering innovation while also becoming a first customer or an anchor customer to ensure long-term sustainability.
- Regulations can support and incentivize the use of sustainable and solutions (e.g., adopting a combination of mandatory regulations and voluntary compliance, further developing ISO technical standards, leveraging EU SST, etc). Speakers highlighted the need to develop a regulatory framework to facilitate Active Debris Removal as well as faster processes for the development of standards. For instance, space companies need to manufacture satellites that are designed to be disassembled in order to facilitate recycling. It was also stressed that there would be benefits in changing approaches to procurement by shifting to a service-based approach.

Challenges regarding the sustainability of outer space are likely to become more pressing as collision risks increase and collision manoeuvres become commonplace, directly threatening commercial and governmental European satellites.

[2] Satellite vs. Debris, UNOOSA, ESA, 2020.
[3] Northrop Grumman and Intelsat Make History with Docking of Second Mission Extension Vehicle to Extend Life of Satellite, Northrop Grumman, April 2021.

Session 2: Which European space infrastructure for the new digital age?

Setting the scene

Information and Communication Technologies (ICT) have become omnipresent across all layers of the economy and society. This digital age is characterized by a pervasive dependence on digital infrastructures and services, which comes with cybersecurity risks that translate into technology and sovereignty challenges. Digital infrastructures have to deal with an increasing demand for coverage and bandwidth, which is a challenge for the computing and telecommunications sectors.

This should be understood in a context of increasing militarization and territorialization of cyberspace with a rising number of cyberattacks coming from state and non-state actors. Some countries are attempting to disconnect their internet infrastructure from the *world wide web* for digital sovereignty purposes. As a result, control over digital infrastructures and technologies gained a strategic dimension for governments. Sovereignty over ICT infrastructures and technologies will influence the resilience, security, and prosperity of Europe.[4]

European decisionmakers have progressively acknowledged the strategic importance of the ICT sector. In 2010, the EU adopted the Digital Agenda for Europe, which aimed at bridging the digital divide and fostering the digitalization of the economy to foster economic growth.[5] However, challenges in terms of digital sovereignty and cybersecurity were not seen as a priority at the time. It is only recently that the EU started to address these issues. In 2021, the European Commission unveiled its Digital Compass strategy, which aims, among other things, at providing connectivity across Europe through secure infrastructures and producing 20% of the world's semi-conductors – materials on which the entire digital revolution relies. The need to address dependencies and vulnerabilities is clearly highlighted as a priority in this strategy.[6]

The place of space telecommunication in the digital age

The space telecommunication sector has greatly evolved over the past decades. Changing market dynamics are leading to a decreasing demand for satellite TV services[7] and a growing demand for internet broadband connectivity.[8] Satcom operators and manufacturers are developing new solutions for this market such as High Throughput Satellites, but the role played by space systems in the broadband infrastructure is still limited to niche markets, such as Direct Internet Access. Ultimately, the role of the space sector in the digital age is poised to evolve, both in terms of infrastructures and services.[9] However, speakers highlighted that there is still room for GEO assets in the market.

On the one hand, the role of digital technologies in space is evolving. Space systems are increasingly digitalized and connected, which expose them to cyberattacks and significantly increases the attack surface. In addition, the space segments are becoming seamlessly integrated with terrestrial infrastructures as 5G is being deployed and it will further intensify with 6G. It raises challenges in terms of management of the spectrum, synchronization between terrestrial and non-terrestrial systems, as well as difficulties to secure an increasingly complex critical infrastructure. In addition, speakers outlined that cybersecurity is also a key issue in the supply chain as defective hardware and software components with backdoors may be integrated by malicious subcontractors. Cyberattacks on production facilities and connected manufacturing tools are also increasingly common. As a result, protecting telecommunication satellites against cyberattacks is essential to European strategic autonomy, but also to the European economy. It was recalled that in the space industry $60 billion in growth was lost due to cyberattacks. A

[4] ASD Europe, Industry considerations on Technological Sovereignty, Concept Paper, October 2020
[5] European Commission, Europe 2020, A European strategy for smart, sustainable and inclusive growth, 2010
[6] European Commission, 2030 Digital Compass: the European way for the Digital Decade, 2021
[7] Jonathan Easton, Western Europe pay TV subs to drop by 4 million, DigitalTVEurope, 2021; Lee Rainie, Cable and satellite TV use has dropped dramatically in the U.S. since 2015, Pew Research Center, 2021
[8] Keeping the Internet up and running in times of crisis, OECD, 2020
[9] Sebastien Moranta, Matteo Capella, in: Laurence Nardon, European Space Programs and the Digital Challenge, Etudes de l'Ifri, November 2017

particular emphasis was also placed on the dependance to satcom systems in military operations, making space cybersecurity a top priority.

On the other hand, the role of space systems in securing digital infrastructures is also poised to evolve. In light of the development of quantum computing, which is posing a major cyber threat as it will likely be able to decrypt today's encryption keys, emerging technologies such as Quantum Key Distribution (QKD) are being developed. QKD could prove more efficient in the space environment than in terrestrial infrastructures due to the physical limitations of quantum communication networks on Earth, thereby providing opportunities for the space sector to play a bigger role in protecting digital systems on Earth.[10] Speakers highlighted the need for technical and financial support from European institutions to develop QKD.

In light of these profound changes, speakers converged on the critical role of public actors in supporting space companies both financially and technically to foster innovation and competitiveness in the sector.

Developments of mega-constellation in Europe

In January 2021, Commissioner Breton announced his interest in developing a "new European integrated, secure and autonomous space connectivity system" in the form of a "multi-orbital initiative" which would build on the GOVSATCOM component of the EU Space Programme and would be integrated in the future EuroQCI initiative. This connectivity system offers the perspective of a potential new flagship programme and underlines the rising importance of digital transformation and sovereignty in the EU agenda. Such programme, which involves the design, production, launch, and operation of a large space infrastructure also offers interesting prospects for the European space industry at large.[11] The representative of the European Commission at the ESPI Autumn Conference further detailed that the rationale of the EC for developing a mega-constellation relies on the ability of Europe to provide digital services to its citizens, the capacity to have an autonomous, resilient, and protected infrastructure against cyberattacks. This project is seen as a critical infrastructure, which will be the backbone of the European economy.

The second mega-constellation project in Europe is Bharti Global's OneWeb, which already launched more than 200 satellites. Speakers recalled that if European stakeholders want to have a European constellation, the time is pressing due to the intrinsic physical limitations of LEO and the availability and prioritization of radio frequencies. Possibilities to catch up later may not be possible, which drove Eutelsat to make a strategic choice and invest in OneWeb. Missing this turning point would otherwise constrain Europe to rely on non-European constellations.

If mega-constellations become a significant component of the digital infrastructure, the global traffic will partly shift from submarine cables to satellites. As a result, mega-constellation will attract significant shares of the global traffic. Most mega-constellations currently in development, which could potentially provide connectivity in Europe are private initiatives such as SpaceX's Starlink, Amazon's Kuiper, and Bharti Global's OneWeb. It may put the control over critical infrastructures in the hands of a few private actors, who will be able to control content and access to the digital infrastructure, raising challenges in terms of digital sovereignty and strategic autonomy.

Speakers converged on the need for Europe to rely on European satellites for strategic autonomy, the protection and integrity of personal and industrial data, the resilience of the telecommunication industry and the space economy at large, the ability to conduct security and civil protection missions independently as well as other EU Common Security and Defence Policy objectives.

[10] ESPI Brief 51, Quantum and Space: The ultimate solution to secured communications?, June 2021
[11] ESPI Brief 47, European Multi-Orbit Connectivity System, February 2021

Session 3: Which space industrial strategy to face new global challenges?

Setting the scene

Europe has a strong track of successful, world class space ventures. The past few decades have transformed space into a European success story that has helped enhance European strategic autonomy. This success in collaborative space-based solutions has also been an inherent driver for European economy and societal development providing benefits for all Europeans. Programmatic successes that have cemented European space leadership and capacity have only been possible in part due to the EU's thriving industrial space sector. While only upholding 4% of the global space workforce, Europe is the 4th space manufacturing power worldwide and provides about 15% of worldwide spacecraft production. Specifically, the European space industry has produced 17% of the global satellite industry output and launched about 16% of the space infrastructures in 2018. This has been done despite a significantly smaller space budget compared to other space powers.[12]

The space sector is now undergoing profound changes that may challenge the ongoing status-quo of European space strategy. Adapting and reacting to these changes will be critical in allowing Europe to retain a position of choice in the global state of space affairs.

A successful but increasingly challenged domain

One of the major developments over the past two decades has been a strong renewed ambition of international actors in the space domain. These new actors have shown a high level of ambition which is funded by increasingly large space budgets. While long dominated by the United-States and Russia, it is China which has perhaps the most increased its presence in space as it now views it as an area of national security concern and economic importance.

The European space sector only represents 4% of the global space workforce and 16% of the worldwide space budget (4 times smaller than NASA).[13] However, Europe has become world leader in fields such as Earth science, Earth-Observation and public infrastructure navigation and meteorology. Yet, while historically successful, multiple issues remain at stake and with the Covid-19 crisis accelerating pre-existing deficiencies, speakers had many topics to tackle ranging from security of supply to the role of the public sector.

Private investment and synergies between the public and the private sector

The past couple years have seen a profound change in the industrial landscape. A change of innovative public schemes, new entrants and market forces have altered a previously stagnant industry. One of the key underlying dynamics of this new ecosystem is usually referred to as New Space and represents an interrelation of trends (new public schemes, new entrants, new solutions, new markets, new industrial setups and new private investments) that have led the space sector towards a more business and service-oriented setup. This has led to the emergence to new actors such as SpaceX, which have altered in depth the existing manufacturing status quo by implementing a new business model which has included vertical integration as well as transitioning from being performance driven to being a service-based company.

Despite the increasingly prominent private and commercial forces at stake in the New Space sector, there is still a strong need for European public actors to support and encourage this nascent segment of the industry. As such, there is right now a need for European approach to a modern landscape that will ensure the long-term success of space as a European "success story". At the time being, when benchmarking

[12] ESPI Launch Database
[13] Marco Aliberti, et al., European Space Strategy in a Global Context, Public Report, ESPI, 2020

Europe with other major spacefaring nations, clear structural differences come to the fore. The most important is that Europe lacks a significant and continuous level of public demand in space infrastructure and services.

There is still a significant gap in access to finance and contracts between New Space and Legacy space. The US and the rest of the world have seen significant developments stemming from the private sector, and to compete, Europe must be capable to offer the appropriate scale up funding required for companies to mature and compete on equal footing in global commercial markets. This is also important to prevent innovative start-ups and breakthrough technologies to be acquired by foreign actors.

Beyond scaled private or public funding, start-ups increasingly require similar market access than bigger players. The development of further Public Private Partnerships (PPP) will stimulate a perennial development of New Space actors. In line with this, the public sector should aim to support risk friendly projects as well as transition from a linear to a more collaborative model, with a higher level of partnerships in the supply chain, standards, and SME's. The EU and ESA are vital in this sense as one of the ways to further partnerships is through flagship projects. Current and future flagship project proposals are a great way to achieve this collaboration and long-lasting success for all actors within European space.

In addition to providing and enabling funding as well as access to contracts, the European space ecosystem must aim to no longer oppose legacy space with New Space and rather try to view them as similar actors with different approaches. Legacy actors have been shown to be perhaps a little too risk adverse, and a European solution will come from combining the knowhow of legacy actors with the more risk friendly New Space. Working together is the best way to develop an economically sustainable space sector for all actors. The convergence towards a single industrial policy was highlighted by speakers.

Europe cannot be autonomous without a robust supply chain

Within a mutating industrial landscape, space directly impacts the European goal of technological non dependence and, to further its positioning in the global political landscape and agenda, Europe must be able to ensure autonomous, reliable, and affordable access to space technology and components. More than half (bar a few exceptional cases) of a European made satellite is composed of components, products and solutions that are manufactured outside of Europe. This is a serious issue, as the supply chain is shared by all primes in Europe. Currently, Europe remains exposed to the fluctuations of foreign commercial markets as well as remains reliant of external technology and solutions making it harder to protect is interests and assure its sovereignty.

The pandemic highlighted even further the reliance of the European space sector on third party components which often originate from foreign countries. In addition to most visible foreign dependence on triple E components, there are many other technical domains where Europe relies on foreign sources for meeting critical needs, including, for instance, advanced materials, equipment, processes, and modelling tools. With the list of sensitive materials (titanium, lithium, bauxite) doubling over the past decade, the EU is also under pressure to secure and have reliable and distributed access to rare earths and motor value chains which are vital to spatial and aerospace industrial ecosystem. Luckily, there are ways to palliate the effects.

Early on during the pandemic, ESA and the EU played a critical role notably through advanced payments. Following this, the European space industry was able to implement alleviating structures such as control towers for all segments of the value chain. Throughout the post-Covid crisis era, the increased demand in raw materials and electric components have made matters difficult again for all European players. As such two critical factors emerge, the need for a European coordination for the management of a critical component European supply chain, and an accelerated focus by European stakeholders to diversify their supply chain. Second sourcing is key for the time being to build a redundant market.

ANNEX: BIOGRAPHIES

Opening Remarks

Andreas Geisler, *Head of Aeronautics and Space Agency, Austrian Research Promotion Agency*

Andreas Geisler is Head of the FFG Aeronautics and Space Agency, Head of the Austrian Delegation to ESA and Chairman of the General Assembly of ESPI. He joined the Austrian Space Agency in 2003 as Team Leader Aeronautics. From 2009 to 2015 he headed the FFG Energy and Environment team and from 2005 to 2011 he acted as Deputy Division Head Thematic Programs of FFG. Mr. Geisler graduated from a technical college for communications engineering and electronics, studied economics and biology and has a PhD in ecology from the University of Vienna.

Session 1: Green Deal for Space - Green Deal in Space? European ambitions and solutions for sustainable development on Earth and in Space

Henriette Spyra, *General Director for Innovation, Technology and Space, Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology*

Henriette Spyra has been the Director General for Innovation and Technology at the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation, and Technology since September 2021. Prior to that, she was the Director of Science and Innovation of the Austrian Environment Agency (Umweltbundesamt) from September 2019 to September 2021. From November 2016 to September 2019, she was the Head of Mobility Transformation and Transport Decarbonisation at the Austrian Federal Ministry for Transport, Innovation and Technology. Mrs. Spyra has a master's degree in international economics and international relations from Johns Hopinks University, USA.

Isabelle Duvaux-Béchon, *Acting Head of the Foresight, Strategy and Coordination Department in ESA DG Services and Head of the Strategy and Development Office of the Department, European Space Agency*

Isabelle Duvaux-Béchon is Acting Head of the Foresight, Strategy and Coordination Department since June 2021. Previously, she was Head of the Member States Relations and Partnerships Office from 2017 to 2021. She is also co-chairing the Preparatory Group for the next Council at Ministerial level, the ESA Space & Arctic Task Force and chairing the ESA Blue Worlds Task Force formed with interested ESA Member States. She is a Commander in the citizen reserve of the French Navy and a full member of the International Academy of Astronautics.

Simonetta Cheli, *Head of Strategy, Programme and Coordination Office of Earth Observation Programmes, European Space Agency*

Simonetta Cheli became Head of Strategy, Programme and Coordination Office of ESA Earth Observation Programmes in 2017 after being Acting Head from 2016 to 2017. Among others, she is member of the International Institute of Space Law, and of Board of Directors IAI (Istituto Affari Internationali), and she has several teaching experiences. She held a degree in Political Sciences with focus on International Law at the University "Cesare Alfieri", Florence, Italy and was an Undergraduate student at Yale University (CT,USA) studying Law and Economics.

Emmanuel Pajot, *Secretary General, EARSC*

With over 17 years of experience combining sciences, technologies, and economy to deliver space-based Earth Observation (EO) services, Emmanuel Pajot has experienced the challenges of developing and selling EO services. After 13 years in the Energy market, he joined EARSC in 2017 as a Project Manager and was appointed as the EARSC Secretary-General in July 2020. With his team, he supports European companies developing awareness on EO capabilities and the dialogue with stakeholders and communities of users.

François Raffenne, *Manager for Strategic Planning and Analysis, ArianeGroup*

François Raffenne became Manager for Strategic Planning and Analysis after holding the position of Marketing & Sales Manager for Missile Defence and Systems within ArianeGroup's Defence Division (formerly Airbus Defence and Space) from 2012 to 2018. From 2010 to 2012, he was responsible for EU & NATO Defence and Security topics within Astrium's Corporate Institutional Relations team. Before joining the industry, he held the position of Desk Officer for North America within the Policy Directorate (DAS), currently DGRIS of the French Ministry of Defence from 2005 to 2010.

Luca Rossettini, *CEO & Co-Founder, D-Orbit*

Luca Rossettini is CEO of D-Orbit which he co-founded in 2011. Since 2017, he is also President of the Association of Space Activities Companies (AIPAS). During his Ph.D. studies in Advanced Space Propulsion at Politecnico di Milano, Italy concluded in 2008, he founded IRTA srl and in 2006, he co-founded The Natural Step Italia. He also worked in the US in a research lab on nanotechnologies in the early 2000s and did an internship at NASA Ames Research Center in 2010.

Alain Bories, *Senior Vice President, Business Development and Political Affairs*

Alain Bories joined OHB SE Group as Senior Vice President, Strategy and Business Development in 2006. In 2020, his job evolved to Senior Vice President Business Development and Political Affairs. He previously worked for the French Department of Defence and for Alcatel ISR, where he was in charge of the Air Traffic management Department prior to becoming VP Sales and Marketing. In 1996 he joined Alcatel Radio Space and Defence as VP Navigation, and in 1998 he was named VP Sales and Marketing Government Affairs in Alcatel Space. In 2000 he joined Thomson_CSF (now Thales) as Corporate Vice President for Space Programmes and was also Director of the Galileo Programme within Thales.

Session 2: Which European space infrastructure for the new digital age? European ambitions and solutions for secure connectivity, digital transformation, and technological sovereignty

Rodrigo da Costa, *Executive Director, EUSPA*

In October 2020, Rodrigo da Costa became the Executive Director of the European GNSS Agency (GSA), now EUSPA. From 2017 to 2020, he was the manager of the Galileo Exploitation Programme. Prior to joining the public sector, Mr. da Costa was the Director of Future Projects and Business Development, Orbital Systems and Exploration at Airbus Group from 2012 to 2017. From 2009 to 2012, he was the Head of Launchers Business Development at Airbus Defence and Space.

David Bertolotti, *Director for International and Institutional Affairs, Eutelsat*

David Bertolotti has been Director for institutional and international affairs at Eutelsat since July 2020. Prior to joining the private sector, he led a diplomatic career for 17 years at the French Ministry for Europe and Foreign Affairs. From July 2019 to July 2020, he was Director for Strategic Affairs, Security and Disarmament at the French MFA. He was also Ambassador of France in Jordan from October 2015 to July 2019. He graduated from Science Po Paris and is a former student of the Ecole Nationale d'Administration (ENA).

Dr. Nicolas Capet, *CEO and Founder, Anywaves*

Nicolas CAPET is CEO & founder of ANYWAVES. Prior to creating its start-up, Dr. Capet was working in the Telecom Division, Antenna Department of CNES, the French Space Agency, Toulouse, France. In 2010, he obtained a Doctoral degree in electromagnetism and microwaves from Toulouse University, France. He also has a degree in electronic engineering and hyper frequencies from the Ecole National d'Aviation Civile (ENAC), Toulouse, France. Dr. Capet is also the Vice President of the Young European Enterprise Syndicate for Space (YEESS), which aims at facilitating and accelerating the New Space dynamic in Europe.

Guillaume de la Brosse, *Head of Unit in charge of space innovation, start-ups and economics, DGDEFIS, European Commission*

Guillaume de la Brosse is currently Head of Unit in charge of space innovation, start-ups and economics in the Commission (Direction-General for Defence Industry and Space). Previously, Guillaume was assistant to the Director-General. Guillaume joined the Commission in 2016, as a member of the Commission's think-tank and member of the UK Task Force, where he dealt with security, defence and space. Before joining the Commission, Guillaume worked in the European Defence Agency as an assistant to the Executive Director (2011-2016) and as a political and military adviser at the French Permanent representation to the EU (2006-2011).

Wolfgang Roehrig, *Head of Information Superiority Unit, Capability, Armament, and Planning Directorate, European Defence Agency*

Wolfgang Roehrig became the Head of Information Superiority of the European Defence Agency in 2018. Prior to that, he was a Project Officer in Cyber Defence at the EDA. Before joining European institutions, he led a career in the German Federal Armed Forces.

Elodie Viau, *Director for Telecommunications, European Space Agency*

Elodie Viau took up duty as the Director of Telecommunications and Integrated Applications (D/TIA), and Head of ECSAT, Harwell, UK, on 1 September 2020. Prior to joining ESA, Ms. Viau worked at SES for 12 years. In June 2018, she became Senior Manager of SES New Space Segment Procurement and Development and then Vice-President for SES Technology Programme Management. She holds a MSc degree in telecommunications from Télécom SudParis, France.

Session 3: Which space industrial strategy to face new global challenges? European ambitions and solutions for industrial autonomy and economic resilience

Andre Hubert Roussel, *President, Eurospace*

Since June 2020, André-Hubert Roussel has been president of Eurospace. He also has been the CEO of Ariane Group since January 2019. From January 2015 to February 2016, he was Head of Engineering, Operations and Quality for the Space Systems business line of Airbus Defence and Space. After that, he was appointed Head of Engineering of Airbus Defence and Space, then Head of Operations, member of the Executive Committee of the Division. André-Hubert has a degree in Engineering from Ecole Polytechnique and Ecole Nationale Supérieure des Télécommunications.

Andreas Buhl, *Country Manager, RUAG Space*

Since January 2019, Andreas Buhl has been working as Country Manager at RUAG Space Austria. Prior to that he worked in the "Aerospace & Railway" division at an Austrian technology company and for more than 20 years at LIEBHERR in the fields of aerospace and railroad technology in various management functions. Andreas Buhl graduated in applied physics from the University of Applied Sciences in Ravensburg-Weingarten (Baden-Württemberg) and completed an officer training with the German armed forces.

Riadh Cammoun, *Vice President for Public and Regulatory Affairs, Thales*

Riadh Cammoun has been the Vice President of Institutional Affairs and Executive Committee member at Thales Alenia Space since 2014. Before joining Thales Alenia Space, Riadh Cammoun was Deputy Director of the cabinet of Geneviève Fioraso, French Minister of Higher Education and Research. Riadh Cammoun is the former Director of the LIST Institute of the French Alternative Energies and Atomic Energy Commission in France. He has a degree in Engineering from the Ecole Spéciale des Travaux Publics and a master's

Geraldine Naja, *Director for Industry, Procurement and Legal Services, European Space Agency*

Geraldine is currently acting Director for Commercialisation, Industry and Procurement at the European Space Agency (ESA). She joined ESA in 1987 as payload operations engineer on the International Space Station programme. She has then moved to various strategic, programmatic and managerial functions across the Agency. Geraldine is a graduate engineer with a specialisation in rocket propulsion, and also holds a master's in political studies and international relations. She has taught fluid mechanics and continues to have teaching assignments about space policy in many universities and institutes.

Dr. Olga Stelmakh-Drescher, *Chief Policy and Government Relations Officer, ExoLaunch*

Dr. Olga Stelmakh-Drescher is a NewSpace advocate, international space lawyer and space environmentalist - shaper of the Space Sustainability Goals and social responsibility for space activities concepts. She holds the position of a Chief Policy and Government Relations Officer at EXOLAUNCH, a global leader in rideshare launch services and deployment technologies for small satellites. Dr. Olga has an extensive background in space matters, having worked in the space sector for more than 15 years, including seven years of governmental and parliamentarian engagement.

Tero Vauraste, *Regional Director Europe, Iceye*

MSc, Lt Cdr (Ret) Tero Vauraste has been a Senior Advisor and Regional Director Europe of ICEYE since October 2020. He is responsible of the European clientele including co-operation with the European Space Agency and Business Finland. Prior his permanent position at ICEYE, Mr. Vauraste served as a Naval and Coast Guard officer and in various CEO and other Senior Executive Positions within security, aviation, automotive, maritime, rail, logistics and Arctic Industries and he has served as a long-term Chair/Vice Chair of the Arctic Economic Council.

Closing Remarks:

Geneviève Fioraso, *Chair, ESPI Advisory Council and Former French Minister in charge of space*

Mrs. Fioraso is the Chair of the ESPI Advisory Council. She is the former French Minister for Higher education, Research and Space. From 2012 to 2014, she was the French Minister for Higher Education and Research, including space. From 2014 to 2015, she was the French Secretary of State for Higher Education and Research, including space. Then, she returned to the French Parliament as a Member of the defence commission and the parliamentary space group. Prior to her political commitments, she was working in the private sector as the CEO of Minatec entreprises from 2003 to 2007.