

# High-level Space Conference of the EU Council

***#EUSPACE for Business***

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and Technology



## *Outcome Report*

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## Table of Contents

<b>LETTER OF BMVIT DEPUTY DIRECTOR GENERAL FOR INNOVATION TO THE SPACE COMMUNITY</b>	<b>1</b>
<b>INTRODUCTION</b>	<b>2</b>
<b>DAY 1: 5 NOVEMBER 2018</b>	<b>3</b>
WELCOME ADDRESS	3
<b>SESSION 1: “TOWARDS A UNION SPACE PROGRAMME: EUROPE’S AMBITIONS FOR SPACE”</b>	<b>3</b>
PRESENTATIONS AND PANEL DISCUSSION	4
HIGHLIGHTS	8
<b>SESSION 2: “RETURN OF EXPERIENCE ON NEW SPACE CONCRETE ACHIEVEMENTS”</b>	<b>9</b>
PRESENTATIONS AND PANEL DISCUSSION	9
HIGHLIGHTS	11
<b>DAY 2: 6 NOVEMBER 2018</b>	<b>12</b>
KEYNOTE ADDRESS BY PIERRE DELSAUX, EUROPEAN COMMISSION DEPUTY DIRECTOR GENERAL	12
KEYNOTE ADDRESS BY JAN WOERNER, DIRECTOR GENERAL OF THE EUROPEAN SPACE AGENCY (ESA)	13
<b>SESSION 3: “FOSTERING BUSINESS DEVELOPMENT IN A GLOBAL CONTEXT: THE ROLE OF THE PUBLIC SECTOR”</b>	<b>14</b>
PRESENTATIONS AND PANEL DISCUSSION	14
HIGHLIGHTS	15
KEYNOTE ADDRESS BY KEVIN O’CONNELL, DIRECTOR OF THE OFFICE OF SPACE COMMERCE, US DEPARTMENT OF COMMERCE	16
<b>SESSION 4: “STIMULATING INVESTMENT FOR SPACE: CHALLENGES AND OPPORTUNITIES”</b>	<b>18</b>
PRESENTATIONS AND PANEL DISCUSSION	18
HIGHLIGHTS	20
<b>SESSION 5: “CRITICALITY OF EUROPEAN SPACE INFRASTRUCTURE AS SPACE ECONOMY ASSETS”</b>	<b>22</b>
PRESENTATIONS AND PANEL DISCUSSION	22
HIGHLIGHTS	25
<b>CONCLUSION</b>	<b>26</b>
<b>ANNEX 1. CONFERENCE PROGRAMME</b>	<b>29</b>
<b>ANNEX 2. SPEAKERS BIOGRAPHIES</b>	<b>32</b>

# Letter of BMVIT Deputy Director General for Innovation to the Space Community

Dear Colleagues,

Hereby I wish to provide you with personal comments on the outcome of the successful high-level space policy conference ‘#EUSPACE for Business’ which was held on 5 and 6 November 2018 under the auspices of the Austrian Presidency of the European Council. The overarching purpose of that conference was to spur fruitful debates on the European approach not only to foster innovation and business development in the space sector but also to emerging space and economic security issues. In bringing together an outstanding diversity of major stakeholders in the public and private sectors, the event shed light on the current opportunities and challenges at political and business level to support the transformation and development of the European space sector. In this sense, #EUSPACE for Business was a particularly timely event in the context of the finalization of the next Multiannual Financial Framework of the European Commission and ahead of the next ESA Ministerial Council.

The five thematic sessions covered a variety of topics of growing importance for the space industry. Contributions of prominent European and non-European speakers allowed to engage in thought-provoking discussions about the future of the space industry and the way forward for public actors to support it. Speakers had the opportunity to exchange their views and share their own experiences. In this regard, I was particularly impressed by the openness and richness of the dialogues on these topical issues. As the space sector is experiencing a major transformation, there is a pressing need to better coordinate among stakeholders and to forge a mutual understanding of priorities in public policies driven by a shared long-term vision.

Another key aspect of the evolving European space policy is Europe’s shifting attitude towards space security matters. Indeed, the protection of space assets is becoming a focal point in Europe as there is growing awareness on the risks of disruption and its associated socio-economic consequences. In this sense, space security and economic security are overlapping concepts which deserve greater attention in public policies. The multi-faceted security topic therefore requires more events like #EUSPACE for Business to bring together actors contributing, sometimes in a loosely coordinated manner, to developments in this essential space policy area.

You can be assured that the Austrian Ministry of Transport, Innovation and Technology (BMVIT) is determined to continuously and proactively contribute to the development of a European space policy supporting economic growth, societal progress and scientific advancement while positioning Europe as a global leader in this strategic domain.

In the meantime, I remain

Sincerely yours,

Ingolf Schaedler, BMVIT Deputy Director General for Innovation

## Introduction

Thanks to determined and continuous public and private investments, Europe now benefits from a well-established and competitive industrial base and from a complete space infrastructure including cutting edge systems such as Galileo, EGNOS and Copernicus. Flagship programmes of the European Union allow decision makers to shape and implement well-informed public policies in numerous sectors and to contribute effectively to economic and societal development in Europe. The uptake of space services in a variety of fast growing sectors is a major opportunity for the European space industry to thrive and develop new lines of businesses. However, as space systems are increasingly more used as part of innovative concepts and business models and become part of our daily lives, dependence on the space infrastructure grows in a parallel process. From this perspective, the socio-economic consequences of a disruption, even partial, of space assets could be dramatic.

In this context, two main aspects are becoming increasingly important in the design of public policies:

- **First**, the thriving innovation ecosystem enabled by space requires adequate support that fits its needs through a suitable policy, funding and framework. Financing space innovation – especially in the current rapidly changing competitive landscape - is a true multi-faceted challenge that needs to be overcome to maintain the competitiveness of the European space industry.
- **Second**, the consequences of growing reliance on space systems ultimately means there is a need to protect the space infrastructure from emerging space security issues which are expected to grow in scale such as space debris or cyberattacks. In this regard, threats to space infrastructure security ultimately create risks for the profitability and sustainability of the space private sector and of businesses relying on services provided by satellites.

In a rapidly evolving global context, the European space sector faces daunting challenges but also promising opportunities and require, more than ever, a well-thought coordination between the various public and private stakeholders to reach its ambitions. In this respect, the High-level Space conference ‘#EUSPACE for Business’, organised under the auspices of the Austrian Presidency of the Council of the European Union with the support of the European Commission and of the European Space Policy Institute (ESPI), brought together the different actors to raise awareness and address the multiple facets of issues at stake in view of supporting future developments of the European space policy.

The Austrian Presidency of the Council of the European Union, through this conference, wanted to provide insightful perspectives on the following more specific issues:

- New Space developments and consequences for institutions and industry
- Security challenges to space infrastructures which are by sheer nature global issues. In this respect, the conference included participation of EU and non-European speakers.

The event was intentionally designed to have a forward-looking vision on European space policy, innovation and business strategies by selecting speakers which are active in the field and recognised for their achievements.

The present proceedings provide a summary of the main ideas brought forward during this event.

## DAY 1: 5 NOVEMBER 2018

### Welcome address

The welcome address was delivered by Ingolf Schaedler, BMVIT Deputy Director General for Innovation, and Barbara Eibinger-Miedl, Styria State Councilor for Economics, Tourism, Europe, Science and Research.

**Mr. Ingolf Schaedler** opened the conference by recalling that Graz, which concentrates an intense space research and industrial activity, is known to be the space capital of Austria. Mr. Schaedler then spoke about the recent discussions on space strategy and programmes that took place in Madrid on 25 October 2018 during the Intermediate Ministerial Meeting (IMM18) of ESA. At this occasion, ESA member states discussed ESA proposal for the future of Europe in space, which will be submitted at the next ESA Council at ministerial level in November 2019. Mr. Schaedler shared his conviction that informal debates on space, such as the one on space business and security that Austria organised for this conference, bring invaluable insights for major decision-making events such as the upcoming ESA Council meeting.

**Mrs. Barbara Eibinger-Miedl** welcomed the audience and speakers to her region and explained that, in addition to being the space capital of Austria, Graz is the first Austrian city for research and development. As well, Mrs. Eibinger-Miedl stressed that Styria, for which Graz is the State capital, is one of the most innovative region in Europe. Mrs. Eibinger-Miedl proceeded to explain that Styria's success lies essentially on the good collaboration between academia and industry, setting an example for the rest of Europe.

### Session 1: "Towards a Union Space Programme: Europe's ambitions for space"

The first session of the conference "Towards a Union Space Programme – Europe's ambitions for space" brought together high ranking government officials and representatives of the European space industry who shared their views on the way ahead of Europe in space and, more specifically, on the proposed regulation establishing the space programme of the European Union for the Multiannual Financial Framework 2021-2027. The first thematic session of the conference gathered following speakers:

- **Norbert Hofer**, Minister, Austrian Presidency
- **Elżbieta Bieńkowska**, Commissioner for Internal Market, Industry, Entrepreneurship and SMEs
- **Pedro Duque**, Spanish Minister for Science and Innovation, Chair of the ESA Intermediate Ministerial Meeting
- **Stéphane Israël**, Europace, CEO of Arianespace

**Mr Klaus Pseiner**, Managing Director at the FFG Austrian Research Promotion Agency, introduced the first session of the conference by recalling the importance of innovation and business development for Europe and the specific significance of the space sector in this dynamic. Although public programmes are essential enablers for the development of the European space sector, corresponding to roughly 60% of the manufacturing industry revenues, a shift of paradigm driving the sector towards a more commercial-oriented step can be observed today. In this context, space programmes based on a continuous commitment of public actors remain, anyhow, indispensable to support the development of a robust, competitive and innovative space industry and business in Europe. With regards to innovation, Mr. Pseiner recalled that synergies with other sectors are an important driver that should be promoted, in particular in the current context. From this perspective, he highlighted that Austria has been quite successful at handling the space sector in close relationship with other sectors. Mr. Pseiner concluded by inviting all European nations to discuss and build a strategic vision for Europe's ambitions in space. Mr. Pseiner then introduced the speakers of the session.

## Presentations and Panel Discussion

**Mr Norbert Hofer**, Austrian Minister of Transport, Innovation and Technology (BMViT), opened the conference, which is one of the major contributions that the Austrian Presidency intends to make to the Space agenda of the European Union, as well as to the further development of the European Space policy, with the following speech:

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*The title of this conference - "EUSpace for business" - is all about the vision that Europe has developed along the years for the space sector. Actually, Europe has been a pioneer - and even a trailblazer - in the promotion of a business-oriented approach to Space. It is in Europe that the first private space operators were set up – Arianespace for launch services, Spot Image in commercial Earth Observation - in a domain initially envisioned as extensively governmental.*

*This policy has been quite successful and I would like to remind here how much "Space" is a European success story.*

*The European space industry has flourished and demonstrated its engineering skills through ESA achievements in all application areas, as well as through the successful deployment of EU space infrastructures - Galileo and Copernicus. In addition, the European industry has also gained enviable positions on the commercial markets every time it has been given the chance to compete on an open and fair competitive basis.*

*All of this has been made possible because of the long-term consistent public investment of European Member States. I would like to stress that this has also been achieved at highly effective conditions. As a matter of fact, it is fair to say that Europe has devoted quite limited overall budgetary efforts to this sector as compared to other major space powers.*

*Therefore, the relevance of the European approach to Space makes no doubt and shall be continued.*

*However, if we have good reasons to be satisfied, we also have to pursue our efforts to keep the leading edge and to ensure that Europe continues to get the place it deserves in the global space economy. It is all about creativity and innovation; it is all about competitiveness of our industry, which is an everlasting effort in a changing world where – unfortunately - no position can be gained forever.*

*Reaffirming Europe's ambitions in Space is more than ever required in the changing global environment.*

*This is the primary goal of this conference.*

- *This is particularly timely and opportune in the current context of finalisation of the next Multiannual Financial Framework of the EU in which space is now embedded as a critical and essential part of Europe's public policies for the well being and security of European citizens,*
- *This is particularly timely and opportune to prepare the next decisions to be made at the next Council at ministerial level of the European Space Agency,*
- *This is particularly timely and opportune to shed light on the upcoming challenges ahead of the European Space industry.*

*Most of the space conferences around the world are nowadays about business development. This one does not make exception, and let's welcome this evolution since it is true that economy is a strong and powerful driver. What is at work here is a gradual shift from a public-led to a more commercial setup of the global space sector.*

*This comes along with deep implications that need to be properly anticipated:*

- *Public markets are regional,*
- *Commercial markets are global.*

*In this respect, the second objective of this conference is to discuss with major stakeholders what are the conditions to be met to ensure:*

- *First, a favourable ecosystem for start-ups and investors, including access to innovative funding,*
- *Second, a sound anticipation and structuration of the public demand,*
- *Third, an open and fair competition to avoid monopolistic situations.*

*This reflection needs to be implemented in a global perspective. The European Space policy cannot be elaborated in isolation. It needs to be conceived as a component of a broader ensemble. In this respect, it is critically important to know what the rest of the world is doing, to understand their rationale and to draw the lessons learnt from their experience. I would here like to thank all the speakers and participants, European or not, who agreed to share with us their views, expertise and knowledge.*

*I have no doubt that everybody in this room is convinced that Space is playing an increasing role in the everyday life of European citizens. This is also a growing concern in the broader European political context. The recent debate on the potential implications of the Brexit - in particular on the UK national security - is just another evidence of the degree of criticality that space infrastructures have gained.*

*Europe has vital interests in space. We must accept it and draw the consequences of this reliance in our Space Policy.*

*Let me share with you my perception of what needs to be ensured in order to safeguard the interests of European citizens:*

- *First, the delivery of services with the required level of performance and reliability. For this, we need robust space programmes and a competent industry readily available to deliver the “state of the art”. This is the mission of space agencies to ensure that.*
- *Second, the long term stability and predictability of public investments. The on-going discussions on the next Multiannual Financial Framework and the upcoming ESA Council at Ministerial level shall provide for this.*
- *Last but not least, we need to ensure the security of our space infrastructures. Let’s put aside for the moment the threats of hostile activities in orbit. This has Security & Defence implications that would need to be addressed in a more appropriate framework. However, many other factors actually need to be considered for the risk they pose to the European economic security: natural hazards of course, as well as the consequences of an increasingly congested outer space.*

*Space pioneers were lucky enough to deal with Space as an infinite resource. We now know that the “useful” space - the one close to Earth - has some limitations, and that we are getting close to them. In this respect, outer space is just like airspace and seas and needs to be monitored and managed properly.*

*I would like to salute here the efforts made by the United Nations, and in particular by the Office for Outer Space Affairs based in Vienna, for their contribution to the Long Term Sustainability of outer space and for all the behavioural modifiers that they have initiated through the COPUOS.*

*Additionally, the United States have recently announced a national Space Traffic Management initiative under the authority of the US Department of Commerce. I am happy to confirm to you that Mr Kevin O’Connell, recently appointed to lead this programme, will present tomorrow, for the first time in Europe, the views of the US Administration in this matter. We are all eager to know more about it.*

*But space security cannot be the outcome of an isolated national initiative. It is obviously a global endeavour; a global endeavour to which Europe needs to contribute its share. And the third objective of this conference is to strengthen the reflection towards a European approach to security in this global context.*

*I am sure that you will agree with me that these are all highly interesting and challenging topics. I would like to thank to the European Commission, Ingolf Schaedler and his staff as well as the European Space Policy Institute for having put together such a relevant programme. Thank you again to all the speakers and panellists who agreed to share with us their views and reflections.*

*I wish you all a pleasant stay in Styria and a fruitful conference and I look forward to a positive and concrete outcome of the discussions to come.*

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**Ms Elżbieta Bieńkowska**, EU Commissioner for Internal Market, Industry, Entrepreneurship and SMEs stressed the importance and timeliness of this conference, under the auspices of the Austrian presidency of the European Union, for the on-going negotiation of the regulation establishing the space programme of the European Union for the Multiannual Financial Framework 2021-2027. Space is a key enabler for European economy and society and European space programmes (Galileo, EGNOS, Copernicus, Govsatcom) provide the right tools to face new challenges in the field of security and climate change. For this reason, space must be properly supported by public investment to ensure European autonomy to access and operate in space. In addition, measures must be taken to protect space systems, which should be recognised as a critical infrastructure, from harm. This is the purpose of the Space Situational Awareness component of the programme.

The proposal of the European Commission for the next MFF was prepared along the following lines:

- **Ambition**, with an increased budget for the space programme (i.e. 16 Billion Euro) in line with the importance awarded to this sector by the EU;
- **Continuation** of commitments for existing components of the programme and introduction of new proposed initiatives;
- **Adaptation** to a changing sectorial and business ecosystem;
- **Transition** toward an exploitation phase (Copernicus, Galileo, EGNOS) based on a service-driven policy.

Commissioner Bieńkowska explained that, in a context of considerable sectorial changes, with private actors taking an increasingly more ambitious and leading role, the approach of public actors must be adapted to continue to support the development of a successful European space sector. A European approach to New Space, which is characterised by disruptive business models and concepts, must be promoted. Such approach should not consist in importing the model set up in the United States but rather in adapting the current European framework, impaired by fragmentation and inefficiencies, towards a strengthened cooperation from basic research to market. It will also be a matter of changing the current mindset in the European space sector, starting with a more open and less risk averse public policy. The European Commission is already taking steps with new instruments to support start-ups and access to finance. In this field the objective of the European Union is not to oppose large and small enterprises or traditional and new businesses but rather to create a fertile environment to support the development of all actors and to bring them together towards measurable results. Finally, it will be a matter of offering more business opportunities, including public funded ones. In the field of access to space, the European Union intends to aggregate launch demand and use European launchers (Ariane 6, Vega). The space sector should also benefit from the new EU Defence Fund.

Commissioner Bieńkowska concluded with a call to European member states to keep in mind the importance of rethinking collectively the European space policy, beyond financial and political concerns.

**Mr. Pedro Duque**, Spanish Minister of Science, Innovation and Universities and first Spanish astronaut, shared his confidence that good progress is being achieved towards greater European cooperation in space policy. In this respect, Mr. Duque recalled that Spain, which currently assumes the presidency of ESA, plays an active role, together with Austria. At the occasion of ESA's Intermediate Ministerial Meeting which was held on October 25, 2018 at the European Space Astronomy Centre (ESAC) in Villanueva de la Cañada, Madrid, Spain, ESA member states set the strategic principles and guidelines to establish appropriate relations between the European Space Agency and the European Union.

Mr. Duque recalled that modern society needs ambitious and far-reaching objectives bringing together expertise and ideas towards challenging goals. From this perspective, space showcases the ability of Europe to achieve great collective successes to be proud of. This is now widely recognised and there is today a broad consensus among European countries to continue existing space programmes and to engage in new initiatives on the basis of a strong cooperation between ESA and the EU. Member states should play a leading role to find and establish the right model of cooperation.

In his conclusion, Mr. Duque underlined that upcoming decisions for the European space policy should involve all actors, take into account the current developments in the space sector and be driven by a shared vision on long-term ambitions.

**Mr Stéphane Israël**, CEO of Arianespace, speaking on behalf of Eurospace, the association of the European space industry, joined previous speakers in recalling the importance of the commitment of the public sector for the development of space industry. Eventually, space is the result of an ambitious public-private partnership. This is true in Europe as well as in other space faring nations.

Mr. Israël stressed that space is now more important than ever. This includes space exploration, Human spaceflight and science, which attracts the interest of the general public but also space services which are instrumental to tackle modern challenges such as security, connectivity or climate change. As a result of a determined public policy, Europe has developed unique capabilities and a strong industrial base. New actors, start-ups and SMEs are now entering the sector, which is beneficial, including for large companies provided that complementarity is sought. However, Mr. Israël underlined that industrial champions are essential for Europe.

Mr. Israël took the example of the last few Ariane launches to illustrate that the European space industry provides services and products to a mix of governmental and commercial customers, in Europe and in the World. The European space industry depends, however, strongly on commercial markets which is a unique situation with comparison to other space powers. Elsewhere, industry relies, first, on public investments. This is particularly true in the United States where space budgets are an order of magnitude higher than in Europe. The situation on the other side of the Atlantic is expected to further develop in this sense, based on U.S. administration determination to achieve space dominance. In this respect, the increase of the European Union budget for the space programme is an excellent step forward that is welcomed by industry, even though an even more ambitious effort, in the order of 18 Billion Euros (additional budget for Copernicus, Govsatcom and SSA) would be required to make a real leap forward. Beyond the budget for the space programme, another important aspect will be the investment to support R&D and innovation. Industry is looking forward to contributing to the establishment of a successful R&D programme.

Mr. Israël concluded with a more specific message regarding Arianespace's own sector. Ensuring an autonomous access to space is a key strategic concern for Europe. History reminds us that a stepping stone

in the creation of Arianespace was the refusal of Mr. Kissinger, U.S. Secretary of State at the time, to launch the telecommunication satellite, Symphonie, to protect U.S. industry against competition. The situation has not changed and private launch service providers like Blue Origin and SpaceX will support, first, U.S. space ambitions. In this context, supporting European launch capabilities is essential and Mr. Israël welcomes the intention of the European Union to aggregate launch demand and procure European services. Such approach should become the best practice across all European countries.

## Highlights

In a context of growing importance of space for numerous economic, societal and environmental challenges, speakers of the first session shared a positive assessment of the situation of the European space sector and praised the successful results achieved by Europe across different domains from science and exploration to GNSS, Earth Observation and Telecommunication services. This is the result of a long-term consistent public investment of European Member States that must be continued.

The space ecosystem is, however, rapidly changing and new opportunities and challenges are emerging. This situation must be reflected in the development of an adapted European space policy providing an suitable framework to seize the new opportunities offered by the so-called New Space transformation while consolidating a European approach to rising economic and operational security challenges. More specifically, speakers underlined that such developments should seek to:

- Ensure the long term stability and predictability of public programmes;
- Reach a level of investment consistent with the growing importance of space for Europe;
- Reinforce and streamline cooperation between European actors along a shared long-term vision to avoid fragmentation and inefficiencies;
- Foster the emergence of new business models and concepts and a complementarity between large established companies and SMEs and start-ups;
- Support European autonomy in access to space by promoting the use of European launch solutions;
- Safeguard European space infrastructure from rising security challenges

A major milestone to pave the way for Europe in space is the negotiation of the proposed regulation establishing the space programme of the European Union for the Multiannual Financial Framework 2021-2027. With the objective to reach, soon, an agreement on this matter, speakers consensually called stakeholders to consider long-term ambitions beyond immediate financial and political concerns.

## Session 2: “Return of Experience on New Space concrete achievements”

The session brought together a diverse range of perspectives from institutions and innovative start-ups illustrating what is at stake in the so-called New Space sectorial dynamic and drawing on major lessons learnt from their respective experiences.

The session gathered the following speakers:

- **Pascale Ehrenfreund**, Chair of the Executive Board, DLR
- **Hélène Huby**, Co-Founder, Global Space Ventures
- **Theresa Condor**, EVP for Corporate Development, Spire
- **Lynn Zoenen**, Governments Affairs Manager, ispace

The moderator, Jean-Jacques Tortora, Director of the European Space Policy Institute, introduced the session by giving an overarching definition of new space as a disruptive sectorial dynamic featuring various end-to-end efficiency-driven concepts leading the space sector towards a more business-and service-oriented step. He recalled that in the United States, space start-ups are currently raising around \$1.5 B per year. Although this amount seems small when compared to the overall U.S. space budget, it actually is in the range of the annual space budget of the European Union.

### Presentations and Panel Discussion

**Mrs. Pascale Ehrenfreund**, Chair of the Executive Board of DLR, provided the audience with relevant insights on the way a research organisation interprets and supports innovation for a sustainable growth of a new ecosystem of space entrepreneurs. R&D is certainly one of the core activities, and the DLR has direct access to the most cutting-edge technologies, with its research supported by 950 PhD students representing about 10% of DLR staff. Ms. Ehrenfreund stressed the importance of innovation processes as well as the use of new models of collaboration, including for example public private partnerships. She listed some success stories in this context such as the DESIS earth observation hyperspectral instrument, the Hayabusa 2 mission’s MASCOT rover landing on the asteroid Ryugu, and the CALLISTO launcher project.

These types of collaborative approaches have enabled the DLR to foster cross sector innovations (and represent 50% of patented technologies). Moreover, increasing attention and support is given to technology transfer, which is providing solutions for markets in other sectors.

Ms. Ehrenfreund highlighted also the need for more harmonized and shared roadmaps among organisations and institutions active in supporting innovation. In particular, she mentioned the activity of European Space Research Establishments (ESRE) in drawing up target-oriented high level directives.

To conclude, she illustrated the main differences between the U.S. and European contexts in terms of culture and funding and the need for a switch of mindset towards a less risk-averse mentality. She concluded that Europe needs to find its own approach.

**Mrs. Hélène Huby**, Co-Founder of Global Space Ventures, was the second panelist to speak, and she was asked in particular to provide a private venture perspective on the most relevant elements for a space start-up to flourish in the European market, as compared to the U.S. one. She explained that three features are required for a start-up to be successful: talent, funding and clients. There are excellent engineers in both Europe and United States, however they also learn how to be entrepreneurs in the United States. In this regard, she commented that students in Europe generally receive less training on building sustainable and profitable business plans within short term cycles. In particular, Mrs. Huby highlighted the importance of a change in paradigm towards more entrepreneurial mission-oriented educational programmes.

Regarding the access to finance, Ms. Huby shared her assessment that Europe will never be like the United States, and that more publicly funded projects will be necessary. She did state, however, that the private market in Europe is one of its assets.

Making an additional comparison between the United States and Europe, she noted that technology developers in the United States are allowed to use and share the outcome of publicly-funded R&D. This is a feature that can accelerate innovation cycles.

Addressing a question on the strengths of weaknesses of the European ecosystem, Ms. Huby explained that, with regards to weaknesses, the B2B market in the US is much stronger, in particular concerning the IOT data or earth imagery needs of import and export companies and that decision times in reacting to market changes must be improved in Europe as well as its highly risk-averse mentality. With regards to Europe's strengths, she underlined how well public and private sectors have been cooperating together as well as benefits arising from European both diverse and unified profile. In addition, Ms. Huby stressed the great employee loyalty observed in Europe, where staff are passionate and proud to work for a company for many years.

Offering several recommendations, Ms. Huby suggested that Europe could benefit from more competitions such as along the lines of the Google Lunar XPRIZE. One idea she proposed for a tech competition would be to offer launch services to the best European technology demonstration missions which could trigger the establishment of foreign start-ups in Europe. Ms. Huby additionally suggested expanding series C/D/E funding sources for European companies, so as to prevent young initiatives with growth potential from being purchased by American companies.

**Mrs. Theresa Condor**, Executive Vice-President for Corporate Development, Spire was the session's third speaker. Like Ms. Huby before her, Ms. Condor explained that decision times in Europe represent a significant weakness for the region's development of New Space initiatives. In a poignant example of Spire's experience, Ms. Condor explained that her company waited 4 months to have a first business proposal meeting whereas, after it moved to the United States, the company raised \$1 M in less than 2 months. She added on this point that the company ultimately relocated to California given the access to funding there and the generally more positive reception from incubators.

Moving on from this point, she explained how the international situation is very competitive, and that many countries have expressed great interest in having a Spire office. In addition to quick access to finance and support, Spire also considers decisive the availability of skills in the job market and the access to political decision makers, which is particularly important with regards to regulatory support. In this regard, she added that, for startups and small companies, access to decision makers is much harder.

Looking at the situation ahead, Ms. Condor foresees a shift towards greater procurement of services and data, which will be enabled and supported by cloud storage systems. She recommended to the EU to take a policy lead on issues such as data access, licensing, and private funding, which are areas of paramount importance.

**Mrs. Lynn Zoenen**, Government Affairs Manager, ispace, was the fourth speaker of the session. Ms Zoenen began her talk by highlighting two points, regarding speed and cost. In particular, she explained that New Space companies are willing to take greater risks allowing more financial resources. In addition to this, New Space companies focus on reducing costs in development and therefore lowering barriers to access to space.

Regarding ispace's future plans, Ms. Zoenen presented a promotional video showing ispace's vision for a lunar settlement called Moon Valley. Aware of the skepticism the company faces with regards to these plans, Ms. Zoenen pointed out several examples in history of visionaries being publicly mocked, such as Robert H.

Goddard in the New York Times for his work on rocketry. In addition to this, she also expressed the company's desire to represent a source of inspiration in the space community.

She used this as a segue to the company's medium-term business plan. ispace has raised 80 million euros to develop and demonstrate its technology concepts, with the eventual plan of a first launch in 2020-2021 of a lunar orbit mission to define and identify a landing site. This will gather the data necessary for an eventual lunar rover mission developed with the help of Japanese universities. This second mission will focus on Polar exploration to map possible sources of ice water.

Ms. Zoenen at this point mentioned that ispace has various investment sources, including public investors, such as INJ from Japan as well as the Development Bank of Japan, and private investors, in particular large multinational corporations seeing ispace as a strategic investment. Ms. Zoenen mentioned operational collaboration with other companies (including those from outside the space sector) as an additional form of support. These companies are able to provide materials and technical knowledge which is essential for ispace's mission. As an example, they worked with a glue manufacturer which offered adhesive alternatives to heavier metal screws. ispace ultimately received support from actors as diverse as Suzuki and the EU.

## Highlights

A major highlight identified across nearly all of the talks was the great importance placed on speedy decision making in response to startups' applications for financing. It was stressed that new models of collaboration would be necessary for supporting innovation such as PPPs. Moreover, inter agency collaboration is desirable at political level. In addition to this, speakers duly noted that the industry and policy makers in Europe must learn to respond faster to changes in the competitive landscape of New Space. Talent, funding and clients were the three identified elements for the success of start-ups.

Speakers also noted strong cultural differences between the United States with regards to these factors and especially the greater risk averse mentality of European investors. One key element is a good understanding of entrepreneurship. To stimulate and promote such mindset the organization of competitions was praised. However, unlike the situation in the US, it was noted that small, young European startups have greater access to decision makers in smaller European policy communities, which they find very important with regards to regulatory support. On the same vein, more attention should be paid to data access, licensing and private funding in policy.

## DAY 2: 6 NOVEMBER 2018

The second day of the Conference was opened by Mr. Ingolf Schadler. Before passing the floor to two scheduled keynotes that would present the respective views of the European Commission and European Space Agency, Mr. Schadler welcomed the participation of high-level representatives of European space institutions and U.S. state administration at the EUSPACE for Business conference. He also expressed special gratitude to Mr. Jean-Jacques Tortora of ESPI for the substantial amount of intellectual work done by him and his team at ESPI to prepare the program and content of the conference.

### Keynote address by Pierre Delsaux, European Commission Deputy Director General

**Mr. Pierre Delsaux**, Deputy Director-General for Internal Market, Industry, Entrepreneurship and SMEs at the European Commission (EC), began his keynote address by highlighting the importance for modern Europe to build upon traditions and historical heritage, arguing that this notion is relevant also for European space endeavours. While transitioning to space activities, he noted the importance of imagination and storytelling associated with space, but at the same time, the importance of space in broader political, economic and social perspectives needs to be constantly reminded. This, Mr. Delsaux noted, represents the essence of European rationale to pursue space and space-related activities. Space is a business tool, he added, contributing to jobs creation, economic growth and innovation.

Europe in space, according to Mr. Delsaux, exemplifies diversity. The usual practice of negative assessments of European space endeavours needs to be balanced by optimism, positivism and dynamism. Mr. Delsaux underlined this suggestion, stating this is one of his main messages to the participants of Graz conference. Having in mind this need for a more optimistic attitude, he recalled numerous European space achievements. Among others, he highlighted the anticipated world-class accuracy of Galileo system of 20cm and long-term development and utilization of the EGNOS system, including outside Europe and in competition with other systems.

Additionally, Mr. Delsaux argued that the competitiveness of the European space sector could also be evidenced by the establishment of some U.S. companies' business in Europe. He noted that there are still areas of improvement for the regulatory environment of European countries. While comparing U.S. and European space sectors, Mr. Delsaux noted that there is a significant difference in one specific indicator, private investment in the space sector, which relates primarily to a higher readiness in the U.S to take risks in investing in yet unproven and ambitious concepts.

Mr. Delsaux then reminded the audience of the recent EC proposal for a new space regulation and of the fact that contents, such as the proposed budget for next MFF period 2021-2027, are still under discussion, reminding the audience that the case for space must still be made by all actors.

The final challenge that Mr. Delsaux touched upon was the relations between the EC and ESA. Although the discussion is always lively, the experience shows that an agreement is usually reached at the end of the day, Mr. Delsaux claimed. He acknowledged several occasions where reaching an agreement between the two actors has not been an easy effort, but recalled that there is a mutual strong willingness to continue working together.

In concluding remarks, Mr. Delsaux stepped back to a broader perspective and argued that the space sector needs to be more open and not develop in isolation. Actors should engage more proactively with other industries.

## Keynote address by Jan Woerner, Director General of the European Space Agency (ESA)

**Mr. Jan Woerner** proceeded with his own keynote address putting the emphasis on various aspects of ESA activities that relate to emerging space businesses.

Mr. Woerner argued that both competition and cooperation are relevant notions, each having different impact on European space activities. Competition constitutes the main driver of development, whereas cooperation serves as an enabler.

Given that one of the topics of the conference was related to investments in space sector, Mr. Woerner spoke also about this issue, arguing that there is not a lack of money in Europe for space projects, as some may believe. He acknowledged nevertheless, that distribution of finance and investments in Europe is different from the U.S. space sector, to which it is often compared.

According to Mr. Woerner, the space community is currently experiencing a change of paradigm, characterised by a shift in motivations, actors, contents, roles and instruments. He underlined that partnerships of ESA with industry are essential and have a spectrum of achievements behind them. ESA, in words of its director general, is an agency, as well as partner, broker, mediator, facilitator and enabler. Mr. Woerner then illustrated different models of partnering with industry, such as traditional procurement, PPP arrangements or partnership schemes counting with already existing business plan of the industry partner.

As presentation of ESA director General followed the keynote of EC representative, Mr. Woerner also discussed cooperation between the two organisations, similarly acknowledging joint achievements as well as existing difficulties to cooperate. He eventually stressed out the fact that relations between ESA and the European Union have been recently subject to joint statement of the two organisations in 2016. The overarching message of Mr. Woerner in this respect was that ESA-EU cooperation is ongoing and expected to continue to bring new results.

Coming back to the primary topic of the keynote, Mr. Woerner discussed emerging space businesses from the angle of the size of the business, on a scale from start-ups and SMEs to large system integrators. He noted that the importance of each actor is not questioned, claiming that there as an appropriate place in the value chain for all types of actors. Brief elaborations were then provided on ESA perspectives on the “seamless chain of innovation”, ESA Industrial Policy principles and main programmatic pillars of the Agency.

Last but not least, Mr. Woerner returned in concluding part of his keynote to one of his previous messages and reiterated that space is a global enabler expanding the knowledge, assisting decision making and enabling entrepreneurship and growth in economy at large.

## Session 3: “Fostering business development in a global context: the role of the public sector”

The third thematic session of the 2<sup>nd</sup> day of the Conference gathered five panellists:

- **Pierre Delsaux**, Deputy Director-General for Internal Market, Industry, Entrepreneurship and SMEs
- **Jan Woerner**, Director General, European Space Agency
- **Harald Gruber**, Head of Digital Infrastructure Projects, European Investment Bank
- **Marc Serres**, CEO, Luxembourg Space Agency
- **Mr Dan Isaac**, ESOA, Senior Manager Market Development at SES

Recalling how the space sector has evolved from purely institutional in its inception to more commercial in recent years, the session moderator, Jean-Jacques Tortora, highlighted how today space business development is a top priority everywhere in the world, Europe included.

### Presentations and Panel Discussion

On the topic of financing European space start-ups and SMEs, the third speaker, **Mr Harald Gruber**, Head of Digital Infrastructure Projects, European Investment Bank, elaborated how the EIB is the most appropriate European institution to offer long-term investment opportunities.

He noted that the space sector is at the same time characterised by a very high innovation content, and composed by a great number of SMEs – as such, the space sector fulfils perfectly two of the EIB policy goals, which are to support innovation and to support SMEs in Europe. The EIB, he observed, is also particularly well placed to provide long-term loans or financial support, and is setting up additional mechanisms such as Venture Capital funds dedicated to the space sector, to support both start-ups but also medium sized companies with good projects that need the resources to scale-up their initiatives. Furthermore, he highlighted how the support of the EIB on taking investment risks on space companies, that typical commercial banks would shy away from, might have a catalytic effect, increasing confidence and enabling further private investments.

**Mr Marc Serres**, CEO of the Luxembourg Space Agency, described past and recent developments of Luxembourg space policy, framing its evolution in the larger efforts to diversify Luxembourg’s economy. He noted that Luxembourg has indeed always been at the forefront of commercial-oriented space policies and activities, starting from the foundation of SES. He discussed the new long-term policy initiative of Luxembourg, to support commercial space exploration and in particular exploitation of space resources. He explained in particular how this is envisioned as a stepping stone to enable the future space economy over the next few decades, at the same time being a visionary goal but also with concrete short-term expectations and spill-over effects.

Mr Serres explained how four main challenges were identified in this regard: first, technology for space resources utilisation is extremely early-stage, and much needs to be done to reach the intended goals. Second, as space activities are regulated by national but even more so by international treaties, he acknowledged that some issues need be clarified for this kind of commercial space activities to flourish in the future. Third, on financing these ventures, he noted that it is a priority to involve private investors. Lastly, on the development of space markets, he pointed out that the whole value chain for space resources utilisation must be developed, encompassing activities like digging, transportation, maintenance and so on.

He concluded outlining the four pillars based on which Luxembourg is developing its strategy, namely securing political support, establishing the necessary and appropriate regulatory framework, fostering education, research and innovation and lastly ensuring proper financing and support for companies.

The last speaker of the panel, **Mr Dan Isaac**, ESOA, Senior Manager Market Development at SES, provided the perspective of telecommunication satellite operators. As the telecom market is evolving, he acknowledged the challenge for satcom operators, whom he recognised are catching up with the fast-paced evolutions of markets and terrestrial technologies.

He outlined in particular new SES efforts to meet the needs of the market and evolve accordingly, such as new game-changing, fully-reconfigurable satellites, as well as massively employing all-electric satellites. He concluded remarking the importance of the EU GovSatCom initiative, to ensure connectivity and protection for European citizens not just in Europe but across the globe, and confirmed the readiness of the satcom industry to play its role in this new initiatives.

### Highlights

The panelists' contributions put the emphasis on the changing role of the public sector and its growing need for adaptation. Mr Delsaux recalled that the public sector should work towards removing obstacles and barriers to business development, facilitate the creation and funding of new companies and attract investment, and contributed the cross-sectorial fertilization of ideas.

Another key aspect to promote New Space industrial dynamics lies in the public-private interface and how traditional and new players can help stimulate its efficiency. New mechanisms of financing between public actors are being proposed now, such as between ESA and the EU, or ESA and EUMETSAT. In banking adequate long-term investment possibilities can be enabled by the centralized financial institution called the European Investment Bank to support innovation and the growth of SMEs through additional mechanisms such as dedicated VC funds.

Countries such as Luxembourg are good examples of commercially oriented space policies which seek to support new trends. Space innovation is not only important and vital for Europe per se but also for enabling space-related activities which are growing very fast. To unlock the potential of New Space industrial dynamics, substantial investments are required to stimulate technological development and support the growth of an innovation intensive ecosystem. Many New Space ideas are still at their early stage at which they need financial, political and technical support the most.

In the field of telecommunications major changes are also to be observed and require adaptations from satellite operators in Europe.

## Keynote address by Kevin O’Connell, Director of the Office of Space Commerce, US Department of Commerce

**Mr Kevin O’Connell**, recently appointed Director of the Office of Space Commerce at the US Department of Commerce, opened the afternoon with a keynote address on Space Traffic Management.

Mr. Kevin O’Connell began his speech by noting the estimated value of the global space economy, which is currently approx. USD 400 Billion and expected to grow to trillions of dollars in 2040. As of today, Mr. O’Connell continued, there is a clear disruption in terms of space technology, applications and services, having a significant impact on the nature of space industry. The role of the DoC in the face of this trend, he added, is to foster economic growth and technological development of U.S. commercial space industry.

The primary emphasis of Mr. O’Connell’s keynote was put on recent policy developments in Washington DC, namely recently initiated national space traffic management policy through the Space Policy Directive-3, and before that through Space Policy Directive-2, aimed at fostering deregulation and modernization of regulatory burden applicable to commercial space activities in the U.S.

The goal of recent organizational changes, such as increased relevance of the DoC according to recent Space Policy Directives, is to create one stop shop for space actors, to facilitate the licensing process and allow for faster delivery of new products and services to the market. In this respect Mr. O’Connell revealed the idea of a permissive but not permission-less regulatory regime to support the growth of U.S. commercial space industry.

In transitioning to key issues of keynote, space situational awareness and space traffic management, Mr. O’Connell acknowledged the ever relevant threats and hazards stemming from the space debris issue and underlined the need of cooperation, mentioned already on numerous occasions throughout the conference. In this case, however, Mr. O’Connell pointed directly to the need of cooperation and coordinated international approach on regulatory issues concerning space activities.

Concerning the space traffic, he then followed, emerging and growing NewSpace concepts are likely to complicate the situation of effective monitoring of space objects and related orbit environment predictions. Why Department of Commerce is suited to be deeply engaged with SSA and STM, he asked the audience, to stimulate thoughts and reflections among the conference participants. He noted, that the Department is well suited to release the data, given its previous experience with similar data dissemination processes.

This assessment led Mr. O’Connell to continue in describing the recent policy developments in the U.S. He explained that the Department of Defense (DoD) catalogue of space objects is not being significantly changed according to new policy directive. The new policy instrument inserts another layer of public actor into the data provision scheme, the Department of Commerce, so that the focus of the DoD can stay with maintenance and upgrade of existing capabilities and the DoC will engage in distribution of the data to commercial and international partners.

In this sense, he noted, the SPD-3 envisions an open architecture data repository including data visualization and analytics to create highly added value to provided SSA services. Better understanding of space environment, he states, offers better predictability and safety for both private and government stakeholders.

Going into more details, Mr. O’Connell noted the importance of standardization. He clarified that the DoC currently envisions evolution of groups of space standards instead of a single all-encompassing universal mechanism for future space standardization. Currently, NASA is also updating the Orbital Debris Mitigation Standard Practices and in this respect, Mr. O’Connell encouraged all governments to reflect on this issue

domestically. Furthermore, he noted international cooperation on such issues is necessary and that USA does have the will to continue in engaging in international efforts, which was further supported by Mr O'Connell through reassuring the audience that the U.S. believe that UN COPUOS will serve as a key multilateral forum to continue international coordination of space exploration and utilization.

Throughout his keynote address, Mr. O'Connell stressed out, for several times, a strong commercial rationale behind recent policy developments in the U.S. arguing that future of U.S. space activities is expected to be from a substantial part of a commercial nature. In addition to this, Mr. O'Connell reminded the audience that principles of safety, sustainability and predictability, which are being fostered through recent developments are not only of great relevance to commercial space industry but also to government stakeholders in national security considerations.

Following the keynote address, a Q&A session was opened. One representative of Romanian Space Agency inquired about the future of publicly shared part of U.S. DoD space object catalogue, to which Mr. O'Connell noted he does not expect major changes in a volume or type of data to be distributed and that this organizational rearrangement, in fact, further supports the SSA sharing arrangements of USA with its partners. Another question, by a representative of Vienna-based space analytics company explored involvement of private sector in the data sharing scheme through the means of open architecture repository. Mr. O'Connell recognized the growing relevance of private capabilities and clarified that this new disruptive services are considered to be of high relevance the public sector as well. A couple of other questions were raised by other participants, aimed mostly at clarification of information related to conjunction assessment and relation between international frameworks and national mechanisms, which were voiced by Mr. O'Connell during his keynote address.

## Session 4: “Stimulating investment for space: challenges and opportunities”

The fourth session of the conference gathered the following speakers:

- **Gilles Rabin**, Director of Innovation, Applications and Sciences, CNES
- **Josef Aschbacher**, Director, Earth Observation Programme, ESA
- **Roger Havenith**, Deputy CEO, European Investment Fund
- **Geoff Sawyer**, Secretary General, EARSC
- **Philippe Brunet**, Director for Space Policy, Copernicus and Defence, DG GROW, European Commission

Moderated by ESPI Director Jean-Jacques Tortora, the fourth session of the EUSPACE for Business conference gathered together distinguished representative of space agencies, European institutions and industry associations to discuss the way ahead to foster investors’ trust and stimulate investments in space companies across Europe. Mr. Tortora introduced the panel acknowledging that a rise in private investments has been noticed also in Europe, notwithstanding the differences across the Atlantic and the presence of issues to be addressed.

### Presentations and Panel Discussion

**Mr Gilles Rabin**, Director of Innovation, Application and Sciences at CNES, opened the panel with a presentation on CosmiCapital, “a unique venture capital fund dedicated to space”, an initiative led by CNES with the support of Venture Capital firm CapDecisif Management. Mr. Rabin explained that in space everything is changing fast, and therefore it is necessary to constantly move not to lag behind. CosmiCapital, “the first European VC fund supported and sponsored by CNES focusing exclusively on private companies in space and related applications”, has been envisioned to provide fuel to foster start-ups and their ecosystem, with a focus on the space start-ups that will help deliver the right space application and space data to the right customer, be it private or public, supporting delivery models for end-products and end-services. The rationale for CNES to initiate this fund is that the Agency doesn’t want to be a spectator, but rather an actor, directly involved in helping these start-ups. Concluding his remarks, Mr. Rabin answered the moderator’s question on CNES expectations and direct contributions to the fund, saying that the Agency is committing EUR 5 million, expecting to boost overall investors’ trust in this market and ecosystem.

The second speaker, ESA Director for the Earth Observation Programmes **Mr Josef Aschbacher**, presented the state of the Earth Observation programmes at ESA and in Europe, emphasizing the position of leadership that Europe holds in Earth Observation, a position acknowledged and praised worldwide, thanks to programmes as Copernicus. In light of the above, he continued by pointing out that something is missing from the picture. In fact, work is still required, in particular in terms of commercialization of space data and imagery, something which is already happening, albeit primarily outside Europe, in the wave of the current paradigm shift in space activities, of which NewSpace is one of the elements.

Moreover, Mr. Aschbacher pointed at two issues that Europe needs to face: firstly, there is a dual need in Europe for access to money and reduction of time needed in making decisions and reacting to new landscapes. Indeed, Europe is not the Silicon Valley and it is not possible to transplant such model in Europe, as access to money and speed of decision and implementation are different. Nevertheless, the expertise available in Europe is as good as the one in the USA, meaning that the Europeans can catch up with the paradigm shift if they welcome new criteria on speed and investments. Secondly, there is a growing role and need for “intelligent” satellites that communicate with each other and provide the possibility for direct interaction with the end user. ESA is trying to cope with the two challenges by preparing strong proposals for the 2019 Ministerial Council, while hoping to provide the best possible solutions for the users of space data

and space applications with the new ESA Φ-Lab, the current designing of Copernicus 2.0, the complementarity of large and small satellites, and the overall integration of traditional architectures and innovative technologies.

**Mr Roger Havenith**, Deputy CEO of the European Investment Fund (EIF), intervened as third panellist and explained the public policy role that the EIF is playing. The Fund, in fact, is not properly a bank, but rather operates on policy imperatives, activating resources only when it can pursue policy priorities, doing so with market-based solutions. Today space is a clear political priority, hence the EIF involvement in space, a sector that can help develop and harness disruptive technologies and foster overall competitiveness, with plenty of positive spill-overs. Notwithstanding these potentials, space start-ups and SMEs are today struggling to receive funds, and here it is best understood the public policy role of the Fund: to correct market failures as the lack of financial resources. The EIF, as institutional investor in the space companies, aims to foster overall trust in the sector and enable private investments by bringing the sector to a situation in which there are many ongoing high quality projects to be invested in.

Asked by the moderator about what would make space start-ups even more attractive, Mr. Havenith provided three key elements: an increased attention to space SMEs' needs, with dedicated funds and tools, specific studies to remove information asymmetries, and an improved sectorial "critical mass" to convince investors; involve all the potential stakeholders to design in the best way the next EU Multiannual Financial Framework; as a Fund, by becoming more active at early stage to make ideas and start-ups investable in, also bundling together potential regional, national and EU resources.

Looking ahead, Mr. Havenith stated that the EC has put together a proposal for further financial instruments and that an equity instrument for the space sector is in the design phase between Horizon 2020, the EIF, and the Juncker Plan (The Investment Plan for Europe). The latter has a goal of moving €300 million.

The speaker added several points on the approach and goals of the EIF. The Fund sees grants as a functional investment tool in cases where the investor is not sure of seeing a return on investment. Because grants are not highly scalable, though, the EIF aims to combine grants with other financial instruments in its investments. Moreover, a large overarching aim of the EIF is to fill market gaps where private investors do not feel ready to invest in initiatives – in particular where a startup might not immediately show a strong return on investment profile – but where public finance could have a valuable supporting role. Finally, Mr. Havenith concluded with a hopeful remark – the efforts of institutional investors, as the EIF, will manage to make space appear on the radar of the financial sector.

**Mr Geoff Sawyer**, Secretary General of the European Association of Remote Sensing Companies (EARSC), began by stressing that change is happening incredibly fast, that Copernicus is a "game changer", that new data sources are appearing, and that new technologies (including the "cloud"/blockchain/machine learning/AI/etc.) and large IT actors (like Google, Amazon, and Microsoft) are entering space. As such, agility is a key work and key priority for EO. He then introduced the audience to EARSC's activities and services to its members. One of these in particular, the EO Industry Survey, is a great tool to stay ahead of the evolution that the market has been witnessing, with emerging start-ups, innovative business models, or the introduction of technologies as AI. The EO Industry survey gathers data on the sector size and trends, mapping activities, number of companies, revenues and workforce of the European Earth Observation industry.

Mr. Sawyer continued by introducing the recently published EARSC position paper titled "The New EU Space Programme Regulation Proposal and the future of the EO Downstream Services Sector". The position paper, in particular, calls for 30% of the Copernicus budget to be allocated to the EO downstream sector, with two

key targets: increased outsourcing and market development. As for the former, EARSC asks for an ever-greater involvement of the industry as commercial supplier of Copernicus services, adding that industry consultation “should be a continuous and routine process”, and that the “Issue of clarity on roles of public and private sectors still needs to be improved”, while for the latter EARSC suggests the need to stimulate the demand side of the market, demand which should come more and more from governments as customers of private services, via private space assets.

The final speaker, **Mr Philippe Brunet**, Director for Space Policy, Copernicus and Defence at the European Commission DG GROW, began his talk in response to the question ‘How can we establish policies for investment for Europe to remain a space power?’ With reusability, miniaturization, space traffic management, in-orbit manufacturing and many other exciting developments, institutional and private investors alike need to be aware of the fact that things are changing and that many technologies not even imagined yet will be available in a decade. In referring to this, Mr. Brunet hinted at how Europe must pursue greater efficiency in all activities that it has already engaged, being flexible and adaptable, and use current financial tools to be ahead of these changes rather than to just protect the status quo.

On the Commission’s side, many efforts are being done with the recently proposed space regulation, the increased budget for the EU Space Programmes, as well as the development of new financial tools to address the aversion to risk in investing - and specifically in space - as this is a major limiting factor, well acknowledged in Europe

Looking to the future, he states that the EC has decided to study the current investment landscape and identify the gaps, but adds that this task is made all the more difficult by the unknown impact of developments that are unfolding now and in the future. For this reason, he suggested that Europe should have a tool similar to the U.S. scientific decadal surveys, with which to better forecast and anticipate these technological evolutions. Adding that non-space industries should also be targeted by specific funds when their activities can benefit to and from space, Mr. Brunet concluded his speech with a single plea: to not use all the space budget and financial tools available to merely sustain the current successes, as this would cause Europe to lag behind as a Space Power.

## Highlights

During the session, it was highlighted the role of speed in business development is critical which explains initiatives taken by a number of space agencies to set up a VC fund, the objective being to support start-ups and their associated innovation ecosystem. In tacking a proactive role space agencies contribute to the success of these business ventures.

The cutting edge nature of Europe’s Earth Observation capabilities was praised but therefore appropriate tools to support the commercialization of space data and imaginary could be further improved. To achieve that, the European approach, criteria, and standards to access to money, speed of decision, and implementation should be rethought. This could be partially achieved through making important decisions at the ESA Ministerial Council next year. Earth Observation combined with a number of ground breaking technologies – cloud computing, blockchain, machine learning, AI, etc... - gives way to a great deal of business ventures.

The role of public policy to support innovation was also mentioned. The development of disruptive technologies is of great interest for implementing public policies for which they can play a role for instance. In addressing the lack of financial resources for these costly innovation intensive projects public institutions should can address market failures. Supporting space start-ups also means the development of dedicated

funds and tools, involve all potential stakeholders to better design the next MFF, and for public institutions to get involved at early stage to make business ventures more attractive.

The importance of space innovation for business and especially new forms of business was stressed multiple times. Indeed, investing in space innovation ultimately brings new horizons and opportunities for other kinds of business which are to thrive outside the space sector. In outlining innovative Space policies one therefore must bear in mind that not only space innovation is important per se but also every single technology that derives from it.

## Session 5: “Criticality of European space infrastructure as space economy assets”

The fifth session of the conference gathered the following speakers:

- **Simonetta Di Pippo**, *Director General, United Nations Office for Outer Space Affairs*
- **Christopher Cannizzaro**, *Physical Science Officer, US State Department*
- **Matthias Petschke**, *Director, EU Satellites Navigation, European Commission*
- **Kai-Uwe Schrogl**, *Chief Strategy Officer, ESA*
- **Carine Claeys**, *Acting Special Envoy for Space, European External Action Service*
- **Carlo des Dorides**, *Executive Director, GSA*

The moderator, Jean-Jacques Tortora, Director, set the scene highlighting how the global economy became increasingly reliant on space assets. The security of these assets is equally becoming an increasing critical question, particularly regarding the long term sustainability of the space activities and the safety of the space environment. He further noted that a fully-effective way to address security challenges could only be envisioned as the result of a global, coordinated effort but that progress on these issues needs also to be supported by regionally/nationally-led initiatives.

### Presentations and Panel Discussion

**Ms Simonetta Di Pippo**, Director of United Nations Office for Outer Space Affairs (UNOOSA), provided an overview of the activities and mandate of UNOOSA, which is guided by the vision to bring benefits of space to humankind by promoting international cooperation in the use of outer space, bringing stakeholders together and fostering partnerships. UNOOSA acts as a capacity builder, global facilitator, and as gateway for space in the UN framework. A key point highlighted by Ms Di Pippo is that space is considered to be a global common of mankind, and to confirm the great interest and relevance of space across the globe, she noted that in just four years UNCOPUOS membership increased by 20%, further confirming that space is climbing at the top of the global political agendas.

Space is indeed a driver for socio-economic development improving daily life of citizens, this is reflected on the UNISPACE+50 Resolution empowering UNCOPUOS to developing a strategy document for space vision.

With regard to global space-related issues, she listed the main challenges ahead for the space community, one of which is the Long Term Sustainability of Outer Space Activities. On this topic, UNCOPUOS conducted extensive work which recently resulted in the adoption by consensus of a preamble and 21 guidelines. The set of guidelines is non-binding and reflects the willingness of states to voluntarily report on their activities in order to comply with their commitment. A second issue highlighted by Ms Di Pippo is represented by space debris, as she noted that in 2017 a record number of objects were launched into space, dwarfing previous launch records. She acknowledged that UNCOPUOS will focus on this topic, which will be included in the Space2030 Agenda.

Ms Di Pippo concluded by stressing the importance of having an already well-established and recognised multilateral forum to discuss security in outer space.

The second speaker of the session, **Mr Chris Cannizzaro**, Deputy Assistant Secretary for Space and Advanced Technologies, US Department of State, was asked in particular to elaborate on the status of EU-US transatlantic cooperation in space matters.

Mr Cannizzaro began his speech by acknowledging the positive on-going space dialogue between the EU and the US, as it continued to take place recently in several high level fora such as in Washington in January 2018

and at the margin of the next 11<sup>th</sup> EU space policy conference in Brussels in 2019. He noted that such transatlantic dialogue included security and commercial matters, and remarked how an increased resilience of space assets can also be achieved with complementary or redundant assets, for example through international cooperation. Recalling the establishment of the National Space Council in the US and the three recently-issued Space Policy Directives, he elaborated in particular on three topics:

- Space environment monitoring, space traffic management, NEO and in particular space weather: he noted that a new strategy is being developed in the US, and that the international community is also becoming more and more interested on this topic, because of its critical implications for the safety of space assets and in turn of the reliance on them for the global space economy.
- On the topic of GNSS, noting how these systems are undoubtedly improving everyone's life, he stressed the need for resilience of GNSS services, and in this regard, the importance of having different but compatible and interoperable systems. He highlighted that the US are working with EU and other providers to advance these goals. open policy renovating and reshaping the way of services are delivered free and open access
- Finally, on Earth Observation, he noted the value of sharing data between different providers, particularly in light of recent natural disasters that afflicted the US. He stresses the importance of the free data policy which offers endless opportunities mostly to SMEs and innovative start-ups.

He concluded his intervention reaffirming the strength of EU-US transatlantic cooperation on space issues and the continued dialogue that is taking place.

The next speaker, **Mr Matthias Petschke**, Director of the EU Satellite Navigation Programmes, DG GROW, European Commission, was invited to discuss the major security considerations for the new, fully-deployed space infrastructures owned by the European Commission – Copernicus, and in particular Galileo.

Mr Petschke confirmed that security is a major concern for a system like Galileo. As the services of GNSS (i.e. timing and synchronisation) are being increasingly employed for a variety of critical sectors, such as telecommunication, power distribution, and financial services, a disruption of the GNSS service could have serious consequences for the economy. Studies calculated that up to 10% of Europe's GDP relies on GNSS (more in detail, around 40% of the telecom industry rely on GNSS signals and 30% of financial transactions use GNSS timestamps). As Galileo undoubtedly has to face a number of threats, it also offers a high degree of robustness, authentication measures and the like.

Furthermore, acknowledging that European critical infrastructures as noted above (e.g. power distribution) are increasingly reliant today on GNSS signals, Mr Petschke informed that the European Commission is preparing an initiative to foster the use of Galileo for European critical infrastructures, in order to make them less depended on foreign navigation systems.

Concluding on this topic, he remarked that EGNSS is a critical infrastructure in itself, and therefore it is fulfilling strict security criteria – redundancy, risk and threat analysis, protection of ground infrastructure.

Moving to EU GovSatCom, he remarked that this is a new space component included in the proposal for the EU Space Programme for the next MFF. It is meant to provide guaranteed access to secure satcom to a number of authorised users from the European security community (such as border guards, police, military forces, civil protection, EEAS and diplomatic, humanitarian missions...) thus supporting in particular the EU Member States security actors.

In conclusion, Mr Petschke mentioned the EU SST initiative, aiming at contributing to the protection of European and MS space assets from space debris, which could be complemented later on with space weather services and NEO observation.

**Mr. Kai-Uwe Schrogl**, Chief Strategy Officer, European Space Agency, elaborated then on ESA's views and positions regarding the security issues for its space assets.

He remarked how ESA member states are extremely aware of the issue of safety and security in outer space. Indeed, awareness of the threats further developed over the years, as threats for space infrastructures can come from outer space itself (such as debris, space weather) and from the ground (in the form of spoofing, jamming, cyberattacks).

Mr Schrogl then recalled the three goals stated in the ESA-EC Joint Statement of 2016: First, the use of space for economy and society. Second, making the European space sector stronger and fit for international competition. And third, safeguarding its autonomy in accessing and using space in a safe and secure way.

This last statement in particular lies at the basis of ESA's work in preparation of the space safety and security thematic pillar, to be presented to its MS at the upcoming ESA Ministerial Council in 2019.

With regard to space safety (encompassing space debris, where Mr Schrogl noted that ESA is a global leader in monitoring, modelling and predicting threats of space debris; and space weather, which is a threat both for spacecraft and for Earth's ground), ESA will present to MS in Seville CM19 a set of proposals for this area.

On the side of security applications, Mr Schrogl noted that ESA is cooperating very closely with EU institutions such as GSA, EDA, EUSatCen, in order to prepare activities in the field of safety and security on Earth and outer space.

He concluded noting that threats for safety and security for outer space are growing from various directions and sources, but are also becoming better understood and better assessed, and ultimately better recognised also in the European political and regulatory context.

**Ms Carine Claeys**, Acting Special Envoy for Space, European External Action Service, gave a speech regarding the EU's - and in particular EEAS - policy and legal initiatives on the protection of its space assets. She recalled the efforts to develop the International Code of Conduct (ICOC) which ultimately did not receive sufficient support in the international community.

In light of this, she then noted that today's changing global space environment calls for renewed efforts, and new common set of standards and norms are needed for new space activities such as On-Orbit Servicing / Active Debris Removal, which might come with concerns of harmful interference or risk of being considered hostile actions.

Lastly she concluded remarking that as global economies are more and more reliant on space assets. Space Situational Awareness and Space Traffic Management efforts at international level are becoming urgent.

The last speaker of this session, **Mr Carlo des Dorides**, Executive Director, GSA, was asked to elaborate on the Agency's activities and efforts regarding the safety of Galileo.

He started by outlining the challenges for such a system from the perspective of GSA.

- Service continuity is marked as a key element, because of the criticality of GNSS signal for more and more economic sectors as discussed by previous speakers. He recalled that 5 days without GNSS could mean more than 5B€ losses, for the telecommunication, finance, transport and emergency services among others. So service continuity is the main challenge and GSA holds a key role there.
- System resilience. He stressed that it is also fundamental to guarantee proper secure services, which is something that the system can deliver thanks also to its duality, and that GSA has built over the years all the competencies required to ensure this.
- To be adaptive to a fast-changing world, reactive, and competitive. Here he remarked how GSA is well equipped to be connected with the user requirements

- The political dimension of space, in particular in the politically-complex European framework, but noting how GSA is fully embedded as an element of the EU family of institutions.

He concluded his intervention reaffirming the key role and readiness of GSA to tackle these challenges to ensure the success of Galileo.

## Highlights

A critical point of the session was the growing importance of the long-term sustainability of space activities and the need for a global approach to appropriately promote it. The role of UNOOSA in coordinating global efforts was highlighted, as a 'capacity builder, global facilitator and gateway for space in the UN framework'.

In supporting international cooperation in Space Policy the instrumental role of transatlantic cooperation in space matters was mentioned and elaborated on. The promotion of resiliency of space assets for instance is one of the strengths of such mutually beneficial relations in space. New approaches to the monitoring of the space environment will require coordination among space-faring countries.

These efforts towards promoting a safe and secure space environment are a top priority for the management of European flagship programmes such as Copernicus, GOSATCOM and Galileo as more and more services rely on their data to deliver. Additionally, such critical data allow Europe to be more self-sufficient. As a result, more resources will be dedicated to refining and improving current security requirement policies. It was noted that GNSS signals are essential for enabling services leveraging space data. Particularly, service continuity and system resilience are key. In this sense, GSA is likely to evolve over time to make sure Galileo is appropriately protected and able to deliver. The EU SST framework initiative was praised for being one of the most encompassing projects dedicated to the protection and European and MS space assets which could be afterwards further improved with space weather and NEO services.

Additionally, emerging Space Security issues and their changing nature were mentioned as one of the most serious challenges to the full exploitation of European space programmes. In this sense, ESA's stance towards space safety and security is expected to evolve to meet the operational needs of European stakeholders. The existence of an invaluable ecosystem of public institutions which have a stake in Space Security such as GSA, EUMETSAT, ESA, EDA, SATCEN and the need for them to work on these issues were underlined. During the same session, it was mentioned that new practices in orbit such as on-orbit servicing or active debris removal require new sets of standards and norms to avoid mishaps between nations. In achieving that, SSA and STM are increasingly becoming pressing issues.

## Conclusion

**Ms. Genevieve Fioraso**, Chair of ESPI Advisory Council, offered the closing remarks, thanking all the speakers and complimenting the quality of the different panels. Mrs. Fioraso noted that the Graz conference was very timely, with negotiations happening at European level, both at ESA and the European Commission. As well, Mrs. Fioraso noted that the conference opened new areas of discussion, notably thanks to the different contributions made by the agencies, industries, new space companies and institutions present at the event. Mrs. Fioraso highlighted that Europe has to promote speed and efficiency to support SMEs and start-ups, help them grow and develop the European space landscape with new business models, new concepts and new talents. Mrs. Fioraso also called European stakeholders to accept failure and become more adaptable to change. In this sense, she pledged for a more business-driven approach to space praising the highly competitive and innovation European space industry which has, according to her, all the expertise required to fully benefit from New Space industrial dynamics. As new actors and markets are emerging in the space sector, public actors are challenged to rethink their approach and revisit their practices. At early stages, public and private investments are instrumental to support development. At later stages, business success is essential to build investors' confidence. Mrs. Fioraso summed up that Europe needs to develop services on the ground and in-orbit in synergy, with the necessity to widen the activities to other sectors and not stay segregated from non-space related activities. She added that Europe needs a clear and coherent vision for delivering on its ambitions.

Lastly, Mrs. Fioraso recalled the progress made in Europe on the topic of space security, and the importance to be prepared, notably with the future development of an STM framework for Europe. The need for maximizing and securing the socio-economic benefits brought by space assets is crucial as more than 10% of the EU GDP depends on space services with gross benefits in the order of €50 Billion per year. Such outstanding growth is expected to continue in the upcoming years with the development of new technologies powered by space technology such as autonomous transport or 5G networks. But these benefits come along with new risks, notably in the field of Security in Outer Space. A well-coordinated European space security strategy is a prerequisite for unlocking the full potential of the European space industry, both in the downstream and upstream sectors. On that particular issue, Ms Fioraso noted the criticality of further discussing space security issues in the context of the next ESA Ministerial Council.

Concluding on her closing remarks, Ms Fioraso saluted the organisation of events like the Graz conference highlighting their importance for enhancing the efficiency of public policies towards empowering, stimulating, and consolidating an innovation-driven space economy, particularly in the context of the finalization of the next Multiannual Financial Framework of the EU. Mrs. Fioraso concluded the conference with these words:

*“It is important that people continue to have dreams for space, so let’s go for space.”*

Ms Fioraso delivered the following speech:

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*This is my great privilege to conclude this high-level space conference organized under the auspices of the Austrian Presidency of the Council of the European Union.*

*Let me first thank Mr. Schaedler and the Austrian Ministry of Transport, Innovation and Technology (BMVIT) as well as the European Commission for the perfect organization of this outstanding event. This conference could not be more timely and the agenda more relevant.*

*Let me also thank Mrs Eibinger-Miedl and Mr. Nagl, the Styria region and the city of Graz for their hospitality and warm welcome. I was delighted to discover the great energy and dynamism of this region, especially in the field of space research and industry. If Vienna is the capital of international space diplomacy, it is certainly here, in this region, that the space heart of Austria beats the strongest.*

*Beyond mere words we also heard about concrete achievements enabled by the much-discussed so-called NewSpace revolution. I will not repeat the large extent to which this comes along with new challenges in a rapidly changing competitive landscape. I would rather like to insist most importantly on the many new opportunities that this is likely to offer. My personal conclusion is that we must urgently give way to the strong potential available here in Europe. We must also better assess how to reap benefits from such new approaches in the conduct of future European Space programmes. Having heard the various stakeholders from the European Commission, members States, Agencies, financial institutions and industry, I have no doubt that this top level challenge is being taken up. Europe has a promising future ahead provided that appropriate policies support innovation and sustainable growth both in the upstream and downstream sectors.*

*As a matter of fact, Space is a domain of excellence of Europe, and the reason for such success story is that space is one of the few sectors where “Europe” takes on its full meaning. A point often made about cooperation is that alone we go faster, and together we go further. In this respect, the relevance of European cooperation in space cannot be questioned. However, we need to find new ways of working together to achieve both performance and speed. In this respect, the recipes that made the success of Europe in Space might need to be adapted.*

*The most essential preliminary step is to reaffirm at political level the ambitions of Europe in this sector along a coherent, clear and broadly shared vision. In this respect, I would like to salute the key role played by the European Union. The proposal of the European Commission for the next Multiannual Financial Framework is a major step in the right direction. Next opportunity will be the upcoming ESA Council at Ministerial in 2019 under Spanish Presidency where more decisions will need to be made to give the Agency the means to fully play its role in supporting industrial and technological developments and in managing key European Space programmes and international collaborations.*

*If past public policies have been instrumental in initiating the positive trends that we observe today, efforts shall now focus on meeting the conditions to ensure a sustainable economic development by fostering the emergence of a virtuous economic cycle for space:*

- *At early stages, public and private investments are instrumental to support business development.*
- *At later stages, business success is essential to build investors’ confidence and public policies should:*
  - *Foster the emergence of new business models through support to innovation,*
  - *And contribute to their sustainability through adequate procurement schemes.*

*What is at stake is to maximize and secure the socio-economic benefits brought by the space infrastructure. Figures speak for themselves: more than 10% of the European Union GDP depends on space services with benefits in the order of 50 billion Euros per year, more than 6 times the annual space budget of Europe. And this return on investment will grow naturally with the development of new technologies such as autonomous transport or 5G networks.*

*The development of space business and economic growth are two sides of the same coin and a virtuous economic cycle is characterized by a shift of paradigm in space applications:*

- *Shift of space capabilities from complementary to integrated,*
- *Shift of users’ adoption from good-to-have to business-as-usual.*

*This will come as a result of both:*

- *Development of applications by strengthening competitiveness and innovation,*
- *Reduction of barriers of adoption by promoting awareness, improving affordability and ensuring simplicity.*

*But these benefits come along with new risks. As space becomes more pervasive and becomes part of business-as-usual, our dependence on space infrastructure grows, creating new vulnerabilities. Yet, challenges to the space infrastructure security are intensifying. Seeking a maximization of space benefits necessarily compels us to take proportionate measures to protect it from harm.*

*Today we had the chance to listen to Mr O'Connell's perspectives on Space Traffic Management. I would like to personally thank you for crossing an entire Ocean to come here discuss that important topic with us. I would like to take that opportunity to highlight the role of international cooperation in promoting a coordinated response to these emerging issues. In this respect, I have no doubt that this topic needs to be addressed by Europe at political level.*

*As Minister Hofer rightly put it, "Europe has vital interests in space", primarily for the well-being and the everyday life of its citizens as well as for its economic security of Europe. I couldn't agree more. In leveraging the full potential of space technology, more attention must be paid to the security of the space infrastructure and Europe therefore needs to consolidate its efforts towards protecting its space assets, which are getting increasingly incorporated into new business models.*

*In the current context of the finalization of the next Multiannual Financial Framework of the EU in which space plays a key role for Europe's public policies it is particularly timely to forge an adequate strategy in Security in Outer Space. In a similar vein, emerging issues in Space Security should also be further discussed and addressed at the next Ministerial Council of the European Space Agency and to underline the utmost importance of protecting space assets, primarily for socio-economic reasons.*

*In a further-reaching perspective, we must admit that our space infrastructure is likely to be targeted by malicious activity and as such, we cannot afford to shun away from our responsibilities and must be ready to take bold decisions to protect our assets. Arguably, the setting up a European Space Security policy accounting for such risks is the next logical step. This was not the topic of this conference, and we obviously still have a long way ahead of us.*

*As chair of the Advisory Council of the European Space Policy Institute, I would like to take that opportunity to highlight the work of ESPI, particularly in the field of Space Security. This year, ESPI published two public reports on this topic, that were distributed to all of you, which are: 'Security in Outer Space: Rising Stakes for Europe' and 'Security in Outer Space: Perspectives on Transatlantic Relations'. Both reports are significant contributions towards harmonizing the European Space Security Strategy. Additionally, I am happy to announce that ESPI will continue its efforts to provide quality research on these topical and pressing issues with a report entitled: 'Towards a European Space Traffic Management Policy' to be published next year.*

*I would like to thank again the Austrian Presidency of the EU for their initiative to organise an event like this. I would also like to congratulate the European Commission for the successful organisation, and to give a special mention to Mr Tortora and his team for their contribution in putting all this together. Major events like this conference are instrumental to enhance the efficiency of public policies towards empowering, stimulating and consolidating an innovation-driven space economy.*

*I thank you for your attention and for attending the EU Space for Business Conference and I look forward to hearing from the concrete developments of your invaluable contributions.*

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## Annex 1. Conference Programme

### DAY 1: 5 November 2018

**14:00**            **Registration and Welcome coffee / Press Conference**

**15:00**            **Welcome address**

- **Ingolf Schaedler**, BMVIT Deputy DG for Innovation
- **Barbara Eibinger-Miedl**, Styria State Councillor for Economics, Tourism, Europe, Science and Research

**15:30**            **Towards a Union Space Programme - Europe's ambitions for space**

**Moderator: Klaus Pseiner**, Managing Director, FFG Austrian Research Promotion Agency

- **Norbert Hofer**, Austrian Minister for Transport Innovation and Technology, Presidency of the EU Council
- **Elżbieta Bieńkowska**, Commissioner for Internal Market, Industry, Entrepreneurship and SMEs
- **Pedro Duque**, Spanish Minister for Science and Innovation, Chair of the ESA Council at Ministerial Level
- **Stéphane Israël**, EUROSPACE, CEO of ARIANESPACE

**17:00**            **Coffee Break**

**17:30**            **Return of Experience on New Space concrete achievements**

**Moderator: Jean-Jacques Tortora**, Director, European Space Policy Institute

- **Pascale Ehrenfreund**, Chair of the Executive Board, DLR
- **Hélène Huby**, Co-Founder, Global Space Ventures
- **Theresa Condor**, Executive Vice-President for Corporate Development, Spire
- **Lynn Zoenen**, Government Affairs Manager, i-Space

**19:00**            **Opening of social event, AT Presidency**

- Opening by **Mr Norbert Hofer**, Austrian Minister for Transport Innovation and Technology
- Welcome address by **Mr Siegfried Nagl**, Mayor of Graz

Concert by ensemble **“Die Steirische Streich”**

Followed by a walking dinner

## DAY 2: 6 November 2018

**08:00**            **Welcome Coffee**

**09:00**            **Welcome address**

- **Ingolf Schaedler**, BMVIT Deputy DG for Innovation

**09:05**            **Keynote address: Europe in the global space economy**

- **Pierre Delsaux**, Deputy Director-General, DG GROW, European Commission

**09:25**            **Keynote address: Perspective on Potential Emerging Space Businesses**

- **Jan Woerner**, Director General, ESA

**09:45**            **Fostering business development in a global context: the role of the public sector**

**Moderator: Jean-Jacques Tortora**, Director, European Space Policy Institute

- **Pierre Delsaux**, Deputy Director-General, DG GROW, European Commission
- **Jan Woerner**, Director General, ESA
- **Harald Gruber**, Head of Digital Infrastructure Projects, European Investment Bank
- **Marc Serres**, Director, Space Affairs, Ministry of the Economy, Luxembourg
- **Dan Isaac**, Senior Manager, ESOA

**11:15**            **Coffee Break**

**11:45**            **Keynote address: Perspectives for Space Traffic Management**

- **Kevin O'Connell**, Director of the Office of Space Commerce, US Department of Commerce

**12:15**            **Lunch Break**

**13:45**            **Stimulating investment for space: challenges and opportunities**

**Moderator: Jean-Jacques Tortora**, Director, European Space Policy Institute

- **Gilles Rabin**, Director of Innovation, Applications and Science, CNES
- **Josef Aschbacher**, Director, Earth Observation Programmes, ESA
- **Roger Havenith**, Deputy CEO, European Investment Fund
- **Geoff Sawyer**, Secretary General, EARSC
- **Philippe Brunet**, Director for Space Policy, Copernicus and Defence, DG GROW, European Commission

**15:00**            **Coffee Break**

**15:30            Criticality of European space infrastructure as space economy assets**

**Moderator: Jean-Jacques Tortora**, Director, European Space Policy Institute

- **Simonetta Di Pippo**, Director, UNOOSA
- **Christopher Cannizzaro**, Physical Science Officer, Office for Space and Advanced Technology, US Department of State
- **Matthias Petschke**, Director, EU Satellites Navigation Programmes, DG GROW, European Commission
- **Kai-Uwe Schrogl**, Chief Strategy Officer, European Space Agency
- **Carine Claeys**, Acting Special Envoy for Space, European External Action Service
- **Carlo Des Dorides**, Executive Director, GSA

**17:00            Closure**

- **Geneviève Fioraso**, Former French Minister, President of ESPI Advisory Council

## Annex 2. Speakers Biographies

### **Ingolf Schaedler, Deputy Director General for Innovation, Austrian Federal Ministry for Transport, Innovation and Technology**



Since March 2003, Ingolf Schaedler is serving as Deputy Director General for Innovation at the Austrian Ministry for Transport, Innovation and Technology (BMVIT). In this function he is responsible for the development and implementation of the Ministry's technology policy, its strategic technology programmes and the related R & D infrastructure. On the level of the European Union Ingolf Schaedler is representing Austria in various high level committees related to Research and Technology Policy, Satellite Navigation and Space Policy.

In 2012, Ingolf Schaedler chaired the World Congress on "Intelligent Transport Systems" (ITS) and since December 2010, Ingolf Schaedler serves as chairman of the governing board of the EU-Joint Programming Initiative "Urban Europe".

Ingolf Schaedler studied Economics at the University Vienna and International Law and Politics at Johns Hopkins University, Paul Nitze School of Advanced International Studies, Bologna, Italy.

### **Barbara Eibinger-Miedl, Minister for Economy, Tourism, Europe, Science and Research of the Federal State of Styria**



Barbara Eibinger-Miedl was Member of the municipal council of Seiersberg (2006-2010), Member of the Federal Council (2006-2010), Member of Parliament of the Federal State of Styria (2010-2017), and Chairwoman of the Styrian People's Party (2014-2017). She is the Minister for Economic affairs, Tourism, Europe, Science and Research of the Federal State of Styria since April 2017 and Member of the Committee of the Regions of the European Union since 2018. Mrs Eibinger-Miedl also was or still is the Deputy Regional Chairwoman of the Austrian Wirtschaftsbund (ÖWB), the Local Director of the Austrian Women's Movement (ÖFB) of Seiersberg (2004-2013), Deputy District Leader of the Austrian Women's Movement of the Graz County (2006-2010), Deputy District Chairwoman of the Austrian People's Party (ÖVP) of the Graz County since 2008, Deputy Leader of the Styrian Women of the Austrian People's (ÖVP) since 2015, and Vice-Chairwoman of the Austrian People's Party since 2017.

### **Siegfried Nagl, Mayor of the City of Graz**



Since 2003, Siegfried Nagl is the Mayor of the Provincial Capital of Graz. Since March 1998, Siegfried Nagl is responsible within the Graz City administration for finance, properties, culture and agriculture. Since January 2000 he is the Chairman of the Graz branch of the Österreichische Volkspartei (Austrian Conservative Party) and since 2002 Chairman of the Kommunalpolitische Vereinigung Österreichs (Austrian Local Politics Association). He was the Deputy Chairman of the Österreichischer Wirtschaftsbund (Austrian SME Union - Styrian Branch) in 1997 and Deputy Chairman of the Österreichischer Wirtschaftsbund (Austrian SME Union – Graz branch) in 1997.

Siegfried Nagl graduated from the Handelsakademie Graz and has an M.A. in Social Sciences and Economics (Business Management).

### **Klaus Pseiner, Managing Director of the Austrian Research Promotio Agency (FGG)**



Klaus Pseiner earned his PhD in biology (ecology) at Vienna University. After working for two years as a student assistant at the University of Natural Resources and Applied Life Sciences, Klaus Pseiner accepted a position at Dornier GmbH. Afterwards he was project manager at Österreichische Raumfahrt- und Systemtechnik GmbH and became senior adviser of the strategic technology planning at ESA/ESTEC in 1989. In 1998, he was appointed managing director of the Austrian Space Agency (ASA). Since 2004 Klaus Pseiner is Managing Director of the Austrian Research Promotion Agency FFG.

### **Norbert Hofer, Minister of Transport, Innovation and Technology**



Norbert Hofer is Minister of Transport, Innovation and Technology since 2017. Norbert Hofer was born on 2nd March 1971 at Vorau in Styria and grew up at Pinkafeld in Burgenland. After taking his A-levels at the Higher Federal Technical Institute for Aeronautics in Eisenstadt he worked as a systems engineer for the Austrian airline “Lauda Air”. In 2003 his love of aviation revealed itself as a curse. In a paragliding accident he sustained severe backbone injuries and has since been suffering from incomplete paraplegia.

From 1996 to 2007 Hofer was Provincial Party Secretary of FPÖ Burgenland, since 2006 he has been Deputy Party Chairman. Between 1997 and 2007 he was a member of the Eisenstadt Municipal Council, from 1994 to 2006 he also was City Party Chairman of the FPÖ in Burgenland’s provincial capital – from 2004 to 2010 also as District Chairman. In 2000 Norbert Hofer moved on to the Freedom Party’s Secretariat in Burgenland of which he remained Director until 2006. After the election to the National Council in 2006 he became a Member of the National Council. In 2005 delegates first elected Norbert Hofer Deputy Party Chairman of the Austrian Freedom Party, a position he is still holding today. In November 2013 Hofer was elected 3rd President of the National Council. In 2016 he was the Freedom Party’s candidate in the elections for the Federal President. He made it into the run-off which he narrowly lost to Alexander Van der Bellen.

### **Elżbieta Bieńkowska, Commissioner for Internal Market, Industry, Entrepreneurship and SMEs**



Since 2014 Elżbieta Bieńkowska is the EU Commissioner for Internal Market, Industry, Entrepreneurship and SMEs in the European Commission of Jean-Claude Juncker. Between 2007 and 2013 she was the Minister for Regional Development of Poland and from 2013 to 2014, the Deputy Prime Minister and the Minister of Regional Development and Infrastructure of Poland. As the Deputy Prime Minister and the Minister of Infrastructure and Development she was in charge of the strategic development system of the country, including the effective investment of the European funds.

Her work resulted in the full absorption of the EU funds from the budget for 2004-2006 and the successful distribution of almost EUR 68 billion granted to Poland for the years 2007-2013. She was managing the process of the preparation of the efficient EU funds implementation system from the EU budget for the years 2014-2020. Apart from the European funds her tasks in the Polish Government included also the management of transport infrastructure (roads, railway, air traffic and ship transport) and issues related to construction and housing. Before from 1999 to 2007 she was working for the local government of the Silesia Region in Southern Poland.

## **Pedro Duque, Spanish Minister for Science and Innovation**



Pedro Duque is a Spanish Astronaut and was Head of Programme Support Unit at the Human Spaceflight Operations Centre. Between 2012 and 2014, he was Director and Member of the Board at AENA Aeropuertos. Between 2011 and 2014, he was Astronaut and Head of the Flight Operations Office at ESA in Germany. Between 2006 and 2011 he was successively Managing Director then Executive President at Deimos Imaging. Between 2004 and 2006, he was Operations Director at the ESA Centre. Between 1992 and 2004 he was a full-time Astronaut. Between 1986 and 1992, he was Member of the Orbit determination team and developer of O.D. software at GMV S.A.

Pedro Duque graduated in Aircraft and Spacecraft Design at the Polytechnic University of Madrid and holds honorary doctorates from the Polytechnic University of Valencia, the European University of Madrid, the National University for Distance Learning, and Almeria University. He was rewarded the Order of Friendship by Russian president Boris Yeltsin in 1995, the Great Cross of Aeronautical Merit by the King of Spain in 1999, and the Principe de Asturias prize for International cooperation in 1999 along with three other astronauts.

## **Stéphane Israël, Chief Executive Officer, Arianespace, Executive Vice President, ArianeGroup**



Stéphane Israël is the Chief Executive Officer of Arianespace SAS, the world's reference launch services company. He also is Executive Vice President of ArianeGroup, in charge of Civil Launcher Programs – which gives him industrial responsibility for the Ariane 5 and Ariane 6 programs. In addition, he is Chairman and Chief Executive Officer of Starsem, the Euro-Russian company in charge of the commercial operation of the Soyuz launcher at the Baikonur Cosmodrome. Stéphane Israël has high-level professional experience in both public economics and the aerospace industry. He holds degrees from the Ecole Normale Supérieure and the Ecole Nationale d'Administration (ENA). He was named a judge in the French Court of Auditors in 2001, where he participated primarily in missions concerning French space policy and the Ariane launch system. He joined Airbus Group in 2007, first as advisor to the CEO, then in various operational management positions in the group's space division.

From May 2012 to April 2013, he was chief of staff in the cabinet of the French Minister for Productive Recovery, Ministry of Industry, Digital Economy, SMEs and Innovation. Stéphane Israël was named Chairman and Chief Executive Officer of Arianespace in April 2013. With the evolution of Arianespace's governance in April 2017, he became Arianespace SAS CEO and a member of the Executive Committee of its ArianeGroup parent company. Stéphane Israël is a member of the Board of Directors of Carrefour (Chairman of the audit committee) and Ecole normale supérieure.

### **Jean Jacques Tortora, Director, ESPI**



Jean Jacques Tortora is the Director of the European Space Policy Institute (ESPI), in Vienna, Austria. He served as the Secretary General of ASD-Eurospace from 2007 to 2016. He was the Head of the French Space Agency (CNES) office in North America and Attaché for Space and Aeronautics at the Embassy of France in Washington, D.C. from 2004 to 2007 and served as Deputy Director for Strategy and Programs responsible for the Industrial Strategy of CNES from 2001 to 2004. He advised the French Ministry of Research for Industrial Policy Funds management aiming at competitiveness support and new space applications and services development and promotion.

Mr. Tortora was based in Kourou, French Guiana from 1990 to 1996 as Head of Arianespace Operations Quality Department where he led the Quality Management of the Ariane 4 launchers final integration and of the launch pad operations and maintenance. He supervised the industrialisation and the implementation of the associated control plans. He started his career in 1984 at the French military procurement agency, DGA, as a naval weapons integration and test engineer, expert in signal processing and warships acoustic discretion.

### **Pascale Ehrenfreund, Chair of the Executive Board, DLR**



Pascale Ehrenfreund is the Chair of the Executive Board of the German Aerospace Center (DLR). The German Aerospace Center is among the largest center for aerospace, energy and transportation research in Europe with more than 8200 employees at 40 institutes and 20 locations in Germany. Since three decades she contributed as Principal Investigator, Co-Investigator and Teamleader to ESA and NASA astronomy and planetary missions as well as experiments in low Earth orbit and on the International Space Station. Pascale Ehrenfreund is Research Professor of Space Policy and International Affairs at the Space Policy Institute/George Washington University in Washington DC, Chancellor of the International Space University ISU and incoming President of the International Astronautical Federation IAF. From 2013-2015 she was President of the Austrian Science Fund (FWF). Pascale Ehrenfreund holds a Master degree in Molecular Biology, a PhD in Astrophysics, and a Master degree in Management & Leadership. The asteroid "9826 Ehrenfreund 2114 T-3" bears her name.

### **Helene Huby, Co-Founder, Global Space Ventures/Space Strategy Advisor, Airbus**



Helene Huby is Co-Founder of Global Space Ventures and Space Strategy Advisor at Airbus. She served as Airbus Defence & Space Innovation Director and grew a portfolio of new businesses ranging from space data-based services to electrical-powered stratospheric drones. She catalysed the creation of the Airbus Innovation Centre in Silicon Valley and Airbus Ventures. She also managed a privately-funded small launcher project. Helene began her career at the French Ministry for Research and Higher Education as Deputy Head of Department for European Affairs. Following her passion for entrepreneurship, she joined faberNovel to contribute to the growth of the digital ecosystem through investing in start-ups both in France and Germany and leading digital projects for corporates.

Helene is Young Leader of the French American Foundation. She privately invests in tech early stage start-ups with a focus on France, Germany and the USA.

She graduated from Ecole Normale Supérieure rue d'Ulm with a MS in Economics, from Sciences-Po Paris and from Ecole Nationale d'Administration with a Master of Public Administration.

### **Theresa Condor, EVP Corporate Development, Spire Global, Inc.**



As part of the early team at Spire, Theresa focused on building the initial business case and then taking a lead role in business development, fundraising, and corporate partnerships. In addition to spearheading Spire's international expansion, she signed Spire's first international MOU, first LOI, and first million-dollar contract. Theresa now leads Spire's engagement on special projects related to space-as-a-service, satellite data licensing policy, and new markets. Theresa sits on the Board of Directors at Spire.

Prior to Spire, Theresa spent the past decade working in emerging markets. Most recently, Theresa managed the Latin America trade syndications desk for Citibank out of NY, working at the intersection of supply chain management, global trade, and development finance at the height of the financial crisis. She also lived in Bangladesh while working for a USAID private sector development and trade promotion project.

Theresa studied at Cornell University, The London School of Economics, and Columbia University School of International and Public Affairs (SIPA).

### **Lynn Zoenen, Government Affairs Manager, ispace**



As ispace Europe's Government Affairs Manager, Lynn is in charge of space law and policy, advocacy of lunar exploration and space resource utilisation as well as European research funding. As such, she is responsible for enhancing the company's relationship with governments, intergovernmental institutions and other institutional stakeholders.

Before joining ispace Europe, Lynn contributed as an economic advisor to the strategic orientation of the Chamber of Commerce of the Grand Duchy of Luxembourg, managed engagement with multiple economic and political stakeholders, and was responsible for international trade policy, national economic diversification policy and the elaboration of position papers on law drafts.

Lynn holds a Master's in International Political Economy from King's College and a Bachelor's in Business Administration and Communications. During her studies, she gained insights in areas including business development in analysis and reporting services, quality assurance in industrial development as well as international trade and investment promotion.

### **Jan Wörner, Director General, European Space Agency**



Jan Wörner was born in Kassel, Germany, in 1954. He studied civil engineering at the Technical University (TU) Berlin and TU Darmstadt, from where he graduated in 1985. In 1990 he returned to TU Darmstadt, where he was appointed as a professor of Civil Engineering and took over as Head of the Test and Research Institute. Jan Wörner headed the university from 1995 to 2007 and succeeded in making it the first autonomous university of the Federal Republic of Germany. From March 2007 to June 2015, he served as Chairman of the Executive Board of the German Aerospace Center (DLR). He became the ESA Director General on 1 July 2015.

Jan Wörner has received honorary doctorates from New York State University at Buffalo (USA), technical universities of Bucharest (Romania) and Mongolia, the Saint Petersburg University for Economics and Finance (Russia) and École Centrale de Lyon (France). He has received the Federal Cross of Merit (Officer's cross, 1st class) of the Federal Republic of Germany for his continuous efforts regarding the next generation of scientists and Germany as a location for Science, Technology and Engineering. He has furthermore been awarded the honours of Knight of the French Légion d'Honneur.

### **Pierre Delsaux, Deputy Director General, European Commission Directorate General for the Internal Market, Industry, Entrepreneurship and SME's**



Pierre Delsaux is Deputy Director General at the European Commission Directorate General for the Internal Market, Industry, Entrepreneurship and SME's. After studying Law at the University of Liège, he obtained his Master of Law at the Northwestern University, Chicago, in 1983. He was Legal Secretary at the European Court of Justice from 1984 to 1987. He worked in the private sector before joining the European Commission in 1991. He started his career within the European Commission in the Directorate General for Competition. He was appointed Director responsible for regulating the financial services in 2007. Following this, in 2011, he was appointed Deputy Director General with responsibilities for the Single Market in the EU. Since December 2015, he is in charge of Space Policy and Defence.

### **Harald Gruber, Head of Digital Infrastructure Division, Projects Directorate, EIB**



Harald Gruber is head of the Digital Infrastructure division at the Projects Directorate of the European Investment Bank based in Luxembourg. He oversees project appraisal in the ICT sectors and advises on the Bank's business strategy with respect to financing of broadband infrastructure, innovation policy and the knowledge economy in general.

He has published *The Economics of Mobile Telecommunications* at Cambridge University Press in 2005. He has co-authored articles in particular on the mobile telecommunications sector in scholarly refereed journals such as *Economic Policy*, *European Economic Review*, *Telecommunications Policy*, *Information Economics and Policy* and *International Journal of Industrial Organisation*.

He is on the editorial board of academic journals such as *Telecommunications Policy*, *Information Economics and Policy*, *Journal of Industrial and Business Economics*.

He has been also professor at Bocconi University (Milan) for telecommunications economics.

Harald Gruber holds a Ph.D. in Economics from the London School of Economics.

### **Marc Serres, CEO, Luxembourg Space Agency**



Dr. Marc Serres has been appointed CEO of the Luxembourg Space Agency in September 2018. He is the Head of the Luxembourg Delegation at the European Space Agency (ESA) and represents the country in the Council of ESA. He is also the vice-chairman of the ESA Council until June 2019. Before joining the Ministry of the Economy in 2013 as Head of Space Affairs, Mr Serres managed the relations with ESA at the Ministry of Higher Education and Research as industrial policy officer during 8 years. These functions as civil servant have been preceded by 5 years of experience in the satellite communications antenna manufacturing industry within the company HITEC Luxembourg S.A., first as Project Engineer and finally as Chief Engineer for satcom products development. He holds a PhD in optoelectronics and a Master in electrical engineering with specialty in microwave frequencies, both from the Université catholique de Louvain in Belgium. Marc Serres is a Luxembourg national.

### **Dan Isaac, Senior Manager, SES**



Dan Isaac is a Senior Manager at SES in charge of developing new markets within the Government and Institutions domain. His experience spans 20 years in the Space industry, starting in 1998 at ESA, working in the development of the Columbus module of the International Space Station; then moving to the first generation of the EGNOS ground segment and then to Galileo. Dan has led SES' participation in a significant number of European institutional initiatives, as a project manager and business development manager, including GovSatCom, where SES is creating the next generation of secure, high-performance end-to-end satellite communications services for European institutions.

### **Gilles Rabin, Director of Innovation, Science and Applications, French Space Agency**



Gilles Rabin is the Director of Innovation, Applications and Science by CNES. Born in 1961, Gilles Rabin is Doctor of Economics and a graduate of the Paris II Assas French Press Institute (IFP). In 2015-2016, he was space and innovation advisor to Thierry Mandon, the French Secretary of State for higher education and research. Prior to this, he was director of a private strategic consultancy for businesses and local authorities, after working as an associate researcher at Grenoble University's PACTE Territories Laboratory.

Gilles Rabin began his career in 1989, as director of the transport department and deputy director of the local development department at BIPE Conseil (a CDC subsidiary), where he acquired a wealth of expertise in transport matters and worked in land-use planning. In 1996, he became deputy director of Nancy urban planning agency, in charge of the city's economic development and the Nancy-Brabois technopole. Between 1999 and 2008, Gilles Rabin was CEO of Essonne development board, where he worked to promote businesses in collaboration with several university laboratories e.g. Génopole, Supélec, INT, Polytechnic, and signed a partnership with the MIT. He then went on to join Greater Lyon city council in 2008 where, as executive director for economic development and land policy, he dedicated himself to developing business and innovation and to projects that enhanced the attractiveness of the region. From 2012 to 2014, he was advisor to the French minister for the economy, productivity increase and digital affairs, with particular responsibility for decentralization, innovation, middle-market companies and business creation, plus the health and transport sectors.

## **Kevin O’Connell, Director, Office of Space Commerce, US Department of Commerce**



Kevin M. O’Connell is the Director of the Office of Space Commerce at the U.S. Department of Commerce. Within this position, Mr. O’Connell leads an office with responsibility as a space industry advocate within the Executive Branch of the U.S. government. Mr. O’Connell brings over 35 years of experience in the U.S. government, in research organizations, and as an entrepreneur and business leader to this position.

Mr. O’Connell has researched and written extensively on the policy, security, and global market issues related to commercialization of remote sensing. Aside from numerous articles and op-eds, he was co-author of *Commercial Observation Satellites: at the Leading Edge of Global Transparency* (2000). He served as the Executive Secretary and Staff Director of the NIMA Commission (1999-2000). He was a member, and later Chair, of NOAA’s federal advisory committee on remote sensing from 2002-2016.

Previously, Mr. O’Connell served as the CEO of Innovative Analytics and Training, a Washington, D.C. professional services firm focused on analysis and decision support for U.S. government and commercial clients. Among other issues, the firm focused on market trends and anticipatory/futures analysis for high-technology industries such as cyber, cloud computing, and geospatial technologies. During this time, he also served as a senior consultant to the Office of the Director of National Intelligence and as an independent advisor to the Director, National Geospatial Intelligence Agency.

Mr. O’Connell’s background also includes extensive experience in national security and intelligence matters, including assignments in the Department of Defense, Department of State, National Security Council, and the Office of the Vice President. He spent a decade conducting and managing research in these areas at the RAND Corporation, including as the first director of RAND’s Intelligence Policy Center.

Finally, Mr. O’Connell has taught a long-running course on comparative intelligence in Georgetown University’s School of Foreign Service, Security Studies Program.

## **Josef Aschbacher, Earth Observation Programmes, European Space Agency**



Josef Aschbacher is the ESA Director of Earth Observation Programmes and Head of ESRIN, ESA’s centre for Earth Observation, located in Frascati (near Rome), Italy. Born in Austria, he studied at the University of Innsbruck, graduating with a Master and a Doctoral Degree in Natural Sciences.

His professional career in ESA began in 1990 as a Young Graduate at ESA ESRIN. From 1991-93 he was seconded as ESA Representative to Southeast Asia to the Asian Institute of Technology in Bangkok, Thailand. From 1994 - 2001 he worked at the European Commission Joint Research Centre in Ispra, Italy, where he was the Scientific Assistant to the Director of the Space Applications Institute. He returned to ESA HQ (Paris) in 2001 as Programme Coordinator where he was primarily responsible for advancing Copernicus activities within ESA. In 2006 he was nominated Head of the Copernicus Space Office, where he led all activities for Copernicus within the Agency and with external partners, in particular the European Commission. In 2014, he was promoted to Head of Programme Planning and Coordination at ESRIN, where he was responsible for planning ESA’s Earth Observation programmes and for formulating and implementing programmatic and strategic decisions across the Directorate. He took up duty as Director of Earth Observation Programmes on 1 July 2016.

## **Roger Havenith, Deputy Chief Executive, European Investment Fund (EIF)**



Roger Havenith is Deputy Chief Executive of the EIF since 1 January 2016. The Chief Executive and the Deputy Chief Executive form the executive management of the EIF responsible for the EIF's strategy and its day-to-day management. They jointly submit requests for approval to the EIF Board of Directors. In his role as Deputy Chief Executive, Roger is supervising the risk management, compliance, financial control and middle/back-office services of EIF, ensuring the smooth running of processes that enable EIF to carry out its business. He acts as main senior counterpart for the EU institutions, notably European Commission, Parliament and Court of Auditors. In this function, he also represents EIF in the discussions with EIB and EC on the next EU Multi-Annual Financial Framework and in the preparation of the next generation of financial instruments addressing EU policy priorities.

Previously, he was heading the EC's DG ECFIN Unit L2 on financing of innovation, competitiveness and employment policies for more than five years. His long standing professional career with the EC – which he joined in 1990 – includes several key roles: among others, he was a Commission negotiator and member of the EC team in charge of the European Fund for Strategic Investments (EFSI) SME Window, as part of the Investment Plan for Europe. For several years he also led the EC's Designated Service responsible for the negotiation, implementation and oversight of financial instruments under CIP, EPMF, MAP and other initiatives.

Roger Havenith has a B.A. in Business Administration from HEC St. Louis in Brussels (Belgium) and LL.M. in International and Comparative Law from Vrije Universiteit Brussel. He also earned a postgraduate degree in European Studies from Institut d'Etudes européennes de l'Université Libre de Bruxelles and M.A. from Licencié-Interprète, Institut supérieur de Traducteurs et Interprètes.

## **Geoff Sawyer, Secretary General, EARSC**



Geoff has been the Secretary General of EARSC since 2011 and has driven the development of the Association into the widely known and well-regarded organisation it is today. During his long and varied career, Geoff has held senior management positions in the space industry with Astrium / EADS / Airbus as well as numerous representative positions in the UK and Europe. He was previously a director of EARSC for 12 years during which he was chairman for 6 years from 1991 to 1997. He has served on many EU consultative bodies such as Spassec (for space and security) and the SecAG (Security Advisory Group) and in industry representative groups for example the chairman of the ASD security research committee. In addition to his extensive industrial experience, Geoff spent 3 years working for the European Commission where he was responsible for supporting space policy and, in particular, the creation of the GMES initiative. Geoff is very well known to many in the space and earth observation sectors and brings this deep wealth of experience and knowledge to support the ambitions of the geo-information industry that EARSC represents.

### **Philippe Brunet, Director for Space Policy and Research, Copernicus Programme and Defense**



Doctor in Medicine (MD) and Juris Doctor in Community Law (LLD), he entered the Commission in 1988 (DG V - Social Affairs). He joined the DG III (Industry) in 1993 in order to prepare the establishment of the EMEA (European Medicines Evaluation Agency, now the EMA) and complete the legal framework of the EU authorisation scheme for medicinal products. Philippe Brunet was appointed deputy Head of Unit "Pharmaceuticals and Cosmetics Unit" in 1998, and subsequently Head of the Unit "Pharmaceuticals, legislative framework and market authorisations" in April 2000. In October 2007 he was appointed Head of Cabinet by Commissioner Kyprianou. The Commission appointed on 19th December 2012 him as Director in DG Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (GROW) for Directorate "Aerospace, Maritime and Defence Industries" as of January 2013. Mr Brunet main institutional files comprise, inter alia, the implementation of COPERNICUS, a constellation of EU-satellites offering Earth Observation services on a full, open and free of charge basis, and the development of civil and military synergies in security and defence matters to render the defence industry competitive and underpin a credible and effective Common Security and Defence Policy. Since 2016, his directorate has in charge the design and development of the new European defence fund. Philippe Brunet has two sons. He has been knighted in the French Order of the Legion of Honour in 2011.

### **Simonetta di Pippo, Director, United Nations Office for Outer Space Affairs**



UNOOSA is mandated to enhance international cooperation in space activities to promote their use for humanity. Prior to joining UNOOSA in 2014, she was Head of the European Space Policy Observatory at Agenzia Spaziale Italiana (ASI) in Brussels. Ms. Di Pippo also served as Director of Human Spaceflight of the European Space Agency from 2008 to 2011, and Director of the Observation of the Universe at ASI from 2002 to 2008, where she started her career in 1986. She has been an Academician of the International Academy of Astronautics (IAA) since 2013, and since 2016 a member of the IAA Board of Trustees. Ms. Di Pippo is also a member of the World Economic Forum Global Future Council on space technology for 2016-18. Ms Di Pippo holds a Master's Degree in Astrophysics and Space Physics from University "La Sapienza" in Rome, an Honoris Causa Degree in Environmental Studies from St. John University, and an Honoris Causa Degree of Doctor in International Affairs from John Cabot University. Ms. Di Pippo was knighted by the President of the Italian Republic in 2006. In 2008, the International Astronomical Union named asteroid 21887 "Dipippo" in honour of her contribution to space activities.

**Christopher Cannizzaro, Physical Science Officer, Office of Space and Advanced Technology, U.S. Department of State**



Mr. Cannizzaro is a physical science / foreign affairs officer in the State Department's Office of Space and Advanced Technology. In this capacity, he develops policy and technical analysis on a wide range of issues pertaining to space, science and emerging/enabling technologies. He represents the Department on several National Science and Technology Council Subcommittees and Task Forces, and he regularly speaks on behalf of the United States in a variety of bilateral and multilateral venues. Mr. Cannizzaro joined the Department of State in 2008 as a AAAS Science and Technology Policy Fellow. Prior to that, he was a research professor at Tufts University, a postdoctoral associate at MIT, and a Fulbright Scholar at the University of Milan. He has a Ph.D. in Chemical Engineering from the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland.

**Matthias Petschke, Director, EU Satellite Navigation Programmes, European Commission**



Matthias Petschke is Director of the EU Satellite Navigation Programmes at the European Commission, Directorate General GROW, Brussels.

A lawyer by training, he joined the EU Commission services in 1995, and has since been involved in a variety of EU policies: Trade policy and negotiation, in different positions at DG TRADE (from 1997 to 2003); Internal Market policy and legislation, notably as Head of Unit for Public Procurement policy at DG MARKT (from 2004 – 2008).

He was Head of the European Commission's Representation in Germany before taking up his current Space policy assignment in 2013, as Programme Manager for the EU Satellite Navigation Programmes, Galileo and EGNOS.

**Kai-Uwe Schrogl, Chief Strategy Officer, European Space Agency**



Prof. Dr. Kai-Uwe Schrogl is the Chief Strategy Officer of the European Space Agency (ESA, Headquarters in Paris, France). From 2007 to 2011 he was the Director of the European Space Policy Institute (ESPI) in Vienna, Austria, the leading European think tank for space policy. Prior to this, he was the Head of the Corporate Development and External Relations Department in the German Aerospace Center (DLR) in Cologne, Germany. Previously he also worked with the German Ministry for Post and Telecommunications and the German Space Agency (DARA) in Bonn, Germany.

He has been a delegate to numerous international forums and has served from 2014 to 2016 as chairman of the Legal Subcommittee of the UNCOPUOS. He also was chairman of various European and global committees (ESA International Relations Committee and two plenary working groups of the UNCOPUOS Legal Subcommittee, the one on the launching State and the other on the registration practice, both leading to UN General Assembly Resolutions). He presented, respectively testified, at hearings of the European Parliament and the U.S. House of Representatives.

Kai-Uwe Schrogl is the President of the International Institute of Space Law. He holds a doctorate degree in political science and lectures international relations as an Honorary Professor at Tübingen University, Germany.

### **Carine Claeys, Head of Space Task Office, European External Action Service**



Carine Claeys is presently acting EEAS Special Envoy for Space and still Head of the EEAS Space Task Force, set up in 2015. In that capacity, she advises the EEAS Secretary General on all space matters of EU interest and she chairs the Board of the EU Satellite Centre and the ad-hoc GNSS security experts group advising the EU Political and Security Committee in the framework of the Council's and High Representative's responsibilities to respond to possible threats linked to the European Global Navigation Satellite System (Galileo/Egnos).

From 2011 to 2015 she was responsible of the corporate processes coordination in the newly set-up EEAs.

Before the EEAS was established, Carine Claeys served in the General Secretariat of the Council of the European Union. She was head of the "Security of space tools" cell in the EU Situation Centre from 2005 to 2011. She was responsible of maritime transports and of transport intermodal questions and networks in DG Transports of the General Secretariat of the Council from 2000 to 2005, after having worked in several other sectors of this administration from 1992 on (mainly energy, human rights, United Nations, drugs, terrorism, agriculture and enlargement).

Carine Claeys holds a PhD in political sciences, a Master degree in business engineering, a Master degree in international relations and another one in development cooperation.

### **Carlo des Dorides, Executive Director, European GNSS Agency**



Carlo des Dorides is the Executive Director of the European GNSS Agency (GSA). In his role prior to Executive Director of the GSA, he held a management role at the European Commission, and was responsible for the definition of the Galileo/EGNOS exploitation phases.

Previously, he led the Concession Department at the European GNSS Supervisory Authority, and served as Chief Negotiator of the Galileo Public-Private-Partnership/Concession contract at the Galileo Joint Undertaking. This in-depth understanding of Galileo and EGNOS, as well as a career in management, helped him excel in his first term as Executive Director.

After obtaining a degree in engineering from the University of Rome, he went on to achieve an M.B.A. from CUOA, Vicenza, Italy, and obtained additional education at the International Space University in Toulouse, France. From there, he worked in management in the aerospace sector, including a position as Head of Advanced Telecommunication Programmes and Programme Manager for major satellite telecommunication projects at Alenia Spazio. Later, he served as Director of Programmes and Engineering at ENAV, the Italian air navigation service provider.

## Genevieve Fioraso, Chair of ESPI Advisory Council



From 1979 to 1986, she was collaborator of Hubert Dubedout, Mayor of Grenoble and member of the French Parliament, in charge of press, documentation and Parliament relations. In 1989, she joined the private sector, as a member of the management board of CORYS, a spin-off from the CEA (French Nuclear Energy Commission), specialized in the design of simulators for training operators in normal and accidental situations in nuclear and thermal power-plants in France and abroad (Eastern Europe, US, India, China, Indonesia, Pakistan, Spain...) as well as train and tram drivers : in charge of Corus institutional relations and European R and T projects (Taxis, Phare and Eurêka programmes). From 1995 to 1999, she was director of cabinet of the Mayor of Grenoble. In 1999, she supported the creation and general management of the Rhône-Alpes Agency for the diffusion of digital in regional SMEs. In 2001 and until 2012, she was elected deputy mayor and 1st vice-president of the metropolitan area of Grenoble, in charge of economic development, innovation, university and research. She was part time marketing counsellor for France Telecom (now Orange) in the field of health and social care. From 2003 to 2012, she was CEO of a new semi private-public company, Minatec enterprises, welcoming within an innovative technological pole start-ups and cooperative projects between public and private research in the field of micro, nano and biotechnologies.

She was elected as a member of the French Parliament in 2012, member of the Parliament Office in charge of evaluating public choices in the field of science and technology (OPECST). From 2012 to 2015, she was French Minister of University and Research, also in charge of space and much committed for the European decision for Ariane 6. Between 2015 and 2017, she was member of the French Parliament, supporting the Commission of defence and Parliament group for space. She published a report for the French Prime Minister in July 2016 entitled "Open space, an answer to the challenges of the space sector". Since 2017 she is Chair of ESPI (European Space Policy Institute) advisory board, Vienna, member of several scientific foundation boards in Paris, Marseille, Grenoble in the field of space, health and scientific diffusion.

### **Mission Statement of ESPI**

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities. In this context, ESPI acts as an independent platform for developing positions and strategies.