

AIR NAVIGATION COMMISSION

ANC Task No. CNS-7901: Conflict resolution and collision avoidance systems

PRELIMINARY REVIEW OF PROPOSED AMENDMENTS TO ANNEX 6, PART II TO INCLUDE PROVISIONS CONCERNING ACAS II EQUIPAGE AND PILOT TRAINING

(Presented by IBAC OBSERVER)

DISCUSSION PAPER NO. 1

1. INTRODUCTION

1.1 The purpose of this Discussion Paper is primarily to reflect on the evolution of ACAS II carriage requirements as occasioned by previous amendments of Regional Supplementary Procedures in the absence of related Annex 6 Part II provisions.

1.2 The paper is also intended to assist in exploring the merits of the amendment proposals for Annex 6, Part II, specifically the Recommended Practice relating to aircraft with maximum certificated take-off mass (MCTM) above 5,700 kg but not exceeding 15,000 kg.

2. GENERAL REMARKS

2.1 IBAC, as a matter of long standing policy, supports the global harmonization of rules and regulations, especially those pertaining to the carriage of airborne equipment. IBAC supports the proposed Standards 6.15.1 and 9.1.2.

2.2 The matters of particular interest to IBAC are:

- a) Has due diligence been applied in the formulation, justification and adoption processes involving SUPPS RAC amendments pertaining to the carriage of ACAS II by certain categories of general aviation aircraft engaged in international operations? This is a relevant, allied consideration because, putatively, the present Annex 6, Part II amendment proposals and, in particular the proposed Recommended Practice 6.15.2, arguably provide, retrospectively, a foundation for previously adopted SUPPS RAC in several Regions.

- b) Unlike the proposed Annex 6, Part II amendments, which relate to future delivery of new aircraft and thus do not invoke retrofit, the SUPPS RAC amendments burdensomely mandate date-specific retrofit.
- c) Is the proposed Recommended Practice 6.15.2 well reasoned and justifiable?

3.REGIONAL SUPPLEMENTARY PROCEDURES

3.1 AN-WP/7901 in paragraphs 3.3 and 3.4 addresses the matter of Regional Supplementary Procedures. It is by no means clear that the Regional Supplementary Procedures in the AFI, EUR and NAT Regions have all been “appropriately justified on operational safety grounds”.

3.2 There is reason to believe that those for the AFI and NAT Regions may have merely ‘echoed’ and been driven by those previously adopted in the EUR Region.

3.3 The Foreword to the Regional Supplementary Procedures states in sub-paragraph 2 a) that “The Regional Supplementary Procedures form the **procedural** (bold emphasis added) part of the Air Navigation Plan...”. The Foreword further states: “...Regional Supplementary Procedures should indicate a mode of implementing **procedural** provisions...”. Sub-paragraph 2 b) states that “They must either specify detailed **procedural** regional options or promulgate a regional **procedure**”.

3.4 Is it appropriate therefore, for SUPPS RAC to prescribe the carriage of airborne equipment, and to do so when the relevant Annex is moot? In addition, the present circumstances are such that the SUPPS RAC in three Regions are invoking a retrofit requirement whereas the proposed Annex provisions, rationally, do not. One could contend that the SUPPS have been used to usurp the status of an Annex. This may be admissible, but where is the rationale to justify doing so in these instances?

3.5 If one examines the SUPPS RAC it is noticeable that the references contained in the title boxes reference “Annex 6, Part 1 – 6.18”. The operative texts presented thereafter are however not confined to commercial operations, but refer to “all aircraft”. It should be noted that the latter term also embraces aircraft engaged in aerial work.

3.6 In other words, at the consultation stage in the SUPPS amendment process it was not made manifestly evident that the proposal was more stringent than the Annex provisions, nor was the justification for such additional stringency presented.

3.7 In the case where SUPPS introduce an equipment carriage requirement not prescribed in the relevant Annex, surely it would be reasonable to first explore the need to amend the Annex provisions. Arguably, the process for amending an Annex embodies a degree of rigor superior to that involving an amendment of SUPPS. On the other hand, this should place an additional burden of justification for any SUPPS amendment which mandates the carriage of airborne equipment.

3.8 In the case where agreement cannot be reached to amend Annex provisions, it would seem feasible, but not necessarily acceptable, that resort could be had to a SUPPS amendment.

4. COMMENTS ON PROPOSED ACAS II CARRIAGE PROVISIONS

4.1 Details of the geographic distribution and characteristics of the world business jet fleet, typical annual utilization of business jets in the EUR Region, forecast annual deliveries of business jets to 2008 and beyond, and typical installed cost and weight penalties of ACAS II and ACAS I equipment are provided in the appendix.

4.2 The data in the appendix indicates that, assuming no significant change in the ‘basing’ of medium/small business jets, most of the future production will reside in the NAM Region. In terms of the number of new aircraft potentially impacted by proposed Recommended Practice 6.15.2, this will be the most affected regional fleet segment. This, in the expectation that many of those aircraft will conduct international operations. On the other hand, such new aircraft delivered to European operators and which will be more disposed to be engaged in international operations will be subject to the ACAS equipage requirement effective 1 January 2005, as indicated in the current SUPPS RAC EUR. Brazil is expected to continue to be home to a significant fleet segment of this category of aircraft, a number of which will be engaged in international operations within the SAM Region.

4.3 The cost and weight of ACAS II for aircraft of MCTM above 5,700 kg but not exceeding 15,000 kg is significant in relation to the cost of the aircraft and the ‘executive’ payload.

4.4 The annual utilization of this category of aircraft is more than an order of magnitude less than that of an airline aircraft. Thus, the exposure to a mid-air collision is proportionately less.

5. RISK ASSESSMENT AND RISK MANAGEMENT CONSIDERATIONS

5.1 The case for equipage with ACAS II in AN-WP/7901 resides essentially on the grounds of “enhancing the effectiveness of airborne collision avoidance systems”.

5.2 All business aircraft in the MTOW range under discussion are equipped with an altitude reporting transponder. The additional carriage of ACAS II will add the maneuver coordination function in any encounter with an ACAS II equipped aircraft. Whilst this may marginally augment the effectiveness of airborne collision avoidance systems, the aggregate risk exposure for these business aircraft has not been considered.

5.3 With the exception of about three mid-air collisions involving airline aircraft, the history of mid-air collisions over the last 50 years and the analysis of these events shows that the probability of a mid-air collision is greatest below 20,000 feet and within 50 -75 NM of the aerodrome of departure or landing.

5.4 When one takes account of the typical operational profile of medium/light weight business jets, use is frequently made of ‘reliever’ and other airports where invariably there is significant general aviation traffic, operations are oft times conducted to/from uncontrolled aerodromes and/or operations are conducted in other than Class “A” or controlled airspace. So, if indeed a case is to be made on safety grounds for equipping such business aircraft with ACAS II, it should be focused in this area. This is where the greatest risk exposure is and where the benefits of ACAS II equipage will pay off, the cost and weight penalty notwithstanding. The risk exposure described above is however more typical of domestic operations than international operations.

6. PROPOSED ACTION

6.1 The Air Navigation Commission is requested to:

- a) agree that a review be undertaken of the relationship between SUPPS and Annex provisions;
- b) explore whether SUPPS RAC AFI, EUR and NAT in respect of the carriage of ACAS II by aircraft with MCTM above 5,700 kg but not exceeding 15,000 kg engaged in international general aviation operations (and aerial work operations) have each been “appropriately justified on operational safety grounds”; and
- c) take account of the information presented above in considering the disposition of the proposed Recommended Practice 6.15.2.

APPENDIX

1. Business jet fleet geographic distribution (2002)

	NAM	EUR	ROW*
Large business jet (1)	2,789	347	299
Medium business jet (2)	3,573	365	475
Small business jet (2)	4,603	431	591

(1) excludes derivatives of airline aircraft

(2) descriptor includes jet aircraft with MTOW in range > 5,700 to < 15,000 kg

*ROW = Rest of world

2. Small business jet characteristics (MTOW >5,700 kg to <15,000 kg)

Approx price range equipped USD 5 million -13.5 million

Typical ranges, at max payload 1200 – 2200 NM

Typical 'executive' payload 635 - 820 kg (1400 –1800 lb)

3. ACAS II installed cost and installed weight (typical as of 2003)

USD 152,500

102 lbs

4. ACAS I installed cost and weight (typical as of 2003)

USD 87,500

75 lbs

5. Typical annual utilization of business jets in EUR (2002)

Medium business jets 325 hours/p.a.

Light business jets 267 hours/p.a.

This is less than one-tenth of that of airline aircraft utilization and therefore exposure.

6. Forecast of annual deliveries of business jets between MCTM 5, 700 kg and 15,000 kg)

MCTM, to 2008 and beyond 250 – 300 units.

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