International Civil Aviation Organization

SIXTH MEETING OF MODE S AND DOWNLINKED AIRCRAFT PARAMETERS WORKING GROUP (MODE S AND DAPS WG/6)

Bangkok, Thailand, 28 – 30 March 2023

Agenda Item 6: Interrogator Code (IC) planning and coordination

CAPACITY FOR SSR MODE S II OR SI CODE ASSIGNMENTS IN THE APAC REGION

(Presented by the Secretariat)

SUMMARY

This paper presents a preliminary assessment on the future capacity for SSR MODE S II or SI code assignments in the APAC region with the current data saved in Frequency Finder Surveillance Module (FFSurm).

1. INTRODUCTION

1.1 With the migration of APAC SSR II codes list into ICAO tool Frequency Finder, it is possible and deemed necessary to undertake an assessment on the future capacity for introducing SSR Mode S II and Mode S SI codes in the APAC Region.

1.2 This assessment took into account the revised Mode S II and Mode S SI code assignment planning criteria as were agreed in the AWSG of the ICAO Surveillance Panel.

1.3 The assessment was performed only with the current Mode S Code assignment plan that has been agreed in the APAC Region.

2. DISCUSSION

Method used for the capacity assessment

2.1 For this assessment, a raster of test points for the APAC Region was generated, this raster contains test points that are separated in the East-West direction with one degree and in the North-South direction with 2 degrees. An overview of this raster is in Appendix A of this paper.

2.2 For each of these test points the capacity of assigning Mode S II code assignments was calculated. For these calculations the ICAO program FFSurvm was used. The Mode S interrogator in these tests was an II-only interrogator. The Designated Operational Coverage was 250 NM.

2.2.1 Considering that in the APAC Regions to date only Mode S II codes have been assigned, for each assignable Mode S II code it is possible to alternatively assign four Mode S SI codes when using Mode S SI interrogators that do support Mode S II/SI code operations.

2.2.2 The capacity for assigning additional Mode S II codes, which is a measure of the capacity for assigning SI codes, was plotted on a map with Google Earth. The colour coding used is

White - no Mode S II code could be assigned

Red - 1 Mode S II code could be assigned

Orange - 2 Mode S II codes could be assigned

Yellow - 3 Mode S II codes could be assigned

Green - 4 or more Mode S II codes could be assigned

Black - all 15 II codes could be assigned

Review of the results of the assessment

2.3 The assessment showed that three main areas in the APAC Region can be identified where it would be difficult or impossible to implement new SSR Mode S radar facilities, either operating with Mode S II codes or Mode S SI codes. These areas are:

a) Afghanistan/Pakistan
b) Malaysia/Singapore/Indonesia
c) Republic of Korea/Japan.

2.3.1 *Afghanistan/Pakistan*. The difficulty with assigning new Mode S codes in this area is largely caused by a recent introduction of 16 Mode S SI codes for Afghanistan. Since the Mode S facilities are new, they may be re-assigned an SI code in case the interrogator can be configured to support Mode S II/SI code operations.

2.3.2 *Malaysia/Singapore/Indonesia*. The only way to provide more capacity for introducing Mode S SI codes is to coordinate with these States the possibility to modify some existing Mode S interrogators to support Mode S SI code assignments and to support Mode S II/SI code operations.

2.3.3 *Republic of Korea/Japan*. Also in this case, the only way to provide more capacity for introducing Mode S SI codes is to coordinate with these States the possibility to modify some existing Mode S interrogators to support Mode S SI code assignments and to support Mode S II/SI code operations.

3. ACTION BY THE MEETING

3.1 The meeting is invited to

a) note the information contained in this paper;

b) consider the methodology used in this assessment and to review the results; and

c) discuss any relevant matter as appropriate.

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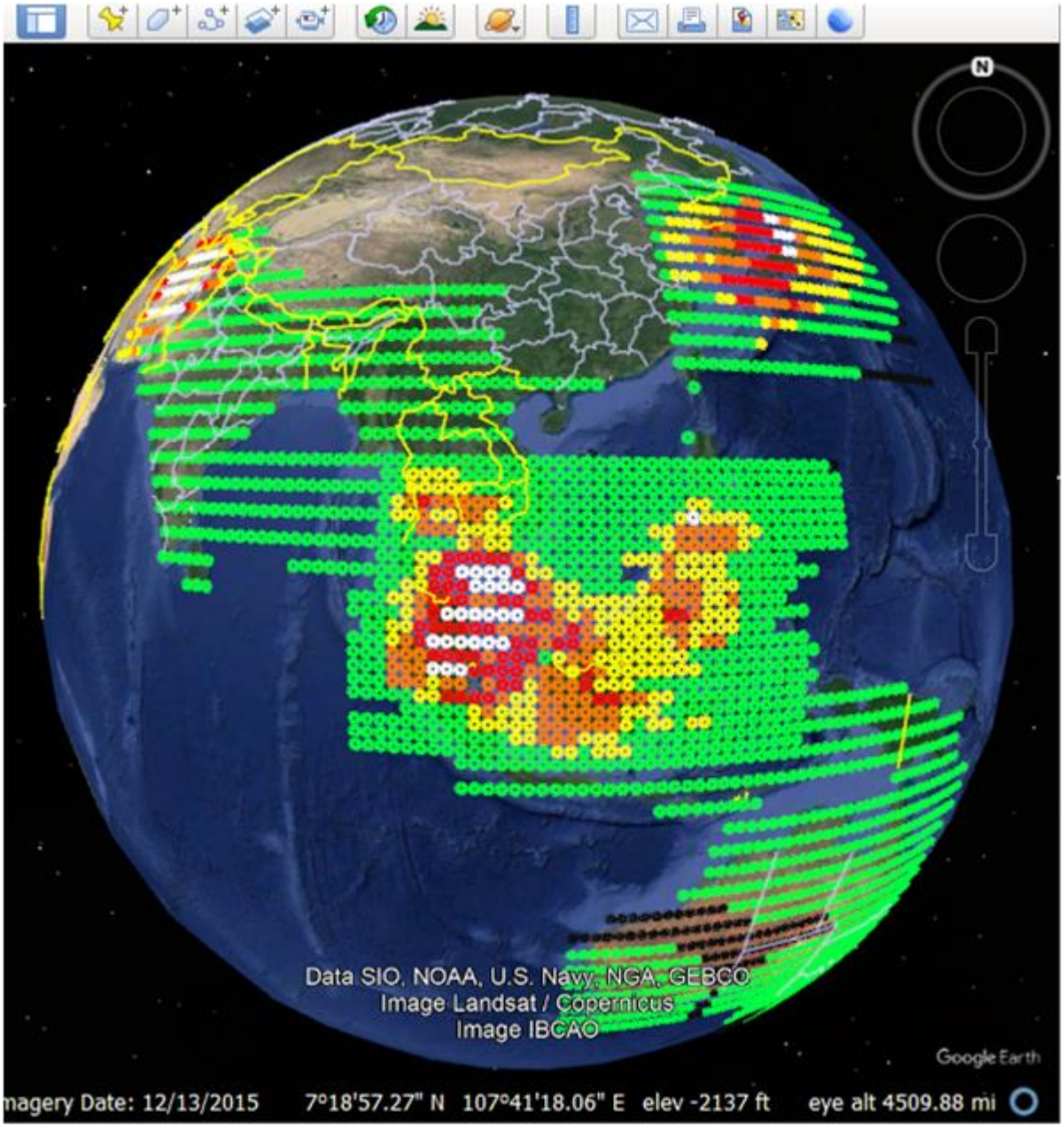
Appendix A

Raster user in the Mode S II/SI code capacity analysis

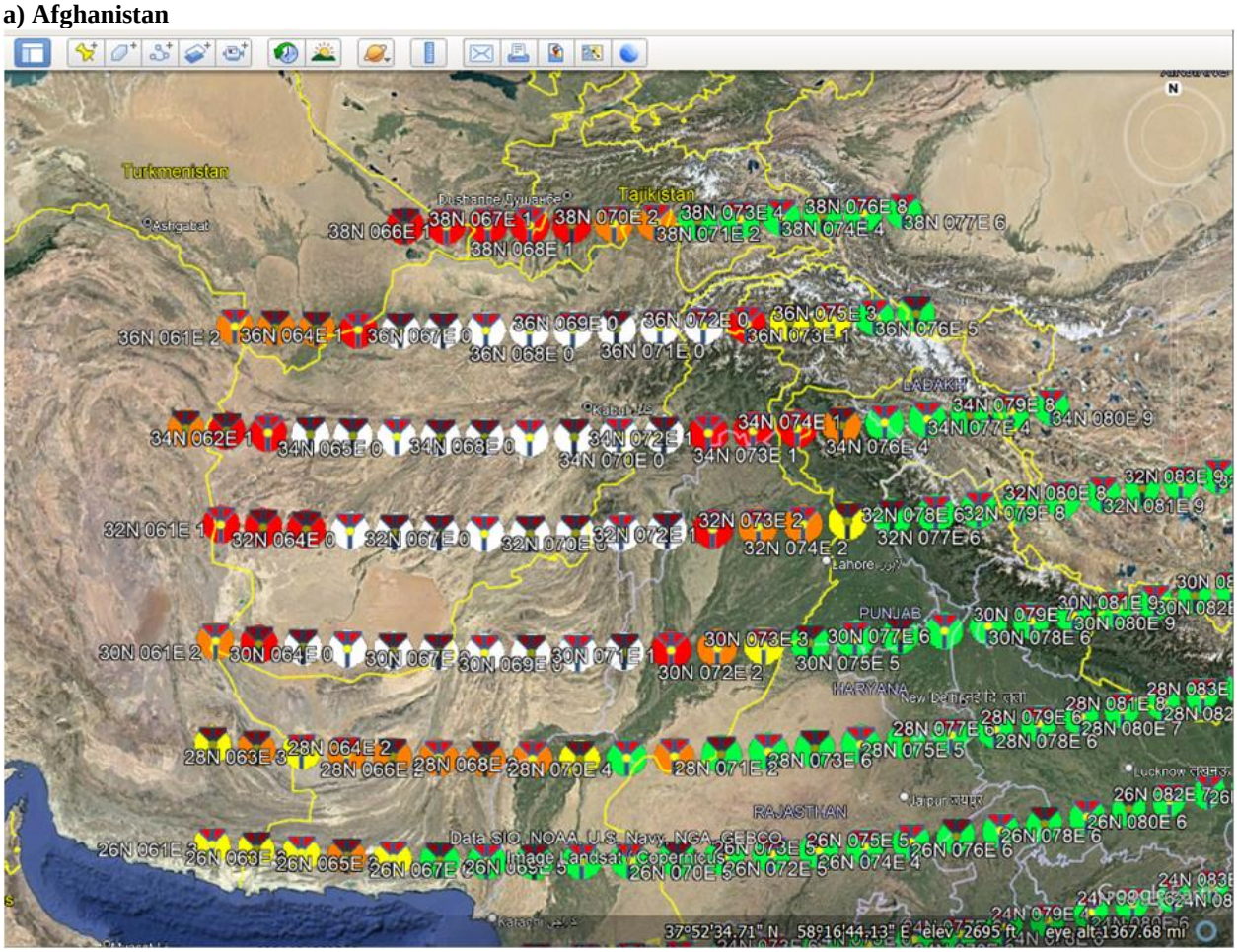


The Google Earth file with these icons is in the file SSR *capacity.kmz*. This file can be viewed with Google Earth. The number displayed in each icon represents he number of II codes that could be assigned at the relevant location.

Appendix B

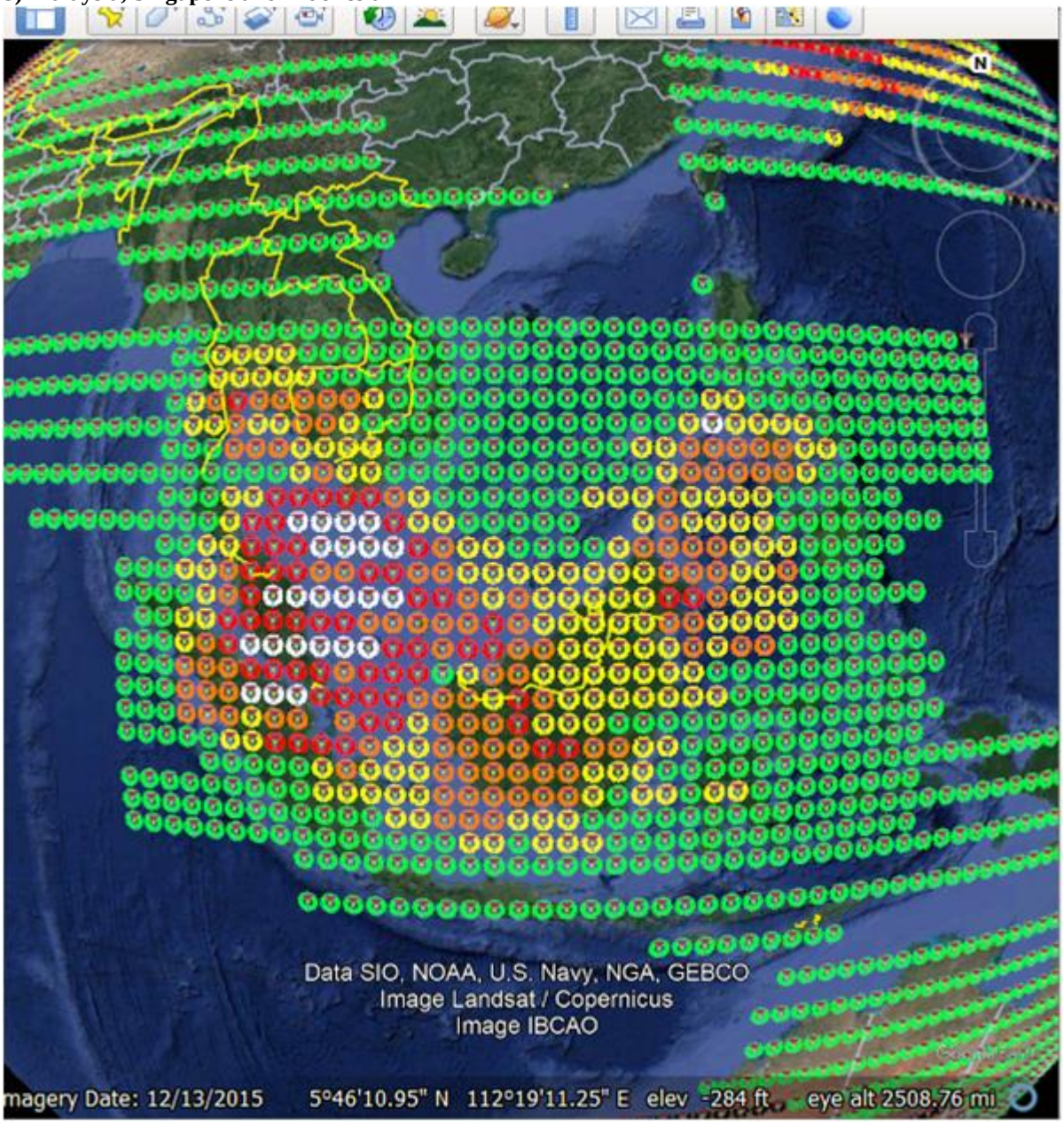
Areas of concern where future mode S II or SI codes may be difficult or impossible (Paragraph 2.3)

a) Afghanistan



Appendix B

b) Malaysia, Singapore and Indonesia



Appendix B

c). Republic of Korea and Japan