

| | Question | Answer |
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| 1 | does that mean that, by June 2023, there won't be any exception such as speed or weight (5.7T) for aircraft, and that ALL aircraft flying IFR will be ADS-B equipped? | By June 2023 only the retrofit temporary exemption expires. Operations not under the mandate (lighter GA end, MTOW<7.5 tons or max TAS <=250 knots) are not affected and will not be equipped 2023, nor 2025 except voluntarily; same applies to old aircraft permanently exempt (built before 07 JUN 1995) |
| 2 | To give details regarding my previous question, the 2017/386 regulation postpones the equipment of ADS-B Out functionality by June 2020 for aircraft with 5.7t MTOW or max TAS > 250 knots. This regulation is still in force at the moment and I wanted to be sure that it will be amended in June 2023 (some light aircraft flying IFR are not ADS-B equipped in France) | If the airplane is less than 5.7 tons and it is flying less than 250 kts it is not required to install ADS-B, it is only required to have ELS fitted. There is no requirement for light aircraft flying IFR under the weight limits and under the speed limits to equip with ADS-B. Of course it can be voluntarily equipped but there is no requirement to fit it. |
| 3 | ESASSP require 97% PD for 100% of flights as surveillance performance for separation services. How can/shall that be handled with ADS-B only when SPI IR doesn't cover all flights in the airspace? | This question refers to the need to accommodate mixed-mode traffic; the NAV PT presentation in the workshop is a good example. ADS-B as sole-means will of course struggle to achieve a meaningful Pd in an environment with non-equipped users, then a local operational assessment needs to take place to analyze the impact and describe what mitigations could be considered. For instance, states have the freedom to declare local airspace mandates alternatively some level of interrogating surveillance should be kept to surveil those not equipped. |
| 4 | How does EDA see the integration of non-ADS-B 5th gen fighters into EU surveillance picture. There will be 400 plus purchased across the region in the next 10 years. | From the military perspective, ADS-B should not be the sole means of surveillance. Specifically for the F-35; 400 plus fighters are coming. They will not be equipped with ADS-B, they may not be equipped with Modes S, it will be Mode AC and of course additional surveillance systems. In any case, the fighters are not mandated (to carry ADS-B equipment) in the regulation (1207/2011), mandated are the transport aircraft. The fighters are mandated (to carry) Mode S equipment (when operating as GAT) but it is not completely sure that they will include it because there are some security concerns and they are purchased as they are and in most cases, they do not include it (Mode S). What could be the way forward? R&D. There are some potential ideas, not necessarily equip the aircraft but using the existing military capabilities of connectivity really to transfer this information to the ground. At the end, it could be, that the ground segment of the military command control services or systems are sending information to the civil site etc. There are different alternatives. It is true, for the time being, it is a challenge. |
| 5 | So is an ADS-B based surveillance system resilient in the face of GNSS jamming | ADS-B is not very resilient to GNSS jamming. (...) We need to protect and make sure that we avoid jamming on GNSS because indeed, ADS-B on the aircraft side is sensitive when we see these real jamming events happening. One additional point of complement on this is that there is also a disparity in how different aircraft handle the jamming. There are some architectures which are more resilient and recover seamlessly when the jamming stops and there are others which do not recover until the aircraft is reset on landing. Again, this is one wish that I hear sometimes coming from the airspace user corner to work on standardizing the way aircraft handle jamming events. |
| 6 | So we are commuting to a surveillance environment that can be crippled by low power GPS jamming! What is the call back plan? | It is not a reasonable assertion at this point in time to commit yourself to a fully vulnerable surveillance chain. This is why the language which is currently recognized is the one that mentions the so called optimum mix, which is an infrastructure or surveillance chain which strikes the right healthy amount of balance between independent and dependent surveillance to take advantage of both without compromising the underlying safety of the air picture and this is where I would propose the discussion to evolve from now on. It is also, as my colleague Johan said very correctly, it is location dependent. You simply have to assess your local operating environment, assess the threats to which the dependent surveillance is susceptible and you design your entire chain around it. Some measure of independent surveillance will be necessary going forward. How much, that depends on your local environment. In some cases more, in some cases less, but some measure of it will in my opinion be necessary going forward. |
| 7 | SUR is the bottle neck to reduce separation. If ADS B sole solution is not feasible, how we can reduce separation in TMAs to improve capacity. | The surveillance concept is performance based, which means it has end-to-end requirements. The original ADS-B application (ref Eurocae ED-126) was designed as an alternative to procedural-only environments, and in that role it indeed offers a substantive capacity improvement by supporting 5NM separation, assuming that its weaknesses are mitigated, such as what concerns the sensitivity of GNSS to Signal in Space jamming. Lower than 5NM, ADS-B should be used only in conjunction with interrogating (or "radar") surveillance, using Eurocae ED-161, and then it no longer is sole-means. Could sole means ADS-B support separations lower than 3/2.5NM if it could rely on 100% equipage and was immune to interference to a degree comparable with the radar? That is a theoretical question and an interesting proposition for a PhD project. We would refer this question to SJU. |
| 8 | What we should be doing in R&D to progress on civil/military integration in SUR ? | In SESAR currently there are some minor activities related to this, but of course we need to go further. This is why EDA together with Eurocontrol and in the framework of SESAR are trying to identify what can be done. At least there is an action of identifying what we can do. The first is to launch some studies on identifying military requirements. Specifically for this aspect, this is the status now. At EDA we have some initial actions in co-operation with Eurocontrol. In SESAR we have already the placeholder to go further. We have now these actions set up and a framework. Of course, now we need to get the buy-in from industry, because at the end, research has to be done by manufacturers. (...) We have produced a strategy with all military communities in which we are including these important aspects. We have several tools and it is a question of beginning and doing something. It is well identified, that we have to work on it. |
| 9 | Why DME/DME+NS are not be used as positioning sensor for ADS B, so it becomes more robust to GPS jamming ? | In the former versions of ADS-B, in the version 0, it was possible to route the position through other devices on board. That was excluded on version 2 because exactly it was impossible to give consistent assurances of accuracy and integrity. This would be in fact the task that the standardization body would have to address. How does the onboard system fill the accuracy, integrity and other flags, if it is receiving the position from something else than GNSS. Because the flags are more or less a pass through from what the GNSS sensor gives in terms of dilution of precision. So the DME/DME sensor would have to somehow simulate appropriate accuracy and integrity values. Accuracy is possible today and is in fact done by navigation systems using an error budget allocated to the DME airborne and ground systems. Concerning integrity, the work has been progressed lately by EUROCAE WG-107 and will result in an updated MOPS for the ground DME station, the transponder, ED-57. It is currently expected for consultation towards the end of 2023 and is developed primarily for the RNP applications in PBN but hopefully ADS-B could also take advantage of that. As a side note, an FAA study into A-PNT performed in 2014 as part of the development of the FAA NAS navigation strategy, featured a requirement to support to both PBN and ADS-B applications and DME/DME was one of the candidate A-PNT systems evaluated. It did not meet the requirement. |
| 10 | What did FAA do to promote and support the equipage in the run-up to the mandate, specifically in the context of the light aircraft families? And what advice would you give to the European Union which recently opened that financing opportunity which Eric mentioned in the beginning of this workshop? | FAA did a lot of things, there was a significant amount of outreach. FAA attended a lot of events in US. We had the MBAA, AOPA events, e.g. fly-ins. FAA there promoted ADS-B, why they were doing it, why do operators need to equip, why do they need this. Making sure people understood the reason why FAA is moving towards implementation of ADS-B. Also one big thing that helped FAA with the General Aviation Community was, they had a rebate program that ran and they were providing 500 USD for those who wanted to equip with. For those who wanted to take advantage of it, had certain requirements they need to meet, and process to do so and when they met it, they were given a 500 USD cheque. So FAA worked on creating that rebate program and that helped incentivize General Aviation as well. |
| 11 | Who enable dynamic blanking area when necessary ATCO in CWP or SMC on ARTAS? | This is done by the operator. It would be the ATCO supervisor contacting our service center supervisor/technical watch supervisor and then the operator switches on, activates or deactivates the blanking area with a command that is done on the ARTAS system by the operator. |
| 12 | I wonder why, if we go through all the standardization work, we do all the work in SESAR research to demonstrate it, why all the validation has to be redone locally? | ADS-B is not a novel concept by any means, yet no technology is perfect and it is part of its lifecycle that its weaknesses are discovered, studied, understood and mitigated. The same can be said for much older CNS technologies such as Mode S where problems continue to be discovered and addressed that nobody would have foreseen. Coupled with the specificities of ADS-B being a GNSS dependent technology and therefore sharing a common vulnerability with PBN, and the fact that it performs sufficiently differently from conventional surveillance to be discernible at the operator output, caution is advised during deployment lest we jeopardize the operator confidence building process and inadvertently set ourselves back. From that perspective it is advised for ANSPs to explore their local applications, devise what mitigation techniques they deem necessary and share these with others in the interest of the common good, such as what is happening in this workshop today. |
| 13 | Could anybody recommend a reference to define a link between ADS-B quality indicators and separation minimas? | Refer to EUROCAE ED-126 for the 5NM case, and ED-161 for the 3/2.5NM cases assuming that independent cooperative surveillance is available to complement ADS-B. |
| 14 | Do you see ADS-B exemptions being extended to NATO allies en-block or will this be on an exceptional case by case | When it comes to State aircraft, the applicability of SPI IR is on EU States. It mandates, when operating as GAT/IFR, ADS-B OUT for Transport type State aircraft. For a given non-equipped EU MS aircraft (under certain conditions), the ATS of that MS is obliged to accommodate it. Non-EU States are not obliged to equip their State aircraft. However EU MS ATS systems are not obliged to accommodate them. It is a national decision if and how they accommodate them. More information on how non equipped aircraft are accommodated in EU MS can be found into the Eurocontrol document: "Management of Flights by Mode S and ADS-B OUT Non-Compliant State Aircraft. Compendium of Aeronautical Information". In this sense, the decision of how to deal with NATO assets will remain national and on a case by case basis as this is linked to each national civil military arrangement. |