

**GABRIEL/1335 – meeting with [REDACTED] at  
AIRBUS technoday**

**Scene setter**

AIRBUS invited you as the future Commissioner for Innovation to give a **welcome speech** at their technoday conference, titled “Airbus innovating for a sustainable future”, subject of briefing GABRIEL/1336.

You will have a **bilateral exchange with** [REDACTED]

Airbus expects you to discuss the following:

- **Industrial policy and strategic value chains:** aerospace shall be flagged and valorized as a strategic sector.

Airbus's view:

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- **Aviation partnerships:** Exchange on the expectations and the content

Airbus's view:

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- **Digital initiatives**
- **Space partnership:** exchange on the expectations and the content

Airbus's view:

- **Budget for Horizon Europe and partnerships:**

Airbus's view:

- **Synergies:**

Airbus's view:



Given the broad scope, several General Directorates were asked to contribute, with positive replies from GROW (both space and defense) and MOVE. A late RTD contribution has been incorporated after deadline.

### **The aviation context**

Aviation is responsible for more than 2% of the CO2 emissions and more than 3% of the greenhouse gases human-made globally. While air traffic increases 4.5% per year, aviation emissions increase more than 3% per year. This is not consistent with the agreed international objectives of the Paris Agreement.

The path to climate neutrality in 2050 is not obvious in aviation. Solutions elsewhere – such as new fuels, fuel cells and batteries – cannot be directly transferred. In order to ensure safety and efficiency, any potential solution requires in-depth research, tests and certification before adoption in aviation.

In order to improve environmental performance, research and innovation should:

- Accelerate development and deployment of more efficient aeronautics technologies in existing aircraft configurations.
- Start ambitious projects to mature and adopt disruptive technologies – e.g. electrification, digitalisation – and advanced aircraft configurations.

No single country or company in Europe has the financial, technological and human resources to put aviation on the path to climate neutrality.

Airbus leads the public-private partnership CleanSky2 together with other EU aeronautical industries (with EUR 1.755 billion from Horizon 2020). It builds upon its predecessor CleanSky, started in 2008 (with EUR 800 million from FP7).

Most CleanSky/2 research results have not been taken up in aircraft development yet, so their actual environmental impact is limited.

Guillaume Faury, Airbus CEO, has stated: “decarbonising air transport is an exceptional opportunity for Airbus” (Les Échos, 17/09/2019)

Horizon Europe envisages a potential Clean Aviation Partnership for boosting the environmental performance of aviation while ensuring safety. An impact assessment is on-going.

In reply to the impact assessment public consultation, Airbus has confirmed preference to focus more on the development and effective deployment of technology and to use synergies with other programmes.

**Objective**

- Obtain Airbus CEO's commitment to co-lead a potential Clean Aviation Partnership more impactful, disruptive and inclusive towards climate neutrality in 2050.

### Line to take

- Assure that space and aerospace sector are of strategic importance for the overall long-term competitiveness of European industry, including in the recently identified 31 industrial value chains of strategic importance, two of which, the Energy efficient and smart aeronautics and the Space-launchers are directly linked to these sectors.
- Welcome the commitment, steering and vision of Airbus, notably on air taxis and urban air mobility, as well as the commitment for a Clean Aviation **Partnership** towards climate neutrality in 2050 with tangible outputs taken up in Airbus products.
- Underline your support to strong research partnerships in the aeronautics & space sectors, which is already an indication by the Commission to the importance of the sector and the willingness to prioritise investments.
- Underline your expectations for such a Partnership to be much more ambitious and impactful than its predecessors and to engage more disruptive technologies and actors from other sectors, as well to increase the level of commitments and contributions from partners, and clearly demonstrate how the partnerships will deliver on our Union priorities, in particular the Green Deal.
- Recall the new co-creation culture across the Commission and with all stakeholders on defining R&I priorities. This includes cooperation across Horizon Europe clusters, including in the areas of digital manufacturing, hydrogen, batteries and big data. Welcome to discover the Strategic Research Agenda being prepared for a clean aviation.
- Remind that safety should remain the first priority and the European Union Aviation Safety Agency (EASA) should be involved to prepare properly certification in time.
- Share your views on taxes and recall of other measures such as R&I (as in your speech)
- In Cluster 5 of Horizon Europe, 11 partnerships –including 2 on aeronautics- will compete for 6 billion EUR. The proposed Green Deal will also require greater R&I efforts to address energy efficiency across Horizon Europe, and will therefore support priorities for clean aviation, in activities earmarked as those of the partnerships or not, within the mobility cluster or outside.
- Remind that the European Defence Fund has been proposed with 13 billions and is a new programme to bring fresh investments to the sector, to the benefit of space and aeronautics as well.
- Show your understanding for flexible rules for participation in PPP and recall that there are also constraints or requirement set by the European legislators on the use of public funds to the European taxpayer.
- Remind that the Multiannual Financial Framework is still under discussion, which includes notably the budget of Horizon Europe and of the European Defence Fund.
- Mention the launch of a European Drone Investment - Advisory Platform by the EIB to facilitate the financing of emerging technologies, as an additional source of investments.
- Stress the synergies with digital R&I as capacity building to develop favourable ecosystems.

- Emphasise the importance to support SMEs in their digitisation across strategic value chains. In this respect, promote the proposed Digital Europe Programme to support digital capacity building and digital innovation hubs across the EU, to help SME to participate in such digitalised value chains.
- Solicit the aeronautics sector to reflect on digital industrial platforms to provide a business-to-business competitive edge in supply chains and customer relations.
- Highlight the challenges of “greening” transport, and how space and the European Defence Fund can build synergies with Horizon Europe under your leadership.

**Defensive points**

***Is the Commission considering merging the SESAR and CleanSky Joint Undertakings?***

We do not envisage merging the two initiatives. Their objectives and approaches are different, underlining a distinction between infrastructure/services (SESAR/ATM) and vehicles (CleanSky).

While being both indispensable to the future aviation value chain, the ATM partnership will focus on digital transformation and Clean Aviation on energy transition and decarbonisation.

The common subsets of activities are minimal, compared to the full scope and interests of their partnerships.

Nevertheless, the two initiatives will have to work closely exploiting synergies and complementarities but keeping the implementing structures independent.

We will have to review the current coordination mechanisms, which should exercise policy steering and oversight avoiding overlapping or conflicting activities and double funding.

**Contacts:** [REDACTED] (DG MOVE.E3), tel.: [REDACTED]

***What are the provisions of the European Defence Fund (EDF) concerning export of results and IPR generated in an action supported by the Fund?***

IPR and results resulting from **development actions** supported by EDF will not be owned by the Union. The recipients generating the result of **research actions** will own them, even with an EDF funding rate up to 100% of the eligible costs.

The EDF will not affect the transfer within the Union nor the export of products, equipment or technologies.

As concerns subsidiaries of third country companies established in the EU, IPR and results of actions supported by the EDF can be exported to a third country with the authorisation of the Member State in which the undertaking is established.

The Commission shall be notified ex ante of any transfer of ownership of results to third-country entities. In case this contravenes the security and defence interests of the Union and its Member States or the objectives of the Fund, the funding provided by the EDF shall be reimbursed.

Eligibility for EDF impose that the IPR and results cannot be subject to control or restriction by a third country.

Contact(s): [REDACTED] (DG GROW), tel.: [REDACTED]  
[REDACTED] (DG GROW), tel: [REDACTED]

***Will space R&I have a dedicated budget under Horizon Europe?***

In the Commission proposal, Cluster 4 Digital, industry and **space** share a common budget of EUR 15 billion. Budget discussions are pending the MFF negotiations.

While a Co-Programmed Partnership may have an earmarked budget over the seven years, the overall amount of funding spent on all Partnerships cannot exceed 40% of the overall budget at Horizon Europe Pillar II level (could be higher for Cluster 4).

The budget for the different Topics under normal Collaborative Research will be discussed in the frame of the strategic planning i.e. with a 2 to 3 years perspective so as to keep flexibility and foster synergies.

***Is space and aerospace considered strategic areas by the Commission, in the context of industrial policy for strategic value chains?***

The Commission considers space and aerospace sector to be of strategic importance for the overall long-term competitiveness of European industry.

A Commission expert group, the Strategic Forum for Important Projects of Common European Interest has recently identified 31 industrial value chains of strategic importance, two of which, the **Energy efficient and smart aeronautics and the Space-launchers** are directly linked to these sectors.

As there are already ongoing EU industrial initiatives in these areas, these value chains however were not prioritised for future coordinated actions.

Contact(s): [REDACTED] (DG GROW), tel.: [REDACTED]  
[REDACTED] tel.: [REDACTED]



## **Background notes**

### Aviation overview

Nowadays aviation is:

- The safest and fastest mode of transport.
- The only one suitable for rapidly covering mid- and long-range distances.
- A highly competitive industrial sector, contributing directly to the EU economy around EUR 200 billion per year (75 % through exports).

Challenges ahead include:

- Environment - without transformative solutions, aviation's CO2 emissions could more than double by 2050, compared to 2020.
- Competitiveness - new actors from China (COMAC), and partly, Russia (UAC) are developing aircraft to challenge the current duopoly (Airbus - Boeing).
- Safety - changes in aircraft require timely and thorough certification by authorities, as sadly reminded by the accidents of Boeing 737 Max.

### Aircraft development, certification and EASA

Costs of development of new large aircraft can exceed EUR 10 billion. If a design issue is detected at a late stage, safety can be compromised and the development costs can increase by 10%. The cycle research-design-build-test-redesign drives up costs and time.

Certification is the gateway from research & development to market uptake, as a compulsory guarantee of safety and environmental compliance. The cost, time and uncertainty related to certification are important factors in preparing new products and services. It can take more than 5 years from preparation to completion of certification tests for large aircraft.

The European Union Aviation Safety Agency (EASA) is in charge of certification in Europe, including for products stemming from technologies developed in EU research & innovation programmes. The sooner and closer involvement in research, the sooner and better preparation of certification.

### Clean Sky 2 Public-Private-Partnership and Airbus

Clean Sky was created in part to permit more mature industrial technology development and demonstration activities – as a public-private partnership between the European Union and the aeronautics industry. Clean Sky has accelerated the European aeronautics industrial roadmaps. It is expected to have a positive economic impact once demonstrators' technologies are applied in products on the market.

Clean Sky 1, under the FP7, had a value of EUR 1.6 billion. The EU paid 50% in cash and industry the other 50% in kind. Clean Sky 1 aimed at demonstrating and validating technologies for halving CO2 and external noise, and for reducing NOx emissions by 80%, along with a green product lifecycle.

Clean Sky 2 has a budget of EUR 4 billion. The EU contributes EUR 1.755 billion and industry EUR 2.2 billion. The aim of Clean Sky 2 is to integrate, demonstrate and validate technologies capable of further reducing CO<sub>2</sub> and NO<sub>x</sub> emissions by 20-30%, and noise emissions levels by up to 5dB. It also aims at maintaining the global industrial competitiveness of European aeronautics.

Clean Sky 2 retains a membership structure of three tiers, headed by 12 pre-defined Leaders receiving 40% of funds (including 3 different Airbus entities - for large commercial aircraft, for helicopters and for regional aircraft, respectively).

Airbus has successfully led and flight-tested two of six demonstrators in Clean Sky 2:

- BLADE as Large Passenger Aircraft prototype with laminar-flow wing, to reduce fuel consumption and CO<sub>2</sub> emissions by 5%.
- RACER helicopter to fly faster and further with 15% less fuel consumption.

Since early 2019 the Executive Director of Clean Sky 2 JU is Axel Krein, previous Senior Vice-President for Research and Technology at Airbus.

#### Horizon Europe Budget and Synergies

The European Commission proposed the new Horizon Europe programme for the 2021-2027 period, with a total budget of EUR 100 billion (in 2018 prices). This corresponds to a 50% budgetary increase compared to Horizon 2020.

In order to maximise impact, Horizon Europe parts must be coherent and work in synergy with each other and with other Union funding programmes. Synergies will be based on alignment of priorities, funding options and rules at different stages of the research and innovation cycle.

For deployment of aviation research, synergies can be set with Connecting Europe Facility (e.g. new fuels/electric infrastructure at airports), European Regional Development Fund (already initiated in Clean Sky 2), InvestEU Fund, LIFE - Programme for Environment and Climate Action, Innovation Fund, European Space Programme, Defence Fund and Digital Europe Programme.

Budget and synergies – together with international cooperation - remain the main areas of Horizon Europe open for negotiations with the Parliament and the Council. Further negotiations on Horizon Europe depend on the results of the multi-financial framework agreement (MFF). The Commission has proposed the MFF based on 1,11 % of the EU GDP, the Parliament based on 1,3% of the EU GDP, the Finnish Presidency has proposed a range from 1,03% to 1,08 %.

In the MFF discussions, the key states supporting Airbus (France, Germany and Spain) are supportive of Horizon Europe and climate-change priorities.

List of Annexes

- Annex 1 – Interview Airbus CEO, Les Échos (17/09/2019)
- Annex 2 - Airbus' reply to Public Consultation on European Partnerships (31/10/2019)
- Annex 3 – Horizon Europe Negotiations – State of Play (11/11/2019)

**Contact:** [REDACTED] (DG RTD.D3) tel.: [REDACTED]

## Impact of aviation on climate<sup>1</sup>

In 2016, aviation was accountable for 3.6% of the total EU28 greenhouse gas emissions and for 13.4% of the emissions from transport. As emissions from non-transport sources decline, the emissions from aviation become increasingly significant. European aviation represented 20% of global aviation's CO<sub>2</sub> emissions in 2015.

Significant resources are being invested at both the European and Member State level, as well as by industry, to improve aviation efficiency through various measures (technology, operations, airports, market-based measures). Their combined effect has however not kept pace with the recent strong growth in the demand for air travel, thereby leading to an overall increase in the environmental impact (CO<sub>2</sub> emissions increased by 16% between 2005 and 2017 despite a gain in efficiency of 24% fuel burn on the same period). Emissions reductions are more difficult to achieve in aviation than in other sectors due to the relatively long lifespan of aircraft (25 years or more).

EAER DASHBOARD<sup>2</sup>

	Indicator	Units	2017	% change since 2014	% change since 2005
Traffic	Passenger kilometres flown by commercial flights <sup>(1)</sup>	billion	1,643	+20%	+60%
	Number of city pairs served most weeks by scheduled flights <sup>(1)</sup>		8,603	+11%	+43%
Emissions	Full-flight CO <sub>2</sub> emissions <sup>(1)</sup>	million tonnes	163	+10%	+16%
	Full-flight 'net' CO <sub>2</sub> emissions with ETS reductions <sup>(1)</sup>	million tonnes	136	+3%	n/a <sup>(4)</sup>
	Full-flight NO <sub>x</sub> emissions <sup>(1)</sup>	thousand tonnes	839	+12%	+25%
	Average fuel consumption of commercial flights <sup>(1)</sup>	litres fuel per 100 passenger kilometres	3.4	-8%	-24%

(1) All departures from EU28+EFTA

(2) 47 major European airports

(3) All departures and arrivals in EU28+EFTA

(4) ETS not applicable to aviation in 2005

## Policy options to reduce aviation impact on climate

Different policies options are used to address the effect of aviation on climate change:

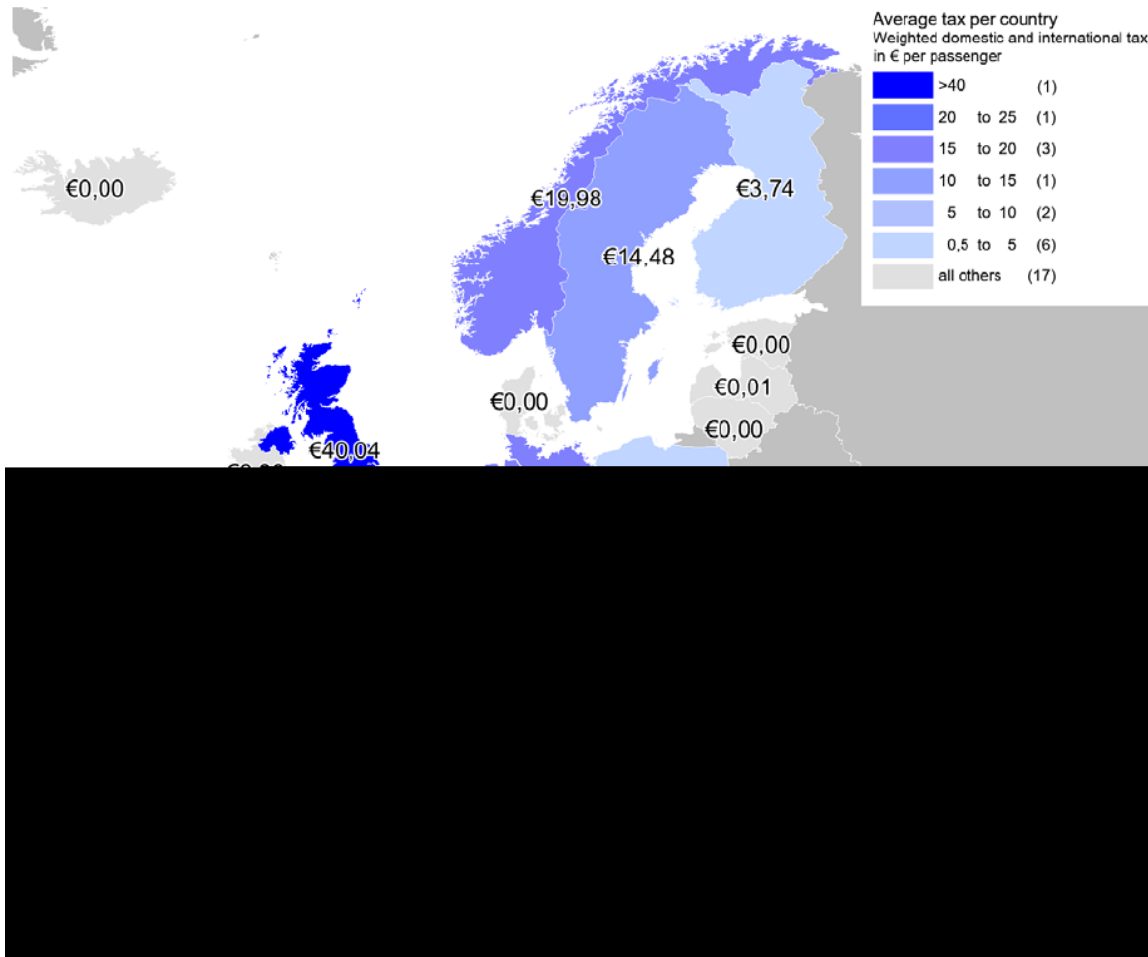
- Support measures that improve air transport eco-efficiency (technology development, fleet replacement, use of biofuel, increased ATM efficiency, etc; these measures present, in addition, a positive impact on the competitiveness of European aircraft and aviation industry.
- Cap-and-trade systems (EU ETS) and offsetting schemes (ICAO CORSIA) that allow compensating emissions from aviation through reductions achieved more easily in other sectors.
- Aviation taxes (ticket tax, VAT or fuel tax) that decrease demand for air travel as a result of the increase of ticket price.

<sup>1</sup> [European Aviation Environmental Report \(EAER\) 2019](#)

### *Effect of aviation taxes*

Aviation fuel is generally exempt from excise duty and many countries exempt tickets from VAT, only 17 MS apply aviation taxes. The weighted average aviation tax in the EU across all Member States and destinations amounts to €11 per ticket.

**Figure 1 – Average aviation taxes per passenger in the EU and EFTA. Weighted average for domestic and international passengers**



A recent report<sup>2</sup> commissioned by DG MOVE shows that aviation taxes lower demand for air travel and have economic and environmental impacts.

Based on the assumption that 1% increase in ticket price would result in 1% decrease in passenger demand, flight number, connectivity (direct flights) and CO2 emission, the report showcases that new or increased aviation taxes would reduce the number of passengers and flights. This would decrease the environmental impact of aviation but have a negative impact on the aviation industry (lower direct employment and direct value added). Impact on tourism has not been addressed.

### *Reducing air travel*

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<sup>2</sup> Report commissioned by DG MOVE “[Taxes in the Field of Aviation and their impact](#)”

As gain in efficiency do not compensate the increase in air travel, several MS consider policy option aiming at reducing demand for air travel, including through imposing new aviation taxes.

Any changes in tax regimes must, however, be carefully analysed especially because the role of aviation and its impact on the country's economy varies significantly between Member States.

Aviation stimulate connectivity and economic growth, supporting investment, tourism, trade, and job creation. Air transport has specificities that often make it difficult to replace it by another mode of transport such as the train. In consequence, aviation taxes by reducing connectivity may have an impact on the whole economy that should be carefully assessed. For instance:

- Many regions have invested in airport infrastructures to improve their connectivity and attract businesses. Reducing air travel attractiveness would affect these regions.
- A number of tourism destinations largely depend on air travel. Aviation taxes could strongly impact their GDP (tourism represent in average 10% pf GDP). Some MS would be more affected than others, not necessarily those imposing the tax. A [study](#) commissioned by Airlines for Europe estimated in 2017 at 25 million the number of extra in bound tourist arrivals and 12.5 billion additional tourism expenditure in the 3 years following an abolition of air passenger taxes across the EEA.
- Decreasing air travel will lead to job reductions in the aviation sector and suppliers with a different impact from MS to MS.

Airlines become also increasingly aware on the need to promote responsible use of air travel as demonstrated by the recent [KLM's "Fly Responsibly" campaign](#) encouraging passengers to reduce their demand for flying. Alternative transport options (like train) like train should be encouraged for short-haul flights. However, the specificities of air travel make replacement for long-haul more difficult and reduction in flights will result in reduction of connectivity (number of cities with direct connection).

### ***Airlines approach to climate change***

Airlines are already addressing the decarbonisation of air transport through compensation schemes (ETS on intra-EU flights, CORSIA, etc) and industry measures (fleet replacement, use of biofuel, etc). Airlines claim that aviation taxes do not help them addressing environmental goals as they have a negative impact on their competitiveness and reduce their capacity in investing more in cleaner equipment and technology. In addition, such taxes are rarely dedicated to environmental initiatives in the aviation sector (development of sustainable technologies and low-carbon fuels, improvement of ATM efficiencies, etc.).

Airlines prefer investing in environmentally friendly technologies, including modernizing their fleets with more fuel-efficient planes and increasing their use of biofuels (current biofuel supply capacity constitute however a limit). For airlines, the goal of reducing emissions coincides, indeed, with the need to maintain their competitiveness by reducing their fuel consumption. Fuel costs represent a significant and highly variable % of airlines operating costs. (32.3 % in 2012, 23.5 % in 2018, expected to rise again to 25 % in 2019).

However, reducing fuel cost did not always coincide with fuel burn reduction as demonstrate by the 'fuel tankering' practice in which planes are filled with extra fuel,

usually to avoid paying higher prices for refuelling at destination airports (a common practice in our daily life). Recently this practice rose criticism and airlines are now reconsidering it.

## **Aviation Research**

In **Horizon Europe**, aviation research will be covered by Cluster 5: “Energy, Climate & Mobility” (total cluster budget proposed is 15b€). The political agreement on the Horizon Europe proposal includes a budget limit of less than 40% for partnerships of the Horizon Europe Pillar 2 (which contains 6 clusters in total). This might only allow for less than 6b€ to be available for partnerships in cluster 5.

Up to 11 partnerships will have to be financed by Cluster 5, including two expected aviation partnerships “**Clean Aviation**” and “**Integrated Air Traffic Management**”. The other partnerships are: transforming Europe’s rail system, zero emission waterborne transport, automated road transport, towards zero emission road transport, batteries, clean hydrogen, buildings and sustainable cities.

The **Green Deal** will require greater R&I efforts in all transport modes. Thus there will be immense budgetary pressure on all partnerships also in terms of cost/benefit and the implementation of R&I results on the market.

Airbus contributes to a stakeholder proposal for research under a Clean Aviation partnership. Incentive for this action was found under the participants in the current CleanSky2 Joint Undertaking. **A document is expected in December, in parallel with the impact assessment for a Clean Aviation partnership.**

## **Regulatory Synergies**

The Commission has implemented a new co-creation culture across DGs and with all stakeholders on defining R&I priorities. This includes cooperation across Horizon Europe clusters, including in the areas of digital manufacturing, hydrogen, batteries and big data.

Practical implementation via the definition of work programmes and cooperation between partnerships will be in the focus of the next steps to be taken in Horizon Europe.

**Contacts:** [REDACTED] (DG MOVE.B3), tel.: [REDACTED]  
[REDACTED] (DG MOVE.E4), tel.: [REDACTED]



## Urban Air Mobility and U-space

Airbus has an ambitious **development programme on air taxis and the development of Urban Air Mobility (UAM)** in general.

Airbus considers urban mobility as a way to extend its traditional aviation market and to transform its business from an original equipment manufacturer (OEM) into a mobility service provider with vertically integrated services, including **Unmanned Traffic Management (UTM, called 'U-Space' in Europe)**.

Airbus UTM aims at building digital Air Traffic Management (ATM) solutions to enable the next generation of aviation. U-Space is seen by Airbus as a digital Single Sky, taking-over the traditional ATM activities in about 10 years' time.

Airbus also leads the UAM Initiative part of the Sustainable Urban Mobility (SUM) cluster of the European Innovation Partnership on Smart Cities and Communities (EIP-SCC). The UAM Initiative is progressing well and has grown to 42 cities.

## Regulatory Developments

Following the entry into force in September 2018 of the new European Union Aviation Safety Agency (EASA) Basic Regulation, the regulation of unmanned aircraft, irrespective of their weight, is an EU competence.

The recently adopted EU rules on technical requirements for drones and drone operation constitute the foundation of one of the largest drone markets in the world.

**Further legislative works are underway including so-called "European standard scenarios" for drone operations that will facilitate commercial drone operations, without prior authorisations. The EC is also jointly developing with EASA a framework for the provision of U-space services, which aims to enable complex drone operations with a high degree of automation.**

## Financial Support

In September 2019, the Commission and the European Investment Bank (EIB) announced **the launch of a European Drone Investment - Advisory Platform** to support the development of emerging technologies and promote European leadership in innovative sectors including UAM.

The announcement includes the launch of a market study to assess the full market potential in MS. It also includes the list of existing financing support options and further information on possible future mechanisms of support at EU level. The aim is to **deliver the study by Q2 2020**.

**Contacts:** [REDACTED] (DG MOVE.E4), tel.: [REDACTED]

### **Integrated ATM partnership**

Support for coordinated air traffic management (ATM) research at Union level was identified by the Member States as priority in the context of the Horizon Europe negotiations. The Commission is currently assessing the scenarios under which a new European Partnership on ATM R&I could be established, building on the experience of the SESAR Joint Undertaking. An impact assessment is currently under preparation, with a decision about the way forward planned for early 2020.

**Contacts:** [REDACTED] (DG MOVE.E3), tel.: [REDACTED]

### **A Co-Programmed Partnership on Globally Competitive Space Systems**

Over the last year, we have been developing a **Space Partnership proposal** to foster competitiveness of the EU space sector and reinforce our capacity to access and use space.

It could implement part of all of the Strategic Research and Innovation Agenda drafted by the consultation platform on space R&I.

Industry, including Airbus Space and Defence of course, research centres and academia are very favourable to the set-up of such Partnership which will allow them to co-programme with the Commission topics which are of interest to them with a multi-annual perspective.

In turn, some Member States expressed reservations regarding the role they will have in the governance (including for their national space agencies).

**Contact(s):** [REDACTED] (DG GROW), tel.: [REDACTED]  
[REDACTED] tel.: [REDACTED]

### **Strategic Value chains and the space dimension**

The role of the Strategic Forum for IPCEI expert group was to identify business-critical strategic value chains and define potential actions and coordinated investments from industry and public authorities across several member states.

The expert group has identified 31 value chains of strategic importance for Europe based on the potential impact on industrial competitiveness, their potential to contribute to the 2030 climate targets, their impact on strategic autonomy and security.

The expert group prioritised six strategic value chains (**none of which directly related to space and aerospace**) for developing recommendations for large-scale coordinated investments by (MS) public authorities and industry.

**Contact:** [REDACTED] (DG GROW), tel: [REDACTED]

## European Defence Fund

The European Defence Fund (EDF) is an instrument to foster the competitiveness and innovativeness of the European defence and industrial base thereby contributing to the EU's strategic autonomy.

The EDF is structured into two windows, one for research and another for capability development with a foreseen budget of EUR 13 billion for the period 2021-2027. The precursor programmes, the Preparatory Action on Defence Research (PADR) and the European Defence Industry Development Programme (EDIDP), will provide the necessary lessons learnt to develop the programme in the most successful manner.

**The European Defence Industrial Development Programme (2019-2020)** co-funds cooperative development projects of defence capabilities (eg. prototyping including testing and certification).

The Work Programme was adopted on 19 March and the calls for proposals for the year 2019 were published on 4 April. Proposals received in response to these calls are now being evaluated.

Topics of the 9 calls published include:

- The Call EDIDP-ISR-2019 on permanent air or space capabilities for Intelligence, Surveillance and Reconnaissance, communication, tactical Remotely Piloted Air Systems and sensor-suite for integration into air-traffic management: With 4 topics and a total budget of €43 700, 000
- The Call EDIDP-ACC-2019 on Air Combat capabilities:  
With 2 topics and a total budget of €12 000,000

**The Preparatory Action on Defence Research (2017-2019)** has entered its final year. Preparatory Action on Defence Research calls related to the 2019 work programme now in their evaluation phase.

The Preparatory Action on Defence Research 2019 Calls for Proposals included the call PADR-EMS-03-2019 on targeting combined radar, communications, and electronic warfare functions, which are of high interest for aerial platforms.

Contact(s): [REDACTED] (DG GROW), tel.: [REDACTED]  
[REDACTED] (DG GROW), tel: [REDACTED]

## Industry 4.0

### Adoption of new technologies

- Industry 4.0 could have an estimated value-creation potential for manufacturers and suppliers of \$3.7 trillion in 2025<sup>3</sup>.
- During the 2017 WMF, it was shown that companies are implementing new technologies. However, surveys show that 78% of companies say they are in 'initial pilots' phase, 22% in 'company-wide adoption', and 0% in 'value-chain ecosystem adoption'.
- It was also shown, quoting a McKinsey report, that adoption of technology at scale is still low as companies are facing different challenges in their journey, both at company-level and macro-economic.
- For instance, top-5 challenges in the early adoption phase are 1) lack of courage to push through radical transformation, 2) lack of a clear business case that justifies investments in underlying IT architecture, 3) difficulty to coordinate actions across different organisational units, 4) concerns about cybersecurity when working with third-party providers, and 5) lack of necessary talent, e.g. data scientists.
- When scaling up the adoption of technology, other issues emerged. For instance, difficulties at integrating data from disparate sources. Furthermore, there is perceived uncertainty about in- vs outsourcing and lack of knowledge about providers. Finally, there are concerns about data ownership when working with third-party providers.
- Whereas common opinion is that Asia-Pacific companies have built factories to the newest standards, in Europe experts say companies can be held back by legacy assets, strong labour rules, and a rigid mindset that fears disruption and the notion of robots taking jobs.
- Labour rules need not be a hindrance, however. Many German companies have put in place digital changes in consultation with workers' councils. At Siemens, which invests €500m a year to train workers with new skills, a pact with staff signed this year included the creation of a "future fund" to ensure that technical progress does not leave people behind.

### Digitising European Industry

- Digital technologies are bringing a step change in the way we design, produce, commercialise, and create value from all types of goods and relevant services. Digitalisation transforms products, production and business processes, and business models.
- The "Digitisation of European Industry" (DEI) initiative provides a set of coherent measures aiming at the digital transformations of our industry and our governments and at maximising their impact on economic growth.

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<sup>3</sup> World Economic Forum, "The Next Economic Growth Engine Scaling Fourth Industrial Revolution Technologies in Production", 2018

- Digitalisation of all sectors of the economy is needed for the EU to reinforce its competitiveness, build a strong industrial base and manage the transition to a smart economy.
- The predicted efficiency gains from the adoption of new technology are so great that, at first glance, they appear to be typos. PwC, for instance, forecasts the shift to contribute as much as 14 per cent to global GDP gains by 2030 — or “about \$15tn in today’s value”. Other studies show that digitisation of products and services could increase EU industry revenues by €110 billion a year.
- To achieve such benefits, we are executing a number of actions:
- We have set up a *governance structure* together with Member States and industry to facilitate the coordination and exchange of best practices of EU and national initiatives on digitisation. Governance consists of Roundtables and Stakeholder Fora. The Roundtables will ensure a continuous EU-wide dialogue. The Roundtables are the mechanism for Member States and industry to steer and support the implementation of the Digitising European Industry initiative.
- To bring the benefits of digital innovation to every industry, the EU will invest €500 million in *Digital Innovation Hubs* until the end of 2020. These hubs will help companies to understand digital opportunities and to get access to knowledge and testing facilities.
- Europe needs to lead in the next generation key *digital technologies and platforms* for all industrial sectors. There are large, but fragmented research efforts in key digital technology fields and in their full integration in industry sectors. These efforts need to be better *coordinated and increased*.
- We need future-proof *legislation* by clarifying ownership of data generated by sensors and smart devices. We also need to review the rules on safety and liability of autonomous systems.
- Future jobs are likely to require *skills* that are different from those that are provided by today’s education or training systems. The Commission will reinforce the role of industry and research organisations in the Grand Coalition for Digital Jobs and improve the understanding of skills requirements for new technologies.

#### Digitalisation in other regions

- Other regions in the world are investing heavily. For instance, China’s ‘Made in China 2025’ strategy provides a multiple B\$ blueprint for upgrading the country’s manufacturing sector via targeted investments in 10 key technologies. Japan, Korea, India, and the USA also have national programmes to support transformation of industry.
- In July 2017, The State Council of China released the “New Generation Artificial Intelligence Development Plan”. This policy outlines China’s strategy to build a domestic AI industry worth nearly US\$150 billion in the next few years and to become the leading AI power by 2030. Although this was the first time AI was specifically mentioned in a Communist Party of China work report, the sentiment is seen more broadly as a continuation of the 13th Five-Year Plan and the state-driven industrial plan “Made in China 2025”<sup>4</sup>.
- In the G20 Digital Economy Ministerial Declaration (April 7, 2017, Düsseldorf), G20 countries, including China have agreed to: “Work together in the areas of

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<sup>4</sup> <https://futureoflife.org/ai-policy-china/?cn-reloaded=1>

digitalization of production [...]”; “Share best practices on the digitalization of production to facilitate digital transformation on a global level [...]”; and “Encourage learning partnerships – e.g. between national initiatives and different interested parties and stakeholders”.

- The WEF led a meeting to explore possibilities for establishing an online platform to facilitate the exchange of information and best practices across countries on the future of production. The goal is to increase transparency by sharing an overview of their respective strategies and initiatives; to leverage potential synergies between countries; and to identify gaps and priority areas requiring strengthened international cooperation.
- The World Economic Forum recently identified 9 of the best factories in the world, selected from a survey of over 1,000 manufacturing sites based on a successful track record of implementing technologies of the Fourth Industrial Revolution. 5 of them are in Europe: Bayer, Division Pharmaceuticals (Garbagnate, Italy), Johnson & Johnson DePuy Synthes (Cork, Ireland), Phoenix Contact (Bad Pyrmont and Blomberg, Germany), Procter & Gamble (Rakona, Czech Republic), Schneider Electric (Le Vaudreuil, France). 3 factories are in China, of which 2 are from European companies, namely Siemens Industrial Automation Products (Chengdu) and Bosch Automotive (Wuxi). The other factory in China is by Haier (Qingdao). The ninth factory is owned by Fast Radius and UPS in the Chicago, USA.
- All nine lighthouse factories have agreed to open their doors and share their knowledge with other manufacturing businesses in order to aid the learning and adoption of technologies by other companies.

#### Digital Innovation Hubs

- A Digital Innovation Hub (DIH) is a group of organisations with complementary expertise and a non-profit objective, offering a set of services to companies – especially SMEs (incl. startups) and mid-caps – to support their digital transformation.
- DIHs act as a one-stop shop, providing access to technical expertise and experimentation facilities, such as equipment, testbeds, and software tools, so that companies can "test before invest". DIHs also provide innovation services, such as financing advice, training and skills development which are all needed for a successful digital transformation.
- A catalogue of DIHs was launched to monitor the development of DIHs across Europe. The catalogue includes all DIHs established by Member States and regions, as well as the ones funded through H2020 projects. The catalogue aims to support networking of DIHs.

#### Digital Innovation Hubs in Digital Europe Programme

- The role of DIHs funded through Digital Europe Programme is to ensure the best use of digital capacities in high performance computing (HPC), artificial intelligence (AI), cybersecurity and digital skills across the economy, enabling the digital transformation of industry and public-sector organisations at large.
- The DIHs will be closely collaborating with the HPC excellence centres, the cybersecurity competence centres and the AI excellence centres which are all to be supported by DEP. DIHs will help their customers experiment and test digital

technologies, including customisation to a specific need, and will link to the excellence/competence centres to that effect.

- Collaboration between DIHs and the different excellence/competence centres will include DIHs acquiring the necessary technology expertise and training from the respective centres, getting access to pan-European resources such as HPC cycles, AI-on-demand platform, data pools, or brokering security audits for SMEs.
- DIHs will also deliver short-term training courses for SMEs and will support matching of trainees to SMEs to acquire digital skills. DIHs will also intermediate between investors and companies to help them get access to finance and to engage in "Test before invest". All DIHs will form a network, so that when specific competences are not available locally, the DIH will be able to connect and refer its clients to a competent hub in the network.
- The main principle of financing DIHs in Digital Europe Programme is co-investments with Member States to pool resources and lead to strategic investments. Member States investments are mainly used for local services and the Digital Europe Programme investments will be used to upgrade the hubs and open up their services for pan-European usage.

#### Artificial Intelligence

- AI is becoming the key to enhancing the productivity of industrial operations. It enables manufacturers to reduce operating costs by up to 20%. It is estimated that AI will contribute up to USD 15.7 trillion to the global economy by 2030, and boost the EU economy by 9-12% of GDP<sup>5</sup>.
- AI is a fast-growing market. A recent report predicts that the revenues from the worldwide AI market will reach USD 60 billion by 2025, growing from USD 2.4 billion revenues estimated already for last year. Industry sectors currently leading in AI deployment are automotive, healthcare, financial services, telecommunications, manufacturing, energy, travel and transportation, and logistics, areas where Europe is leading.
- Venture capitalists and corporate giants like Google, IBM, Yahoo, Intel or Apple are competing in the race to acquire private AI companies. Over 250 private companies using AI algorithms have been acquired since 2012, with 37 acquisitions taking place in the 1st quarter of 2017 alone.
- In the field of AI research, many recent breakthroughs come from European labs such as DeepMind's software that beat the best human Go masters (DeepMind had already been acquired by Google when this development was made).
- European research in AI also attracts investments from major global players. Facebook set up an AI research centre in Paris in 2015. Earlier this year, Google announced plans to create a new research centre dedicated to AI, also in Paris, after earlier having taken a stake in the German Research Centre for Artificial Intelligence (DFKI). Amazon is setting up an AI research hub in Germany's Cyber Valley, in Tübingen, and IBM last year opened its worldwide Watson IoT Headquarters in Munich.

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<sup>5</sup> PwC, "Sizing the prize – What's the real value of AI for your business and how can you capitalise?", 2017



- Europe builds on significant research in AI. The AI and Robotics part of the Horizon 2020 framework programme is one of the world's largest civilian programmes in the field with a budget of EUR 700 million over the period 2014–2020. The Big Data part of Horizon 2020 further dedicates substantial funding to AI technologies over the period 2014–2020.

#### Artificial Intelligence in Manufacturing

- Accenture's research suggests AI will add approximately US\$3.7 trillion to the manufacturing sector by 2035<sup>6</sup>. McKinsey predicts that AI has the potential to create \$1.4T to \$2.6T of value in marketing and sales across the world's businesses, and \$1.2T to \$2T in supply-chain management and manufacturing. In manufacturing, the greatest value from AI can be created by using it for predictive maintenance (about \$0.5 trillion to \$0.7 trillion across the world's businesses<sup>7</sup>).
- Machine learning improves product quality up to 35% in discrete manufacturing industries, according to Deloitte<sup>8</sup>.
- Manufacturers are improving shop floor productivity by investing in machine learning platforms that deliver the insights needed to improve product quality and production yields.
- Using machine learning to streamline every phase of production, starting with inbound supplier quality through manufacturing scheduling to fulfilment is now a priority in manufacturing. According to a recent survey by Deloitte, machine learning is reducing unplanned machinery downtime between 15-30%, increasing production throughput by 20%, reducing maintenance costs by 30% and delivering up to a 35% increase in quality<sup>8</sup>.

#### Digital Europe programme – state of play

- The EU institutions reached a provisional agreement on Digital Europe, excluding budget-related issues, on 13 February 2019. The European Parliament endorsed the provisional agreement on 17 April 2019.
- The Commission is currently preparing Digital Europe's implementation, after having delivered the draft Orientations, in order to have the first draft work programmes published in time for the programme's launch in 2021.
- From 25 July-25 October 2019 a consultation is running to gather feedback on the programme's draft Orientations for 2021-22 (~around 200 replies to date).
- We are also gathering advice and expertise via informal discussions, including from a group of nationally assigned experts. This group of experts has been set up informally (i.e. not by a Commission decision to create an independent expert group but by the Director-General of DG Connect) to gather more detailed feedback.

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<sup>6</sup> Accenture, "Manufacturing The Future", 2018

<sup>7</sup> <https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/most-of-ais-business-uses-will-be-in-two-areas>

<sup>8</sup> <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-a-turnkey-iot-solution-for-manufacturing.pdf>



- The Digital Europe programme with an overall budget of €9.2 billion supports the digital transformation of Europe's societies and economies. It will provide support in five key areas that are essential for the future competitiveness of Europe, namely (i) high performance computing (€2.7 billion), (ii) artificial intelligence (€2.5 billion), (iii) cybersecurity and trust (€2 billion), (iv) advanced digital skills (€0.7 billion), and (v) deployment and best use of digital capacity and interoperability (€1.3 billion).

#### MFF 2021-2027 next steps

- The Finnish Presidency is pursuing work to develop the Negotiating Box. The European Council will hold an exchange of views in October 2019, aiming for an agreement before the end of the year.
- Key upcoming dates 2019:
  - 10 December      General Affairs Council
  - 12-13 December   European Council

