DGCA/06-IP/29
16/3/06

DIRECTORS GENERAL OF CIVIL AVIATION CONFERENCE ON A GLOBAL STRATEGY FOR AVIATION SAFETY

Montréal, 20 to 22 March 2006

Theme 2: Improving aviation safety
Topic 2.1: Transparency and sharing of safety information

SAFETY IMPLICATION OF SYSTEM IMPLEMENTATION ISSUE (SSR MODE S PARTIAL DETECTION ISSUE)

(Presented by Japan)

SUMMARY

This paper presents the SSR Mode S partial detection issue in which the response signals of certain types of Mode S transponders could not be correctly acquired by SSR Mode S ground radars. The meeting is invited to acknowledge the importance of proper performance management of avionics.

1. DISCUSSION

1.1 Various avionics serve as important tools to air navigation and air traffic control (ATC) from the past. It is difficult to imagine the ATC without the Mode A code and altitude information obtained by Secondary Surveillance Radar (SSR).

1.2 States and groups of States are developing the next plan beyond 2010 to overcome existing and expected constraints due to increasing air traffic. Such initiatives include the Next Generation Air Transportation System (NGATS) being developed by the United States and the Mode S enhanced surveillance (EHS) by EUROCONTROL. New avionics based on Standards and Recommended Practices (SARPs) and global industry standards would provide the basic system for realization of such initiatives. Without proper procedures to ensure the functionality and performance of avionics, it is quite difficult to appreciate the expected benefit of new systems.

1.3 As a part of the CNS/ATM system, a new system SSR Mode S was developed through the SSR Improvement and Collision Avoidance Systems Panel (SICASP) of ICAO, which is capable of improving the performance of SSR to cope with the problems like coasts, ghost targets, fruits, etc., occurring in the radio spectrum environment and being compatible with the existing Mode A/C systems.

New SSR Mode S ground segments as well as avionics have been implemented since the 1990s in the world. Since the commencement of SSR Mode S radar operation in Japan, a phenomenon that the response signals of certain types of Mode S transponders could not be correctly acquired by SSR Mode S ground radars has been observed many times.

1.4 To resolve the above-mentioned SSR Mode S partial detection issue, Japan issued the AIC 010/06 in Attachment A to request operators to carry out proper maintenance of transponders and urged relevant countries to acknowledge this serious issue. Considering that SSR Mode S transponders have been implemented with the mandatory carriage of ACAS as specified in Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes* and this partial detection has also been observed in other States, there is a potential threat to aviation safety that the aircrafts equipped with such a transponder hinder air traffic control operations. The ICAO Surveillance and Conflict Resolution Systems Panel (SCRSP) has been also discussing this issue. Although this cause has not been identified yet, it is a very crucial issue. Taking this opportunity of the DGCA, all Contracting States are requested to regard this issue as serious and cooperate together to resolve the SSR Mode S partial detection issue.

1.5 ICAO has developed various international SARPs through its established procedures including technical panels established under the auspices of the Air Navigation Commission (ANC). In the past, ANC panels have worked not only on the development of new SARPs but also on the review of the progress of implementation. It is considered that necessity on the development of additional material and/or the new SARPs could correctly be appraised through a technical review process by the technical panels, which have developed the SARPs. The SSR Mode S partial detection issue also needs to be addressed accordingly.

2. CONCLUSION

2.1 The Conference is invited to:

a) note the information contained in this paper;

b) acknowledge the importance of proper performance management of avionics including SSR Mode S transponders;

c) encourage Contracting States to cooperate together to resolve safety related implementation issues especially including the SSR Mode S partial detection issue; and

d) acknowledge the importance of continuous review of the implementation issue.

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APPENDIX

JAPAN

AIC

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MINISTRY OF LAND, INFRASTRUCTURE AND
TRANSPORT CIVIL AVIATION BUREAU

国 土 交 通 省 航 空 局

Nr010/06
16 FEB 2006

010/06
SSRモードS地上レーダーの運用開始について

1．以下のとおりSSRモードS地上レーダーの運用が開始される。

施設名 Name of Facility	運用開始日時 Date/Time of commencing its operation
山田ARSR YAMADA ARSR	平成15年11月20日0000JSTから From 1500UTC 19 NOV 2003
いわきORSR IWAKI ORSR	平成15年12月4日0000JSTから From 1500UTC 3 DEC 2003
三国山ARSR MIKUNISAN ARSR	平成16年2月23日0000JSTから From 1500UTC 22 FEB 2004
上品山ARSR JOBONZAN ARSR	平成18年2月8日0000JSTから From 1500UTC 7 FEB 2006
八戸ARSR HACHINOHE ARSR	平成18年3月1日0000JSTから From 1500UTC 28 FEB 2006

但し書き：ただし、いわきORSRについては平成18年2月8日から当分の間モードA/3およびモードCのみにより運用を行う。
Note: IWAKI ORSR will operate using only Mode A/3 and Mode C from 8 FEB 2006 until further notice.

2．SSRモードS地上レーダーはモードS用航空交通管制用自動応答装置のみならずモードA/3及びモードC用航空交通管制用自動応答装置を装備した航空機も捕捉することが出来る。

3．以下のモードS用航空交通管制用自動応答装置はICAO標準に適合しないことからSSRモードS地上レーダーに捕捉されることが出来ず、管制運用に支障をきたす可能性がある。このため、当該航空交通管制用自動応答装置を装備した航空機は当該ブレティンに基づく改修を実施した後に飛行することを強く要請する。

ハネウェル・ソフトウェア・ブレティンMST67A-SW2 Rev.4又はそれ以降の改訂版の適用を受けるハネウェル社製MST67AモードS用航空交通管制用自動応答装置であって、当該ブレティンに基づく改修が未了のもの。

4．日本においてSSRモードS地上レーダー運用開始後、特定のモードS航空交通管制用自動応答装置（ロックウェルコリンズ社製TPR-720型及び同TPR-900型モードS航空交通管制用自動応答装置）が経年変化により性能が劣化し、モードS地上レーダーに正常に捕捉されない現象が多数観測されている。このような航空交通管制用自動応答装置を搭載した航空機は管制運用に支障をきたすおそれがある。

010/06
Commencement of SSR Mode S ground radar

1. SSR Mode S ground radar will commence its operation as follows.

2. SSR Mode S ground radar is able to acquire not only the aircraft equipped with a Mode S ATC transponder but also the aircraft equipped with an ATC transponder (Mode A/3 and Mode C).

3. Since the following Mode S transponder doesn't comply with ICAO standard, this transponder is not acquired by SSR Mode S ground radar. As a result, there is a potential threat which the airplane equipped with this transponder prevent air taffic control operation. Therefore, it is strongly recommended that the airplane equipped with this transponder fly after modification in accordance with appropriate Software Bullentin.
—Honeywell MST67A Mode S transponders, as listed in Honeywell Software Bulletin No.MST67A-SW2, Revision 4, or later revision, that is not modified per Honeywell Software Bulletin No.MST67A-SW2, Revision 4, or later revision.

4. Since the commencement of SSR Mode S radar operation in Japan, a phenomenon that certain type of Mode S transponder (Rockwell Collins TPR-720 and 900 ATC/Mode S Transponder) could not be correctly acquired by SSR Mode S ground radar due to performance degradation with age has been observed many times. There is a potential threat that the aircraft equipped with such transponder hinder air traffic control operation

このため、当該モードS航空交通管制用自動応答装置を搭載した航空機運航者は、平成18年5月31日までに以下の措置を執ると共に、当該装置の電波法第38条及び国際民間航空条約 第10附属書に基づく基準への適合性を常に確保することが強く要求される。

所有する全ての当該装置を取り下ろした上で精密点検を実施し、パルス幅等性能パラメーターについて標準値に再設定すること。

又は、所有する全ての当該装置に係る過去の検査記録を統計的に分析すること等により、常にパルス幅等性能の健全性が確保できる処置を特定し、航空機登録国の承諾を得た上で、当該処置を実施すること。

注）我が国の航空運送事業者においては、過去の点検記録を統計的に分析した結果を踏まえ、パルス幅の下限値を0.48μsとする処置を行うこととしている。

Therefore all the affected operators are required to accomplish the following actions on those Mode S transponders by 31 May 2006 (JST) and to secure them to comply at all times with the standards of the Article 38 of the Radio Low of Japan and ICAO Annex 10 to the convention on International Civil Aviation.

- To remove the affected Mode S transponders and carry out the precise inspection of them to reset performance parameters (ex. pulse width) in a neminal values, or
- To analyse statistically the past inspection records of all the affected Mode S transponders and identify the measures to secure the performance (ex. pulse width) at any time and accomplish them under acceptance of the responsible state authority.

Note: JCAB has accepted that certain Japanese operators adopt the measures to keep the bottom value of 0.48μs of the pulse width as a result of their statistical analyses of the past inspection records.

5．備考

本航空情報サーキュラー発行と同時に、平成18年1月19日付航空情報サーキュラーNr003/06を取り消す。

なお、新情報は太い縦棒により表示される。

5. Remarks

This AIC supersedes AIC Nr003/06 dated 19 JAN 2006.

New informations are indicated by bold vertical lines.

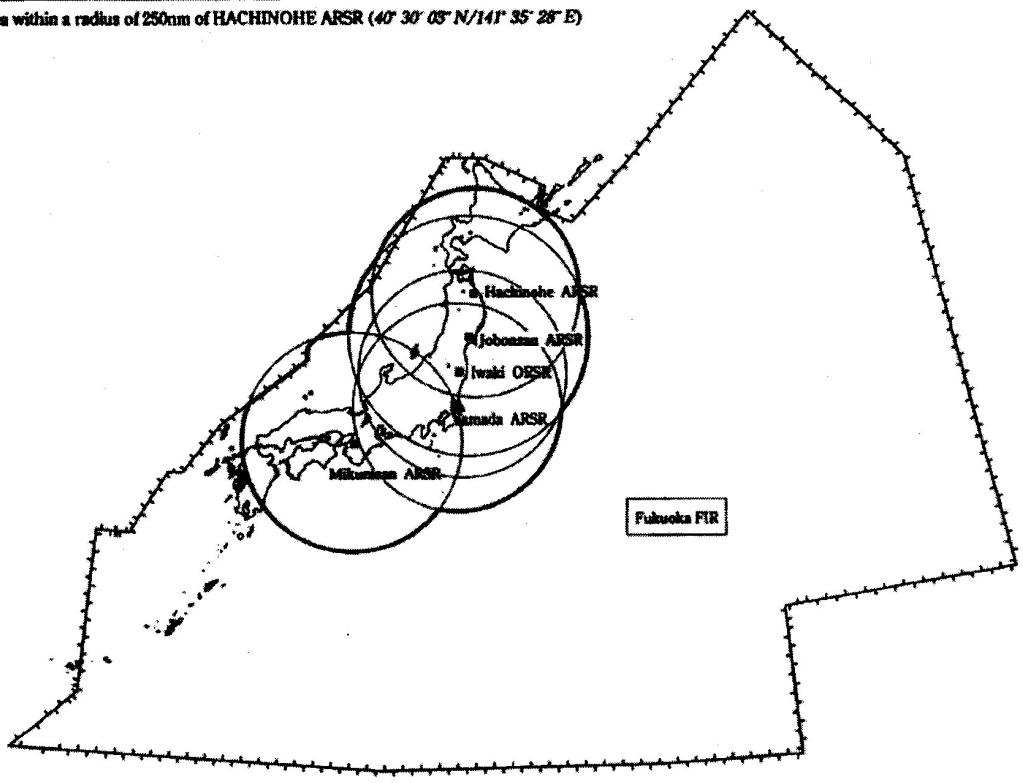
YAMADA ARSR COVERAGE CHART
Area within a radius of 250nm of YAMADA ARSR (*35° 46' 46" N/140° 31' 38" E*)

IWAKI ORSR COVERAGE CHART
Area within a radius of 250nm of IWAKI ORSR (*37° 06' 43" N/140° 47' 44" E*)

MIKUNISAN ARSR COVERAGE CHART
Area within a radius of 250nm of MIKUNISAN ARSR (*34° 21' 47" N/135° 29' 06" E*)

IOBONZAN ARSR COVERAGE CHART
Area within a radius of 250nm of JOBONZAN ARSR (*38° 30' 02" N/141° 21' 31" E*)

HACHINOHE ARSR COVERAGE CHART
Area within a radius of 250nm of HACHINOHE ARSR (*40° 30' 05" N/141° 35' 28" E*)



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