International Civil Aviation Organization

The Twenty-Second Meeting of the APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/22)

Bangkok, Thailand, 25 – 29 June 2012

Agenda Item 5: Provision of ATM/AIS/SAR in the Asia/Pacific Region, including associated CNS matters

SURVEILLANCE BASED SERVICE REQUIREMENTS IN THE SOUTH CHINA SEA

(Presented by IATA)

SUMMARY

This paper discusses progress on surveillance capability for the South China Sea. It suggests Service delivery outcomes and efficiency objectives should drive efforts and a focus is required to deliver surveillance based outcomes for all South China Sea 'main Trunk' routes.

This paper relates to –

Strategic Objectives:

A: ***Safety*** *– Enhance global civil aviation safety*

C: ***Environmental Protection and Sustainable Development of Air Transport*** *– Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

GPI-3 Harmonization of level systems
GPI-4 Alignment of upper airspace classifications
GPI-5 RNAV and RNP (Performance-based navigation)
GPI-6 Air traffic flow management
GPI-7 Dynamic and flexible ATS route management
GPI-8 Collaborative airspace design and management
GPI-17 Data link applications
GPI-22 Communication infrastructure
GPI-23 Aeronautical radio spectrum

1. BACKGROUND

1.1 Major traffic flow AR9, which extends over the South China Sea (SCS) contains the 6 North/South "Main Trunk" routes of South East Asia – L642; M771; N892; L625; N884; M767.

1.2 Also, the SCS routes are intersected by busy routes between East and West Malaysia and also by important routes linking Bangkok, Ho Chi Minh and Hong Kong to Jakarta, Manila and Australia.

1.3 Main Trunk routes that are wholly contained within one ANSPs jurisdiction naturally receive a dedicated focus to ensure that efficiencies such as flow management, route design and reduced separations are implemented in a timely manner. In the case of the South China Sea routes, a number of States/ANSPs must work together to achieve similar results.

1.4 The key to delivering an optimized ATM service in this area is surveillance, with associated communications infrastructure. Additionally, shared information (CDM) and inter-facility data communications (AIDC) are essential.

1.5 In the SCS, planning for surveillance functions combining current Radar coverage, ADS-B installations and ADS-C for remote areas with the associated communications infrastructure (VHF or Data-link) has been underway for some time. But coordinated project planning (as urged by CANSO) has not seen the development of a **total** surveillance capability progressing in a synchronized fashion.

1.6 The Regional Surveillance Strategy (as revised by APANPIRG 21) clearly encourages States to implement surveillance on major air routes, to share data and supports the ICAO 11th ANC decision endorsing ADS-B as a future enabling technology.

1.7 APANPIRG/22 Decision 22/35 urges states to expedite the ADS-B implementation project in the South China Sea area.

M771 & L642:

1.8 During the 8th ADS-B SITF Meeting held in May 2009, a cost-benefit study on ADS-B implementation (to compliment radar coverage and provide full surveillance) for L642 & M771 routes was presented showing a positive business case with annual savings of US $4M and 3M lbs of fuel burn, and reduction in 10M lbs of carbon emissions per year.

1.9 To progress surveillance based operations on M771 & L642 an ad hoc group comprising Hong Kong China, Mainland China, Singapore and Vietnam was formed to agree a framework regarding implementation timelines, avionics standards, optimal flight levels, and ATC and engineering handling procedures. So far we have seen 50nm longitudinal separation implemented on these two routes - it is understood further reduction is unlikely until 2014.

1.10 Hong Kong, China also surveyed aircraft ADS-B equipage and found that 79% of aircraft on M771 & L642 were equipped and transmitting the required level of accuracy. Singapore data for their FIR shows similar high levels of equipage and accuracy (70%).

1.11 Singapore is implementing an ADS-B mandate in Dec 2013. Hong Kong, China is mandating ADS-B on M771 & L642 also Dec 2013 and for the rest of the FIR in Dec 2014 at the same time RNP 4 will be mandated in Hong Kong.

1.12 Singapore, Vietnam and Indonesia updated the ADS-B SITF/11 (WP20) meeting on progress toward providing “radar like separations in the South China sea” with progress on data sharing agreement and implementation scheduled for 2nd half of 2012.

1.13 The States involved are to be commended for the work done so far in developing a coordinated approach to managing the traffic on these two routes; however a sharper co-ordinated focus and more harmonized planning is required for the South China Sea as a whole.

1.14 CANSO presented a paper to ADS-B SITF/11 that highlighted action Item 48/4 from the 48th DGCA Conference (*see below*). CANSO also stated that the full benefits of ADS-B implementation could only be achieved through **harmonized implementation**. It was also noted in this paper that while progress has been made on M771 & L642 little progress has been made for other SCS routes.

> ***DGCA Action Item 48/4:***
> *Recognizing that the full benefits of ADS-B would only be achieved through harmonized implementation, the Conference urges States and Administrations to expedite ADS-B implementation and share with ICAO Regional Office their implementation plans*

1.15 In early July CANSO is facilitating a Focus Group meeting to look at the implementation programs. While this action is focused on ADS-B - it is surveillance & data sharing capability that is envisaged and key to enhanced services and efficiencies in support of Seamless ATM operations.

1.16 The SEA/BOB ADS-B sub Regional Implementation WG is charged with coordinating efforts in both the Bay of Bengal and SCS areas. CANSO & IATA have also been active in supporting this group but progress has been slow and an operational deliverable for the SCS routes appears to be some way off.

1.17 Movements on the Main Trunk routes, L642; M771; N892; L645; N884; M767, reached110850 movements in 2011. Growth so far in 2012, just for the two busiest routes – M771 & L642 – has been in the order of 20%.

1.18 From a User perspective evidence would suggest that more concerted actions to ensure efficient and environmentally effective operations are required. An analysis of flight operations from one major operator in this area is relevant.

- In 2004 the average time between “off blocks” and “on blocks” for the Singapore to Hong Kong sector was 3 hours and 43 minutes. In 2011 this had increased to 3 hours and 51 minutes, representing an average increased “engines on” time of 8 minutes per flight. If these times are adjusted to remove taxi time differences then the additional average airborne flying time is 3.9 minutes per flight.
- 86 flights per day x 3.9 minutes per flight represents 335.4 minutes of flying time or annualized around 122,420 minutes or 2,040.4 hours or 85 days of fuel burn and emissions across this one sector.
- For the same operator, the Hong Kong to Singapore sector shows an average additional “block” time of 6 minutes with an adjusted “airborne-only” average increase of 2.9 minutes.
- 104 flights per day x 2.9 minutes per flight represents 301.6 minutes of flying time or annualized around 110,084 minutes or 1,834.7 hours or 76 days of fuel burn and emissions across this one sector.

1.19 Accepting that there has been traffic growth between 2004 and 2011 and that it is not possible to simply say that there are an 161 days per year of “additional” fuel burn and emissions just related to a less efficient air traffic management system, it is still clear that the current ATM system is not providing the efficiencies of reduced fuel burn and emissions per flight that it needs to. The fact is that it takes more “engine on” time in 2011 to produce the deliver the same economic output (i.e. flight) as in 2004.

2.0 DISCUSSION:

2.1 The end objective cannot be to simply have capability in place but to deliver the surveillance based services that the technology enables. The reason for doing this is quite simply to stop increasing "engine on" times, reduce controller workload while enhancing safety outcomes.

2.2 The question is "when can users expect surveillance based service delivery to be a reality on South China Sea Routes?". Full benefits can only be achieved by harmonized implementation of this surveillance capability.

2.3 While a significant focus has been on ADS-B implementation; ADS-C in remote areas of the SCS is also critical to provide full surveillance over the whole area.

2.4 The combination of current Radar, ADS-B with data sharing, ADS-C and the associated communications infrastructure is required and it is suggested that this overall view of the South China Sea needs to be the focus of states in a coordinated & harmonized approach for the area.

2.5 The current planning for Seamless ATM through the APSAPG and the adoption of the ASPAC Concept of Operations are initiatives developed to give an overall framework and goals for implementation planning for the region

2.6 The Asia/Pacific Air Navigation Concept of Operations under surveillance states:

> ***Surveillance****: in areas where the provision of direct ATS surveillance is possible, ATC separation must be based on these surveillance systems (i.e. radar, multilateration and ADS-B). In areas where direct surveillance is not possible, ADS-C surveillance (and associated with CPDLC capability) must be enabled providing reduced horizontal separations (i.e. RNP4 30/30 and planning for RNP2).- also,*

2.7 SEACG/19 took the initiative to establish a number of small working groups, one of which focuses on Surveillance; to:

- assess current status of implementation;
- identify barriers to implementation;
- make recommendations to assist harmonized ATM procedures and applications;
- make recommendations that assist implementation in accordance with the ASPAC Air Navigation and ATFM Concepts of Operations, and the ASPAC Seamless ATM initiatives related to ATS Surveillance.

2.8 However, given the APSAPG outputs are some way off and the SEACG initiative is recent; the perception is that the overall objective of surveillance for the South China Sea is split between a number of formal and ad hoc groups focused on technology implementation (such as ADS-B) with unclear service delivery objectives.

2.9 State engagement is required and innovative solutions should be encouraged and investigated - a focused surveillance task force maybe the most effective way to achieve the objective for the SCS routes.

2.10 Service delivery objectives should be set to ensure implementation efforts are focused on overall deliverables for the SCS as a whole. IATA suggests the following for consideration.

- Where direct surveillance is available, 10NM Long separation will be provided by Dec 2014 (to coincide with Hong Kong China's ADS-B/RNP4 mandate) supported by Radar; ADS-B and VHF/CPDLC).
- 30NM surveillance based separation on all other South China Sea routes should be implemented by Dec 2016, supported by ADS-C and CPDLC.
- The implementation of a full route redesign based on RNP4 (30NM Lateral) by Dec 2016 should be conducted to improve route efficiency.

3.0 ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) endorse Surveillance objectives for the South China Sea; and

c) discuss any relevant matters as appropriate.

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