



***ASAS issues identified
in the AP23 work***

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AP23 Overview: Deliverables

Action Plan 23 is a **FAA and Eurocontrol** common study focused on the **longer term airborne surveillance and ground surveillance** applications.

Five deliverables from AP23:

- D1 – General data exchange
- D2 – Methodology to prioritize applications for AP23
- D3 – Operational Role of Airborne Surveillance in Separating Traffic
- D4 – Draft proposal for a second set of ADS-B/ASAS applications
- **D5 – Airborne separation applications : Issues paper**

NOTE: D5 is still under work among AP23 for a delivery in 2009



Contents

- Main points from D5 - **ASAS Key Issues**
- These are mostly the key questions in relation to ASAS:
 1. Change to ATCO/Flight Crew role and procedures
 2. Compatibility with TCAS
 3. Transition towards airborne separation and self-separation
 4. Airborne separation minima
 5. Regulatory and safety case
 6. Implementation and operational benefits
- D5 sums up the question and **tries to provide sensible answers or indicates work required to provide solutions**



1. Change to ATCO and Flight crew role and procedures

- Paradigm change: new way of providing separation with ASEP applications.
- Several issues are identified:
 - The delegation of responsibility must be clear at each moment
 - In ASEP, a pair of aircraft is treated differently by ATCO and the impact has to be assessed - especially on the design of ATCO HMI.
 - The duration of delegation might have an impact on mental picture and on traffic situational awareness.
- For ASEP, is it always ATCO initiative or can it be on pilot's request?



1. Change to ATCO and Flight crew role and procedures

- The operational procedure must be decomposed in phases in order to support clear and unambiguous role of actors.
 - With ASEP, traffic situational awareness is increased in the cockpit 😊... but possibly decreased on the ground. ☹️
- Data link can be used extensively.
 - To inform the “reference aircraft” of the ASEP procedure
 - To exchange technical data or complex messages
 - To inform ATC of aircraft intentions during the maneuver - however it is debatable whether this information should be displayed to the ATCO.
- Ground tools to determine the opportunity for the ASEP procedure are probably required.
 - Monitoring aids could be proposed for reduction of workload?



2. Compatibility with TCAS

- IAPA Project (EUROCONTROL, 2005) showed that interactions between ASAS applications and TCAS can occur:
 - When crossing at less than 5 NM SEP, RA can occur;
 - When crossing at less than 7 NM SEP, TA can occur.
- RAs can become a show stopper
 - Repetitive RAs as in RVSM early days must be avoided

=> ASAS procedure and logic must be designed **“TCAS RA proof”**
- TAs can become annoying too
 - => Maybe a redesign of TCAS is the best way forward



3. Transition towards airborne separation and self-separation

- Today → ASPA → ASEP → SSEP: what transition strategy?
 - ANSP's way: identify applications that are locally beneficial and proceed with gradual introduction of ASAS
 - Airlines and avionics industry's way: define an operational concept that meets SESAR/NextGen objectives and develop a new system
- Changing operational environment
 - Moving forward step by step can help to build up confidence in the new procedures and gain experience before the next step.
 - But moving forward slowly makes it difficult to follow for aircraft equipment and human actors, and will take time to reach SESAR or NextGen goals.
 - Mutual benefits must be assessed to find the best agreement on the implementation timeline



4. Airborne separation minima

- Can we introduce ASEP application without the determination of airborne separation minima?
 - If the separation minima is based on airborne surveillance, is it aircraft dependant rather than airspace dependant?
 - Do we need a set of values (3, 6, 9 NM) with respect to aircraft performance?
- If the airborne separation minima are too different from ground separation minima, is it operationally viable?
 - If Ground SEP >> Airborne SEP → Why not SSEP?
(in oceanic airspace in particular)
 - If Ground SEP << Airborne SEP → Why delegate separation?
(effectiveness of ASEP in terminal areas?)



5. Regulatory aspects and safety case

- ICAO provisions are sufficient to enable ASEP and SSEP.
 - The operational procedure must be crystal clear on the delegation of responsibility.
 - Contingency procedures must be developed relying on the airborne side solely. In any event, ATCO cannot recover responsibility if Ground SEP is not met.
- Safety cases are needed.
 - ANSP must establish a safety case for a given application in a given airspace
 - The Regulatory authority will have to approve it for certification.
 - What will be required for this approval is still unclear.



6. Implementation and operational benefits

- ANSP will choose an AS application adapted to the local environment.
- Cost Benefit Assessment
 - ATCO and flight crew acceptability cannot be dissociated from operational benefits such as safety and flight efficiency.
 - It is difficult to evaluate benefits brought by ASAS application while ASAS is one element of a complex ATM system.
- Examples of CBA already achieved
 - NATS evaluated ASEP-ITP/ITF/ITM in North Atlantic airspace (ASSTAR project)
 - DSNA evaluated ASPA-S&M in Paris TMA (PALOMA and CRISTAL PARIS project)



6. Implementation and operational benefits

- What are the gains for ASEP-ITP in oceanic compared to ATSA-ITP?
 - Only marginal additional benefits with a more complex equipment
 - However, more additional benefits could be brought by the combination with other applications such as ASEP-ITF, ASEP-ITM.
- DSNA evaluated the airspace design and the need for mandatory carriage under ASPA-S&M
 - We can expect benefits without changing the Paris TMA but not much
 - Workable with partial equipage of the fleet, but no benefits under 70% of equipped aircraft



Conclusions

- AP23 team is preparing for the future of AS applications using NextGen/SESAR concept of operations and setting the scene at the ICAO level.
- The production of D5 on “airborne separation issues” will provide a high level framework and possibly hints for answers to the key questions.
- ANSP and Airlines will need to assess detailed and specific applications and conduct CBA before implementation.



Thank you

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