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Sir

SELECTION OF RADAR (PSR/SSR) AND ASSOCIATED AIRBORNE TRANSPONDER MATTERS

1. Your letter dated 31 May 2006, regarding this topic refers. The permission document submitted to the Economic Regulator during September 2006 indicates ATNS as adopting the following position regarding your correspondence:

"The Commissioner of Civil Aviation has indicated that the current requirement for approach radars within TMA's where radar services are provided is in his view not so much a safety requirement as it is a matter of industry economics. The industry subsequently requested that the original requirements for approach radars at Bloemfontein and George be reconsidered and that only secondary surveillance radars be provided. ATNS have on the basis of the Commissioner's and industry's views deferred the provision of the two primary radars concerned, pending completion of a formal safety case and risk assessment. The safety case and risk assessment will inter alia consider ICAO prescribed separation standards and target levels of safety, airspace capacity requirements and the need for buffer and/or transponder mandatory areas to ensure the continued maintenance of the required aviation safety standards. The results of the safety case and risk assessment will be made available to affected parties for consideration and finalisation of the conditions under which secondary only surveillance can be used for separation purposes."

2. The debate on the implementation of and the requirement to carry and operate airborne transponders, in order to enhance surveillance and thereby safety was initiated by the ICAO requirement for aircraft of certain weight categories or capable of carrying specified amounts of passengers, to equip with ACASII (TCAS version 7). In order for ACAS(Airborne Collision Avoidance System) to provide effective information, the environment in which it operates, needs to be electronically responsive and as such the operation of transponders by all operators present in the airspace at a particular time is required.
3. Further to this requirement is the need, as reflected in the AFI CNS/ATM Implementation Plan version 5.1 to utilise Secondary Surveillance Radar (SSR) in order to provide surveillance within busy terminal control areas (TMAs). The document also states that where available and when necessary in the interest of safety, existing primary radars (PSR) may continue to be used in these TMAs, where there still exists a mix of transponder equipped and non transponder equipped aircraft, until there is a sufficient equipage in pressure altitude transponders. The AFI CNS/ATM Implementation Plan version 5.1 further indicates they following: *"The intent is to discourage the installation of new primary radar. Equipage in pressure altitude reporting transponders should be promoted by States in accordance with ICAO provisions in Annex 6, Part 1, international air transport, and Part II on general aviation."*

4. The debate has now centred on the economic benefit of the utilisation of primary radar systems versus that of secondary surveillance radar systems and the associated cost of deploying and obtaining benefit from the two systems. There are two widely opposed schools of thought, which can unfortunately contribute to the dilution of safety in those areas where the use of a surveillance system will benefit the user. Your letter dated 31 May 2006 indicates that the interaction with industry regarding the deployment of surveillance systems whether Primary or Secondary Radar is the sole responsibility of the service provider (ATNS) and is based on industry economics rather than on safety considerations.
5. ATNS has given clear indication to the aviation industry at large and in particular to those operators based at Bloemfontein, East London, Port Elizabeth and George of the intention to deploy dependent surveillance systems at these locations, in order to enhance safety and efficiency, by way of AIC 44.2, which was published and effective on the 18/03/2005. This implies that the operation of transponders would be required within the airspace surrounding the mentioned airfields. The same publication also reflects that Cape Town, Durban and Johannesburg would continue to be equipped with both PSR and SSR. All other TMAs will be equipped with dependent surveillance systems when electronic surveillance is justified.
6. The justification to deploy a dependent surveillance system and to require transponder operations within specific distances of TMA/CTA boundaries, in a totally active environment, both laterally and vertically is contained in Chapter 8, section 8.7(Use of Radar in the Air Traffic Control Service) of the Procedures for Air Navigation Services/Air Traffic Management – PANS ATM(Doc 4444). Under these provisions, an ATC is required to maintain specific distances between identified aircraft and also between identified and unidentified aircraft, while providing a radar controlled service to a flight. Should a pilot not operate the transponder, or should there not be a requirement to operate the transponder within the vicinity of the airspace in which radar control services are being provided, the ATC's situational awareness regarding the presence of this flight is downgraded.
7. As the ATC may operate, dependant on the traffic situation up to the limit of the controlled airspace, in this case the TMA or CTA boundary while still providing the necessary radar separation, the lack of knowledge regarding the presence of unannounced traffic in the vicinity of the controlled airspace boundary may result at best in a reduction of separation, or at worst a collision, should there be an error committed by either the pilot of the aircraft which should be remaining clear of controlled airspace or the ATC.
8. Further to the issue of the carriage of transponders in the vicinity of TMA/CTA boundaries. It should be noted that although South Africa has legislation in place requiring the operation of transponders within specific airspaces, the standard contained in Annex 6, Part 1, 2 and 3 reflects that all aeroplanes and helicopters, excluding those which have been specifically exempted by the appropriate authority shall be equipped with a pressure altitude reporting transponder. The transponder is required to operate in accordance with specifications contained in Annex 10.
9. The standard is strongly supported by a recommendation that all aeroplanes and helicopters should be equipped with transponder. This is absent from South African legislation. It is also to be noted that it is the intent, according to the standard contained in Annex 6, that aircraft not equipped, should be segregated by not sharing airspace with those equipped with ACAS.
10. In complying with the PANS ATM (Doc 4444) regarding the minimum distances to be applied between aircraft when providing Radar separation, ATNS has determined that 10 nautical miles(NM) between the extremities of radar position indicators(RPS) is required. In order to maintain the required the separation standards between known and known and unknown traffic the airspace boundaries will need to be expanded to allow for the same effective volume of airspace, thus allowing for the existing service standards to be maintained.

11. Note should be taken of the fact that a potential increase in the number of aircraft movements has been calculated to be an estimated 1, 000,000 movements per year leading up to the Soccer World Cup, with that figure increasing by 3, 3% over the following period. To provide the required service at expected levels of safety, will require the implementation of technology which would include transponders in the very airspaces in which this requirement is now being debated.
12. With due consideration of the safety implications, the economic impact and the potential impact on capacity requirements ATNS has decided to conduct a functional hazard assessment (FHA) and a collision risk assessment (CRA). These activities will identify the specific hazards and risks associated with the utilisation of passive and dependent surveillance systems, the combination of the two systems and the associated buffer zones and /or transponder mandatory areas and aircraft equipage. The FHA will provide a mechanism to mitigate the hazards and risks associated with the aspects subjected to the assessment.
13. The FHA will be conducted by ATNS personnel in cooperation with representatives from the industry, including AASA, BARSAA, Aeroclub, ALPA, AOPA, HASA and SACAA. The SACAA is hereby invited to participate in the FHA activities. The FHA is scheduled for completion by 31 March 2007. In pursuit of the target date for completion a consultation with the stakeholders is scheduled for the end of November 2006. A formal invitation will be forwarded to you once the exact details regarding the date and venue have been finalised.
14. The CRA will be conducted by a recognised specialist, available through an organisation such as NLR (from the Netherlands). This assessment will be similar to the assessment conducted for the implementation of RVSM within AFI, although of smaller magnitude of work. The CRA will deliver accurately calculated target levels of safety for the airspaces and activities conducted in those airspaces, with the associated passive and dependent surveillance systems and buffers. As such the TLS will form the basis for future safety assessments and be an indicator of the feasibility of system implementation in the future. This activity will further support the amended requirements of Annex 11, regarding the responsibility of states to calculate appropriate target levels of safety.
15. ATNS, as the service provider, is primarily concerned with the safety of ATM service delivery. The actions taken by ATNS are concentrated on achieving the required levels of safety within the ambit of available technology and with due consideration of industry economics and system safety in collaboration with all members of the ATM Community.
16. ATNS would like to cooperate very closely with the SACAA and in this collaborative environment produce a result that will benefit the aviation industry in South Arica.

Yours truly

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Distribution: ATNS – CEO
AASA
Aeroclub
ALPA
AOPA
BARSAA
HASA
SACAA