



International Civil Aviation Organization

ICAO

**Eleventh Meeting of the FANS Interoperability Team – Asia
(FIT-Asia/11)**

Video Teleconference, 23 – 27 August 2021

Agenda Item 2: Central Reporting Agency Reports

PBCS PERFORMANCE ISSUES IN THE SOUTH CHINA SEA

(Presented by Central Reporting Agency)

SUMMARY

This paper discusses the causes of poor datalink performance in the South China Sea and potential resolutions.

1. INTRODUCTION

1.1 In recent problem report investigations by the CRA, particularly those focusing on PBCS performance, it has been noted that there is persistently poor performance in a certain area of the South China Sea. Upon further investigation, it was found to be due to weak VHF coverage in the area, especially after removal of a specific VHF ground station.

2. DISCUSSION

Identification of Issues

2.1 Several problem reports have been investigated in the last several years regarding poor datalink performance in the South China Sea. The data reviewed in these problem reports show delayed messages, especially on flights originating and ending in Singapore. Analyzing the flight path flown by many of these flights, it was noted that they were operating on the edge of VHF ground station coverage. This results in the avionics attempting messages on VHF as it is generally the most preferred media and will retry several times before transitioning to SATCOM. Then, due to receiving intermittent signal from the VHF stations, the avionics may attempt to transition back from SATCOM to VHF, further delaying messages.

2.2 In **Figure 1** below, the coverage of AeroThai/ARINC VHF ground stations in the area of concern are shown.

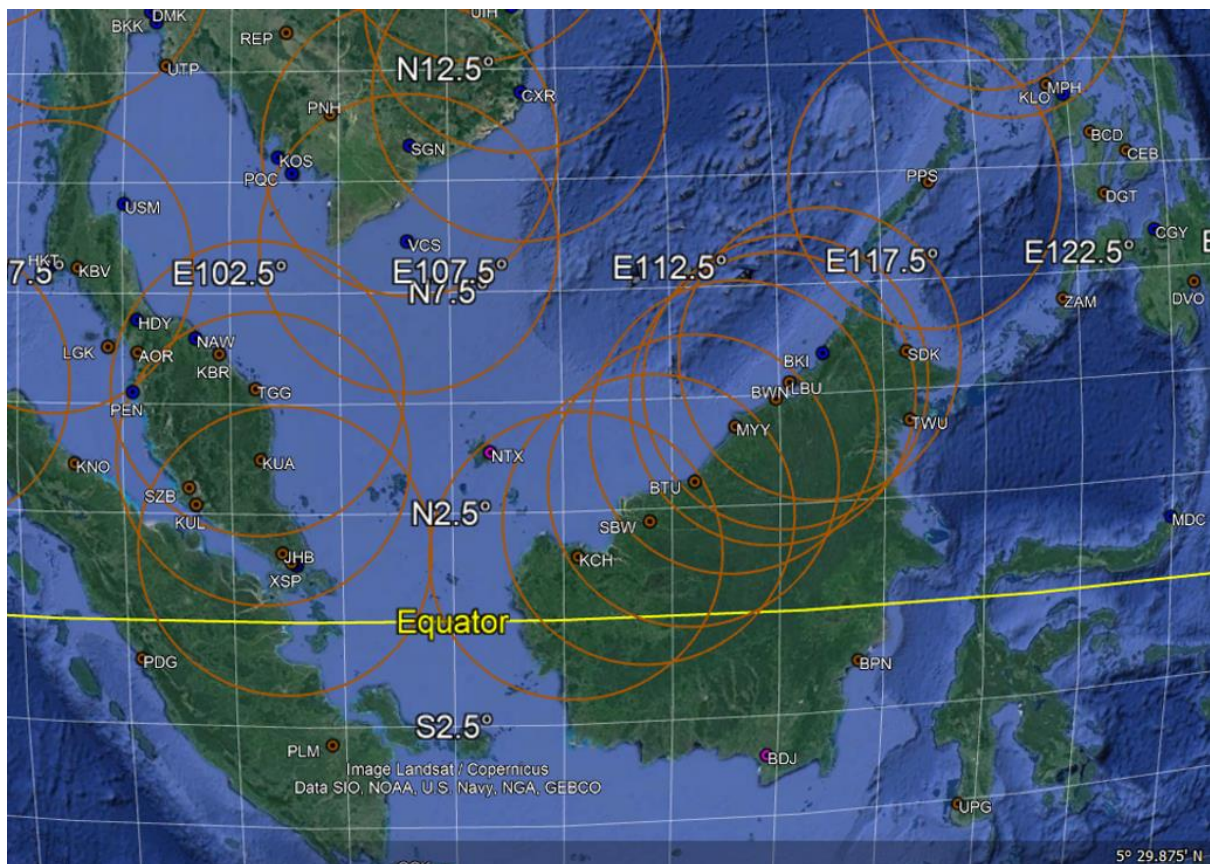


Figure 1: ARINC VHF Coverage in South China Sea (~200nm radius from each station)

2.3 As it is shown, there is a channel in the South China Sea which is not covered by VHF ground stations. If the flights flew within that channel, it would actually have good performance as the aircraft would not pickup weak VHF signal and therefore would remain on SATCOM. However, of the PRs we have analyzed, we have seen that most flights tend to fly on the edge of VHF coverage on either side of the channel leading to the undesired behavior.

2.4 In **Figure 2** below, the same region with SITA stations is shown. The main difference here is that there is no SITA station at the VCS location thereby reducing the area of VHF coverage on the north side of the channel.

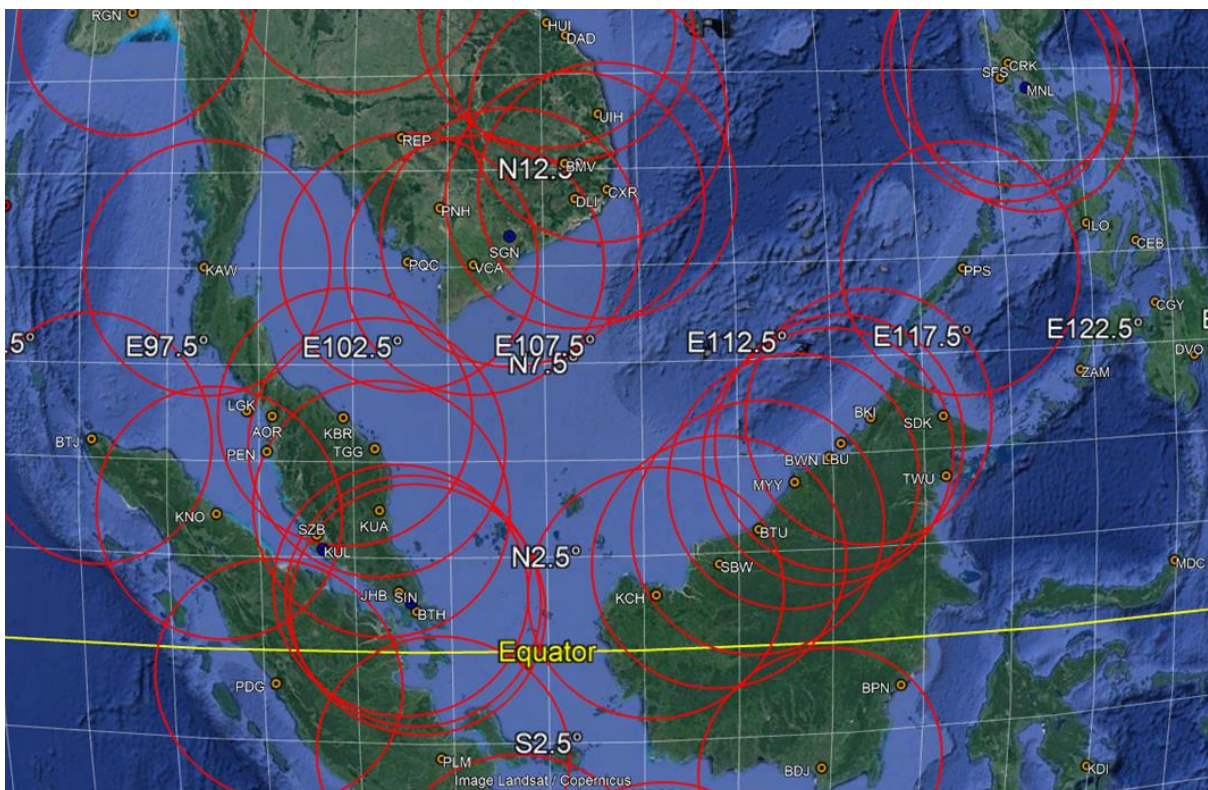


Figure 1: SITA VHF Coverage in South China Sea (~200nm radius from each station)

2.5 An additional cause of the poor performance in the area is the deactivation of an existing VHF ground station at NTX. The NTX station has been deactivated since 2017. Had it been active, it would have bridged the coverage gap in that area quite a bit.

Potential Solutions

2.6 There are a few potential ways to address the poor performance seen in this area. The first is to investigate whether reactivating an ARINC/SITA station at NTX is possible. It is believed the existing station was decommissioned due to a state request in 2017. Reactivating stations at NTX will allow for coverage of a large portion of the area which is currently on the edge of other VHF station coverage.

2.7 The second option is to ensure that the avionics on aircraft flying in the region are optimized for media switching. There are several options for doing this, such as configuring media region tables to disallow VHF in those transition regions and force the aircraft to remain on SATCOM. Another option is to upgrade the avionics to software that includes the RAT1 timer. This allows messages to be sent over SATCOM after it has been unsuccessful on VHF for 60 seconds, rather than continuing to try over VHF. Additional aircraft improvement options are detailed in FIT ASIA/9 WP 3, Datalink Performance Improvement Options.

2.8 Barring any network or avionics improvements, we will continue to see poor PBCS performance for aircraft flying those route and should be taken into account by affected ATC centers.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
- a) note the information contained in this paper; and
 - b) pursue resolutions listed above if desired