

Smart and sustainable solutions for greener ATM – The Airport Domain

19 November

Question	Answer
<p>I would like to see more initiatives about projects aimed to improve sustainable aviation based on improving ATM. I have in mind reducing holding time, level-off due to ATC constraint, reducing separation time between aircraft</p>	<p>Olivia / Ruben: Please listen in to the upcoming two webinars on environmental impact reduction for arrivals/departures and en-route.</p>
<p>Annika how can your project help to change or modify the economical model of commercial airlines or business aviation ?</p>	<p>Annika: I think it can give very good insight in changing travel behaviour and intermodal integration. Airlines are already enegaging in providing door-to-door journeys (to some degree) for passengers. the question might be hot they can position themselves across the passenger door-to-door journey.</p>
<p>Excellent Annika, We fully support these ideas. Are you aware of any EC initiative to build hyper trains across Europe?</p>	<p>Annika: Thank you. At the Technical University Munich they are working on a hyperloop project: https://tumhyperloop.de/#home On EU level, I found this initiative: https://ec.europa.eu/eipp/desktop/en/projects/project-9401.html</p>
<p>This has been considered for almost last 30 years, and nothing substantive has happened since modal split is the most stable category in transport.</p>	<p>Annika: Considering developments in past years, especially including the Paris Climate agreement and respective goals, the transport sector will have to work towards reaching ambitious goals and introduce new trechnologies as well as operations on a large scale; rethinking intermodal integration and alignment can be one of the key levers; furthermore, with airports facing severe capacity constraints (before COVID-19) intermodal integration may provide some degree of mitigation.</p>
<p>Are'nt EU commission put constraints for less than350 NMiles travel?</p>	<p>Philippe: The removal of air traffic for short distance to the benefit of other mode of transport is a national competence.This potential decision must however comply with EU competition rules. On the Barcelan Madrid case, the Commission did not oppose but simply reminded the need to respect these competition rules.</p> <p>Annika: I think there have been ongoing discussions but it has not been decided as far as I know. It might be difficult to introduce on a large scale.</p>

<p>What otehr main factors have been in choosing transport mode? Only environmental awareness is has certainly not been the primary cause. Under which conditions this would be the case?</p>	<p>Annika: Two main factors influencing passenger choice of transport modes are ticket price and travel time (i.e. how quickly can you get to your destination); in addition to this offered frequency and time of day (e.g. availability of connection in the morning, at a specific time) play an important role in passengers decision making process; the consideration of the environmental footprint as a factor in decision making has gained more importance in the past years</p>
<p>A/P infrastructures (e.g. TWYs slope) as well as fluidity of the Taxi instructions from the GND controller (stop & go motions) are also factors significantly impacting the possibility to perform less-than-all-engines taxi at departure.</p>	<p>Guiseppe: Yes.</p>
<p>due to the COVID 19 the Air-condition (PACK) must be ON at all stages of the Flight, Take OFF (if possible, Flex Rate etc.) and Taxiing and Parking!</p>	<p>Guiseppe: Hello Manfred, yes, of course the decision is to be taken for each flight, in the specific operational circumstances.</p>
<p>Most of the times LOC controllers don;t even know the TTOT and don't arrange their take-off sequence based on that. Also, whcih cTOITOLT? The TTOT provided 20 min prior? Or the TTOT provided at AOBT? Because huge gaps may exist between the two</p>	<p>Guiseppe: Good points, those are exactly the points to investigate, and they may differ at different airports. We think that "pragmatic" solutions can be found, to do it "a bit more often".</p>
<p>Could the best gain/benefit of sustainable taxing only be achieved in combination with more accurate and predictable ground movement planning ?</p>	<p>Dirk / Simon: Great question, well: In the current operational way of work the time between performing pushback and asking for taxi clearance is kind of a black box. Blockage of apron bays is happening all the time, but we have not been able to identify the impact on performance yet. More predictable ground movement planning would, in our opinion, indeed be this best gain/benefit.</p>
<p>How safe is this single engine procedure?</p>	<p>Guiseppe: Hello Milan, it is safe when the points of attention are addressed... for each one, a solution is known.</p>

<p>To which extent SESAR Environmental Project is connected with the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and will it be also obligation for European States before or after 2027?</p>	<p>Philippe: Hello Konstantinos. There is no direct connection between CORSIA and the SESAR program. The overall objectives from the solutions is to improve fuel efficiency and thus helping airlines reducing their offsetting obligations under the scheme. Concerning the obligations of the EU MS to join the CORSIA, the EU MS are already applying obligations for Pilot phase: from 2021 to 2023. I invite you to consult all the different EU Council decision issued around the topic or the ICAO website. https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx</p>
<p>If many exceptions are required, what sense then does it make? Anyway it will need certification - generally or on the case by case basis.</p>	<p>Dirk / Simon: In order to improve towards a new structural basis, baby steps have to be taken, including exceptions. We strongly believe in this form of incremental innovation</p>
<p>I am sure that optimum flow of gnd traffic from parking position to t/o will bring more than single engine taxi (you need a running APU as well for redundancy)</p>	<p>Dirk / Simon: For both Single Engine taxiing and Taxiboting, obviously there is a tipping point in emissions by, depending on airport complexity and taxi duration.</p>
<p>The A320 NEOS need still a long warm up time!</p>	<p>Dirk / Simon: Correct. Although much of this warm-up time is 'cranking'. This increases the amount of time needed after pushback. This will be disaster for the flow in busy gate areas and will lead to longer gate blockages. It actually makes sense to start engines while (not after, while) 'sustainable taxiing' to save time. But this is an underestimated effect on airport capacity, by the newest Jet engine start-up times.</p>
<p>Why do we still waste fuel bringing heavy planes to terminals (across other runways - runway incursion accidents)? Why not leave the planes parked by the runways and provide *comfortable* bus-trains that will take pax between plane & terminal, through tunnels under runways if necessary?</p>	<p>Dirk / Simon: Good question! Untill we jointly decided this is a way forward, we are trying all we can to implement potential future proof operational concepts within the current environment</p>
<p>suggestion: Maybe Dirks & Simmnons Topic can also be handeled in ICAO, AOWG leded by tony Heap</p>	<p>Dirk / Simon: Dear Roland, more than happy to join!</p>
<p>Sustainability of airports needs to be clearly defined in terms of scope and content from the aspects of the main stakeholders involved.</p>	<p>Dirk / Simon: Agreed. Sustainability in general is a concept that involves many stakeholders at the airport.</p>

<p>How are you dealing with an aircraft engine failure or any other discovered while uncoupling lately close to the holding point ?</p>	<p>Dirk / Simon: Fortunately, we have not have to deal with this situation. For the trials, our solution was simply to return to the gate (if it would have occurred). Sustainable taxiing does increase the probability of return to gates due to this but it remain a very small chance.</p>
<p>What about traffic asking to depart from a different rwy because it better links with routing, if when not available will make it fly longer route to intercept the routing to destination and making it less greener</p>	<p>Dirk / Simon: Although there is six runways at EHAM, we strive for planning and predictability, also in RWY usage. As Taxibot can serve as an 'ordinary' pushback truck as well, there always is the possibility to disconnect after pushback.</p>
<p>It seems that the entire process of handling aircraft will slow down and as such affect the capacity of the apron, taxiway, and runway system, particularly during the peak periods.</p>	<p>Dirk / Simon: In the trial period, we did see some delays in the processes due to inefficient processes (it was all new to everybody). However in the long term, we don't add additional processes, we just change the sequence of them. We think, if managed well, changing a sequence does not have to lead to longer process times. In fact, because you start engines during taxiboting/near the runway, the busy gate areas become less congested. But it's completely clear that the control of ground movements will change</p>
<p>Comment: in FRA TaxiBot trials on eo the main issue identified was the service roads....and the interference with taxiing aircraft when crossing taxiways - Fast Time Simulations done by many organisations about the use of electric taxiing!</p>	<p>Dirk / Simon: This is true for Schiphol as well. Our service roads are not wide enough yet, and crossing taxiways is also an issue. We have done a simulation on aircraft under sustainable taxiing, but not including (car/Taxibot) traffic. Do you have access to such a study? Would be great for us to get in touch (prent_s@schiphol.nl)</p>
<p>According to information, the method of pulling the A/F from the front wheel for a long has been disapproved by the manufactures with the argument that the wheel in question hasn't been designed to play that role. What is your opinion?</p>	<p>Dirk / Simon: Correct. At this point, Taxibot has been certified by Boeing and Airbus to perform this activity on nose gears. The Taxibot mitigates the issues related to nose gear loads. Besides extensive sensoring and pro-active acceleration/deceleration, this is solved by letting the pilot control the convoy, including braking the aircraft. In other words: for the certified aircraft, this is not an issue.</p>
<p>Due to the Corona virus and HEPA Filters etc. we have to keep the Air Condition (PACKS, Airflow) ON with 2 engines!</p>	<p>Dirk / Simon: This is new for me, very interesting (hopefully temporary). We would like to talk about it. Could you send me a message? (prent_s@schiphol.nl)</p>

<p>Also, how do you manage unscheduled MX after disconnect? E.g. Tug disconnects but engine would not start, and the AC needs to be towed the A/C back to the gate for MX fix. In this case the taxi time x2 (in terms of delay) as this type of issue is detected immediately after push with a standard tug.</p>	<p>Dirk / Simon: For the happy flow this is not in scope. We did however identify this as a potential issue. We have a database with 'return before airborne' aircraft, i.e. because of unscheduled maintenance, or mishandled luggage, unruly pax etc. The small number of this made us go forward, although on an individual aircraft movement you are obviously right.</p>
<p>The SAFRAN solution was also tested in FRA with A320 and Airbus help, it was stopped by Airbus a few months ago.</p>	<p>Dirk / Simon: Thanks, and completely correct! It was on the slide for the sake of completeness :)</p>
<p>Many technical engine issues are only found at engine start. With taxibot you risk to cause congestion at the runway entry point in case of technical issues with the A/C. Is this considered?</p>	<p>Dirk / Simon: Sure, yes. This does increase the probability of return to gates but it remain a very small chance. Besides, this is only an issue on single lane taxiways, as returning would be difficult (against traffic).</p>
<p>How do you manage push Tug availability? With Taxibot a tug is potentially gone for 15-30 min depending of the parking stand / QFU.</p>	<p>Dirk / Simon: This is certainly true. The issue has not occurred during our trials due to the Covid-19 related traffic downturn. However in the future, this issue is primarily an issue concerning staff (truck drivers). For this reason, we also look into driverless developments for the technology.</p>
<p>Hi Dirk, nice to see you again after Meeting in AMS in March to this topic. congratulation to successful implementation in AMS. BR Roland from Austria</p>	<p>Dirk / Simon: Hi Roland, Long time no see! Thanks for your kind words.</p>
<p>Wheeltug is a very old Project, we have discussed in 2010 already, LH and others Air Berlin !</p>	<p>Dirk / Simon: Correct, and they are still 'in the game'. Certification for Boeing 737-700 and 800 is expected next year (information from Wheeltug).</p>
<p>What about if you have the flow of departing aircraft demanding to take-off in the short period of time?</p>	<p>Dirk / Simon: As Dirk just presented, this indeed is an interesting issue. In the current operational concept tested (1 uncoupling point at the runway), this leads to congestion. The solution for this is more uncoupling points and lower uncoupling time. In addition, optimizations such as A-SMGCS might help us in the future.</p>

<p>I have done TAXIBOT Test in Frankfurt do you have the results from FRA and LH?</p>	<p>Dirk / Simon: Hi Manfred, we have been in touch with Sven Meyenburg (LH) quite elaborately about it. However, all information about it is more than welcome! Maybe we can get in touch about it? Not sure if you can see my e-mail address..</p>
<p>In the current performance scheme an area 40miles around airport is excepted form environmental KPIs. Is there any plan for adopting the model Signur presented aiming at optimization of routes at airports, that will probably alleviate somehow from CO2 the airports ?</p>	<p>Philippe: The SES performance scheme is being reviewed to possibly adopt ENV indicators that will monitor what is needed to improve. This could at best occur by RP4 time but in the mean time we do move forward and develop solutions that will tackle the problematic.</p>
<p>To which extents your approach works for crowded scenarios: multiple flight arriving at about the same time to the same airport - assuming your adjustment are only done near ground (departure/arrival)?</p>	<p>Sigrun: Thank you. Our approach will help to identify those trajectory options which are more favorable for environment. This allows for a weather situation to identify which departure to select on that specific day. Interaction between individual flights needs to be assessed separately. The idea is to expand such ATC systems, in order to have available this environmental impact information, or favorable departure information.</p>
<p>This looks like far from reality to achieve. Noise is decreasing problem and optimizing 3D or 4D trajectories is absolutely unrealistic. Where is the role of ATC?</p>	<p>Sigrun: Our feasibility study focused on a full trajectory optimisation comprising also climate impacts. However, when focusing on local air quality and noise, a possible concept to integrate such additional environmental assesment, requires to expand current ATC by such environmental impact and assessment information, in order to integrate environmental aspects in the decision making process.</p>
<p>My favorite question - Of grouping noise patterns (lot of noise for few) or spreading noise (less noise for more) which is the better solution</p>	<p>Sigrun: Good question. To my understanding, this question is closely linked to the annoyance issue. I know that some airports try to protect particularly, those zones which are most impacted, in order not to put all the noise on them. However, knowing that adaption measures, e.g. noise-isolated windows, are easier applied only to limited areas. So, probably there is no easy answer to this.</p>
<p>Hello,why combining with density population only? I mean pollution is not good over water for instance or natural environments..</p>	<p>Sigrun: Thank you for your question. In our ATM4E feasibility study we focussed on impacts on population. However, I agree, also natural environments can suffer from pollution, in terms of acidity (nitrogen oxides), or damage to plants (e.g. ozone). The overall concept would allow to also include such impacts on natural environment; this depends on definition of the environmental metric which is used when calculating the ECFs.</p>
<p>can you advise its the Departure or arrival zone around Airprot</p>	<p>Sigrun: I have the feeling that their is a larger mitigation potential in the departure procedure. In arrival procedures much less room is given for improvement and reduction of impacts.</p>

<p>Sigrun, how realistic is it in a pre-pandemic traffic environment in Europe to consider all environmental components in the trajectory management?</p>	<p>Sigrun: Thank you for your question. I think one has to be realistic. Assessing major environmental impacts in the trajectory management is a central issue, and one should aim to be able to do so. However, optimizing is another story, as trade-offs occur, and you can't minimize all of them. But at least providing a quantitative estimate of their impact is to my understanding helpful in developing solutions.</p>
<p>Will the recording of this webinar be made available?</p>	<p>Olivia / Ruben: Yes, the recording will be made available on the SJU events page</p>