



**SESAR Digital Academy Webinar:**  
**Smart and sustainable solutions for greener ATM**  
*Part III – En-route*

*Moderated by Olivia Nunez*  
*ATM expert, SESAR JU*

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**SESAR**  
JOINT UNDERTAKING

## Today's speakers

### **FRA in upper airspace, high and very-high complexity**

- Florence Serdot-Omer, ATM expert, DSNA
- Max Canham, OPS development, SKYGUIDE

### **Civil military cooperation**

- Remus Lacatus, Senior Military ATM Expert, EUROCONTROL
- Yevgen Pechenik, Airspace Configurations, EUROCONTROL

### **Climate efficiency beyond CO2: Contrails and more**

- Sigrun Matthes, Project Coordinator, DLR

### **Wake energy retrieval**

- Nick Macdonald, Project Leader, Airbus

### **Key takeaways and next steps**

- Philippe Lenne, Aviation Sustainability Programme Manager, SESAR JU



Question	Answer
<p><b>Does FRA allow tactical conflict prediction tools like MTCD to be used considering MTCD needs 15-20' horizon in future?</b></p>	<p>Depending on the complexity of the traffic, conflict detection tools might indeed be required in order to guaranty both safety and capacity of the airspace.</p>
<p><b>How safety performance was measured pre/post FRA implementation?</b></p>	<p>During the SESAR Free Route project a safety study of the solution was performed. Safety requirements were defined according to the SESAR methodology. We than checked that these requirements were fulfilled by the solution either during the validations exercises or through expert based judgement.</p>
<p><b>Sorry if I could not catch, but is there a way to get comparison between the savings in FRA and causes in approach? Causing any holdings etc. since the flights use FRA at upper and saving time?</b></p>	<p>Implementation of FRA should not have a direct impact on the approach units. As Florence mentions "flight's predictability is improved in FRA (less trajectory revision needed), ATFCM measures are more efficient, which should ease adherence to an arrival slot."</p>
<p><b>how is the airspace sectorized for ATCOs in FRA?</b></p>	<p>For the SESAR simulations within SKYGUIDE, it was the same as the current sector structure. The SESAR simulations also included cross-border trajectories from Italy, but these will not be part of SKYGUIDE's initial FRA implementation.</p>
<p><b>What is represented in SKYGUIDE's safety assessment Y axis?</b></p>	<p>This is from the SESAR validation report and is a scale from 1-6 used by the ATCOs when answering questions after each simulation exercise. 6 being perfect and no impact and 1 being not good and large impact. The important element for me is the comparison between the baseline and the FRA scenarios which have difference airspace designs but use the same traffic sample.</p>
<p><b>ATFM en route delay requirement for meeting arrival slot at destination and FRA concept may work at cross purpose. Have the scenarios addressed this issue?</b></p>	<p>As flights predictability is improved in FRA (less trajectory revision needed), ATFCM measures are more efficient, which should ease adherence to an arrival slot.</p>
<p><b>Max, are the technical solutions you mentioned isolated solutions or are they transformable to other systems?</b></p>	<p>At a high level they are they are transferable. The needs in a FRA environment is to have a clear understanding of what route each flight will take as there are many different options. In addition, given the different options, additional ATCO decision support tools (e.g conflict detection) may be needed. The implementation of these solutions will be more specific to the technical platform being used.</p>

<p><b>I think that someone has to make an evidence what has been done in SESAR because many things are overlapping and repeating. KPA are all very well known and the question is if the same airspace is used as the same by both military and civil aircraft.</b></p>	<p>Yes, indeed, but it also because the same problems are being addressed from different perspectives. Depending on the needs for segregation. If a mission has to be segregated, then in tactical ops it can be used either by mil or civil</p>
<p><b>The extent of military operations should be specified.</b></p>	<p>Hi Milan, what do you mean by extent?</p>
<p><b>To what extent should the airspace users be made responsible for flying an environmentally optimised trajectory (eg. route, level, speed) versus a user preferred trajectory?</b></p>	<p>Excellent question: this exploratory research project's work is focused on assessing what the trade-offs would be. Their results will be a key element for addressing the question you raise, but this is a next step.</p>
<p><b>Extent I mean is the number of military aircraft being in the same airspace with the commercial ones needed to be separated. In addition, for how long this situation lasts?</b></p>	<p>The number of military aircraft that could be in the same time in the same airspace with civil traffic is very variable, from country to country, depending on the number of available assets. Is not a parameter processed by ASM. Our focus is on the number and size of the airspace reserved/restricted for military usage that is communicated usually 24 hours in advance. That gives to ATM information on the extent at which (number of areas, time, flight level block) the airspace will be used by MIL.</p>
<p><b>ATM4E: Isn't this way of optimising trajectory just shifting emissions from one state to other?</b></p>	<p>No, we are not just shifting emissions, but we identify those regions, which are in particular sensitive to aviation emissions, which means that emissions there would have a larger impact than in other regions. E.g. illustrating this for the case of contrail and contrail cirrus, an aircraft would cause a contrail cirrus (and associated climate impact) in such a sensitive region, while in other regions, aircraft simply don't form such a warming contrail. Hence, you aim to avoid those regions.</p>
<p><b>Thanks Max, actually, if we get some time-saving on airspace, some flights on the system pay back this time-saving to the system to balance the time we saved thanks to FRA.</b></p>	<p>The rate of aircraft per hour that an airport can accept is indeed independent of whether the airspace is FRA or not. This is why all ATFCM elements including flight time, enroute and terminal capacities are managed by the network manager from the time of flight plan submission. Once airborne, if there is a need for a flight to absorb delay in the en-route portion of the flight, the AMAN systems will make this known to the en-route controllers, and they can then take measures like reducing the flight speed or stretching its path. If there is path stretching, the benefits of free route may of course not be realised.</p>
<p><b>Predictability may be improved; however, we cannot underestimate the issue of new congestions on approach of an airport. otherwise, we already would have a good mechanism to apply FRA</b></p>	<p>Hopefully this is not the case. Different countries have different FRA application levels and some even have FRA from ground up. As such, it is important that the ATFCM elements are managed from the beginning and this is ensured by the network manager who manages the flight plan from the time it is submitted.</p>

<p><b>Do each aircraft generate the same contrails risks? what are the aircraft impacting parameters?</b></p> <p><b>What are the main airspace relevant parameters for contrails?</b></p>	<p>Contrail formation depends mainly on ambient conditions, but also to a certain extend on aircraft type and geometry, as well as fuel characteristics.</p>
<p><b>What is the purpose of this? What about safe separation?</b></p>	<p>The fello'fly project is a flight demonstrator activity. Safety is our first and foremost priority. We are progressing well, but of course should we encounter showstoppers on safety aspects we will not seek to bring it into service.</p>
<p><b>Did the July 2020 flight tests confirm the fuel savings observed in 2016 with a different pair of aircrafts? What were the savings observed in July?</b></p>	<p>The July 2020 flight tests showed fuel savings that were in line with our models, and very compelling from both a commercial and environmental perspective. This test campaign confirmed the potential for savings within the 5-10% range for a follower aircraft.</p>
<p><b>Are you excluding ATC from the control loop?</b></p>	<p>The operational aspect of this project is very important, and for this reason we are very happy to be working with Airline &amp; ANSP partners. The aim is to confirm a concept of operations for wake energy retrieval that works for all operational stakeholders.</p>
<p><b>Is there any prediction of selling aircrafts ratio and fello'fly effects? also, if this will remain under use of Airbus, the plans would be done to provide meeting the flights to use fello'fly? :)</b></p>	<p>One of the objectives of the project is to confirm the commercial viability. We are in discussion with our Airline &amp; ANSP partners on these aspects.</p>
<p><b>Good idea but in the conservative system like air transport will certainly need time to be implemented. In addition, benefits do not seem persuasive.</b></p>	<p>A 5-10% fuel saving for a follower aircraft is significant, both from an economic and an environmental perspective. Should we demonstrate the feasibility, it will only be possible to bring into service if the industry works together. In particular, the rulemaking and ATM procedures will need to follow. We are working with ATM partners in this respect, and also ICAO.</p>
<p><b>@Nick: For the foreseeable future, is fello'fly only foreseen for oceanic airspace or also over continental airspace?</b></p>	<p>The longer the en-route portion of the flight, the higher the fuel savings we expect to achieve; this is why we have started by considering the concept in an oceanic environment. We expect to address continental airspace in the future.</p>
<p><b>Nick, this is an excellent idea! Fuel savings plus capacity gains in the NA system! Operationally this shouldn't be a problem (safety). Is EASA already in the development team?</b></p>	<p>We have presented the demonstrator project to EASA representatives. We will engage further with them as the project progresses.</p>

**@Nick: and forgot to say:  
thank you for this very clear,  
comprehensive presentation!**

Thank you.