



International Civil Aviation Organization
The First Meeting of South China Sea Major Traffic Flow Review Group
(SCS-MTFRG/1)
Kuala Lumpur, Malaysia, 19-20 January 2015

Agenda Item 4: Review of Relevant MTF Data and Identifying Current Operational Constraints and Problem Areas

REVIEW OF SOUTH CHINA SEA FLOS AND FLAS

(Presented by IFATCA)

SUMMARY

This paper presents a review of the South China Sea Modified Single Alternate FLOS and FLAS together with a proposal for the phased reversion to the ICAO Standard Single Alternate FLOS.

1. INTRODUCTION

- 1.1 A Modified Single Alternate Flight Level Orientation System (FLOS) was devised by the South China Sea RVSM Implementation Task Force over 13 years ago as part of the reorganization of ATS routes in the South China Sea for the introduction of RVSM in the area in 2002. The Modified FLOS was developed into a Flight Level Allocation Scheme (FLAS) for the purpose of allocating additional flight levels to the six primary SW/NE uni-directional routes, whilst maintaining no-PDC arrangements for the many less busy (bi-directional) crossing routes.
- 1.2 The Modified FLOS and FLAS were reviewed in 2007 by the South China Sea RVSM Scrutiny Group which revised the FLAS for primary and crossing routes, but the modified FLOS concept remained in place.
- 1.3 With the rapidly changing distribution of traffic flows in this area and the significant improvements in ATM facilities, this paper presents some proposals for the phased establishment of the standard ICAO Single Alternate FLOS in the South China Sea airspace in accordance with Annex 2 and in line with the Asia-Pacific Seamless ATM Plan. In addition to the implementation of improved ATM efficiencies, this will also demonstrate that ANSPs have a framework in place that will provide realistic benefits to the operators as soon as new facilities are available.
- 1.4 This proposal draws on a number of related ideas and plans that have been submitted by various States and Organizations during previous years, which, for a number of reasons, were not accepted. With the current momentum of cooperation and coordination within the region for the development and implementation of several major projects, it is hoped that a similar atmosphere will pervade with this task and there will be a satisfactory and constructive outcome.

2. DISCUSSION

History

2.1 The modified Single Alternate FLOS and FLAS introduced in 2002 provided operators using the primary SW/NE routes with additional levels whilst allocating a limited number of levels to the crossing routes and for ATC the benefit of no-PDC operations on all routes (see Table 1). This provided aircraft operators on the six primary routes with reduced ground delays and better opportunities for achieving an optimum cruising level. However, the Modified FLOS was not consistent with the Standard FLOS used in the adjacent airspace. Therefore at the boundary of South China Sea area, ATC had to transition flights on the primary routes leaving the airspace to standard levels and those entering the area to non-standard FLAS levels. These tasks had to be conducted close to the airspace boundary to maintain the integrity of the Modified FLOS concept. This additional ATC workload was considered manageable considering the traffic levels at the time.

Routes	Westbound	Eastbound
Primary	FL 300, 320, 340, 360, 380, 400	
Crossing	FL 290, 310, 330, 350, 370, 390 410	

Table 1. South China Sea FLAS 2002 - mid-2008

2.2 During the following years a few of States made proposals to revise the FLAS, but there was no consensus amongst all States. However, following a report by MAAR that the South China Sea RVSM airspace had exceeded the Target Level of Safety, the West Pacific/South China Sea RVSM Scrutiny Group was formed to review the FLOS/FLAS structure and analyze the causes of the large number of LHD reports. Over six meetings in 2007/8, one of their findings was that at the ATC units at the boundary of the South China Sea airspace, the transitioning of flights to another flight level was significantly adding to controller workload and was hindering them from completing the necessary coordination with the adjacent unit. Therefore the FLAS levels for the six primary routes and the crossing routes were revised (see Table 2) and responsibility for carrying out the transitions was changed with a consequent sharing of the tasks amongst the units concerned (see Figure 1).

Routes	Westbound	Eastbound
Primary	FL 310, 320 350, 360, 390, 400	
Crossing	FL 280, 300, 340, 380	FL 290, 330, 370, 410

Table 2. South China Sea FLAS Mid-2008 - Present

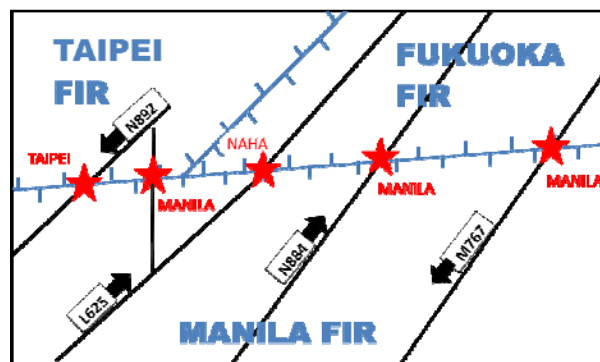


Figure 1. Transition Responsibility at the Northern Boundary of the South China Sea Area

2.3 At RASMAG/19, MAAR reported that in the South China Sea RVSM airspace the Target Level of Safety had been exceeded due to the large number of LHDs. They noted that of the

133 LHDs reported in 2013, 120 were in Category E (ATC Coordination) and 36 of these were flight level message errors. The specific details of individual events are not available, but it is possible that increasing traffic, level transitions and controller workload are contributing factors in many of these coordination incidents.

- 2.4 At SEACG/21, in response to a Working Paper from Hong Kong relating to the rationalization of routes and flight levels in the South China Sea, the Secretariat noted that, ‘consideration of short term actions are required to mitigate the risks, but also longer term changes need to address systemic causes, which include the abnormal FLOS.’

Three Phase Proposal

- 2.5 Because the South China Sea route structure is complex with multi-FIRs and varying levels of surveillance and communication capabilities amongst the ANSPs, it is difficult to make substantive changes to a route or a flight level in one location without have repercussions throughout the whole area. However with the adoption of the Asia Pacific Seamless ATM Plan and ICAO ASBU plan by all States, now is the time to prepare plans for the implementation of the new procedures and practices that operators are expecting be available within the next three years.
- 2.6 The Three Phase Proposal is a simple concept to utilize the new ATM systems and facilities that are in place or will be coming on line within the next few years. Phase One maximizes the existing facilities, sub-divides the South China Sea airspace area and reinstates a standard FLOS in one sub-area. Phase Two integrates the existing and new facilities that should be available by 2017 with additional primary RNP 4 routes with a standard FLOS throughout the area. Phase Three will address the crossing routes and level availability with the surveillance and communication facilities that will be operational in 2018.
- 2.7 This paper only addresses Phase One.

Phase One – L642/M771

- 2.8 The routes L642 and M771 are the busiest of the six primary routes and mainly serve Hong Kong-Kuala Lumpur/Singapore destination traffic. For the majority of their distance the routes are designated as RNP10 and are spaced 60 NM laterally apart. The routes do not extend beyond the South China Sea area and are distinctly separate from the other four primary routes that serve the north easterly and eastern areas. Therefore it is proposed to split L642 and M771 from the other primary routes, L625, M767, N884 and N892 (see Figure 2).
- 2.9 It is proposed that on routes L642 and M771 the South China Sea modified FLOS is replaced by a standard ICAO single alternate FLOS, similar to that used on A1/P901 and A202 in the north western area of the South China Sea. The following items will have to be considered in this proposal:
- within the Hong Kong and Sanya FIRs the Single Alternate FLOS is be applicable to all routes (except for the small portion of N892 at the southern extremity of Sanya FIR);

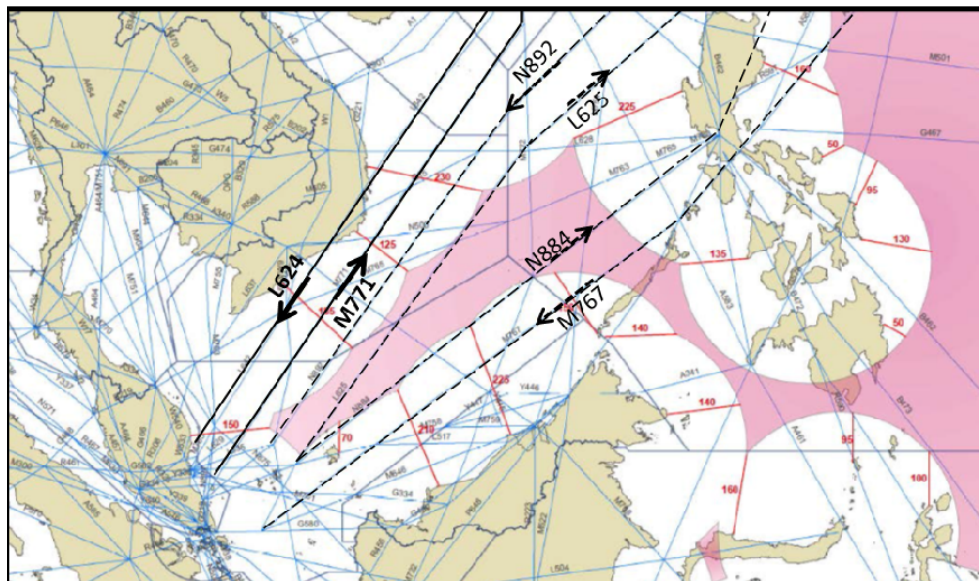


Figure 2. South China Sea Primary Routes

- the six flight levels allocated with the current FLAS are replaced by four single alternate FLOS cruising levels;
- the crossing routes are allocated the remaining single alternate cruising levels based on traffic requirements;
- the Large Scale Weather Deviation (LSWD) contingency measures are withdrawn;
- Sanya and Hong Kong, which currently use 50 NM spacing, follow up on the reduction in en-route spacing coordinated between Singapore and Vietnam (50 NM to 40 NM in Dec. 2013, reducing to 30 NM by end of 2014 and further to 20 NM by end of 2015), as advised at SEACG/21, providing a common transfer spacing between all units.

2.10 In terms of airspace capacity, the 50 NM spacing provides a capacity of approximately 8 aircraft per hour per flight level, therefore with 6 levels available, the theoretical capacity of L642 or M771 is 48 flights per hour. A 30 NM spacing provides a capacity of approximately 15 aircraft per hour per flight level, therefore with 4 levels available, the theoretical capacity is 60 flights per hour. With 20 NM spacing a capacity of approximately 20 aircraft per hour per flight level is provided, therefore with 4 levels available, the theoretical capacity is 80 flights per hour. A 75% increase in flights on these routes is not anticipated in the coming years, but the additional capacity will significantly increase the opportunity for flights to achieve optimum cruising levels on these routes.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
- a) note the information contained in this paper; and
 - b) discuss any relevant matters as appropriate.