



ICAO

International Civil Aviation Organization

**FIFTH MEETING OF MODE S DOWNLINKED
AIRCRAFT PARAMETERS WORKING GROUP
(MODE S DAPS WG/5)**

Video Teleconference, 23 – 25 March 2022

Agenda Item 3: Sharing of State's implementation on Mode S and related issues in APAC region

UPDATE ON MODE S IC CODE MODULE IN FREQUENCY FINDER

A program for managing, assessing compatibility and presenting frequency assignments for aeronautical communication and navigation systems as well as for the coordination of SSR Mode S Interrogator Identifier (II)/ Surveillance Identifier (SI) codes

(Presented by the Secretariat)

SUMMARY

This paper presents the latest work, enhancements and functionalities brought to the SSR module of the Frequency Finder tool to assist ICAO Regional Offices and States to manage and coordinate SSR Mode S II/SI codes.

Action by the meeting is in paragraph 3.

1. INTRODUCTION

1.1 ICAO has developed the program Frequency Finder that offers a tool to assist ICAO Regional Offices and States to manage and coordinate aeronautical frequency assignments. Further Frequency Finder provides also for the calculation of interference areas and a geographical interface for plotting of the frequency assignments, including any interference area.

1.2 In addition, this program combines the data base management functions for updating the ICAO COM lists 2 and 3 as well as the SSR list for SSR Mode S II/SI codes. The current test version of the SSR module in Frequency Finder is now capable of assessing compatibility with Mode S II codes and Mode S SI codes, which is now under final evaluation by ICAO team and will be released in due course. The planning criteria for the assignment of SSR Mode S Interrogator Identifier (II) codes are contained in Annex 10, Volume IV and, to some extent, further clarified in the Aeronautical Surveillance Manual (ICAO Doc. 9924). The Aeronautical Surveillance Working Group of the Surveillance Panel is expected to approve the proposed modifications material in 2023.

2. CURRENT WORK ON FREQUENCY FINDER

2.1 Enhancement to the tool to facilitate Mode S II/SI code assignment planning

2.1.1 Frequency Finder included a module for SSR Mode S Interrogator Identifier (II) code assignments that was introduced about ten years ago. This module implemented only

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the planning criteria for SSR Mode S II codes, which are in line with the planning criteria for Mode S II codes as is currently in Doc. 9924.

2.1.2 Recently, the need has been identified in the APAC Region to introduce SSR Mode S Surveillance Identifier (SI) code. Relevant change proposals to DOC 9924, which were generated from within the APAC Region are currently being reviewed within the Surveillance Panel. These change proposals will be reflected in the SSR module in Frequency Finder to include the option to assess the compatibility of both Mode S II and SI codes, including cases, where not all Mode S interrogators or transponders are capable to use Mode S SI codes. This is in particular relevant in cases, where the transition towards full implementation of SI codes is in progress. The updated Frequency Finder tool is currently being tested by ICAO Head Quarters and the ICAO APAC Regional Office.

Note.- It is important to note that although insertion of the compatibility testing for Mode S SI codes required a significant amount of work for software development, to realize and keep user-friendly operability of the Frequency Finder, these were effected in a way that does not really change how the FF tool is to be used by users.

2.2 A standalone version of Frequency Finder tool for the SSR module

2.2.1 The distribution of the runtime version to States is foreseen in separate files, one for VHF-COM and NAV frequencies and one for SSR module since in States it may not always be the same person that is looking after SSR codes and looking after frequencies. For the remainder, the functions on the Start screen are the same as in earlier versions.

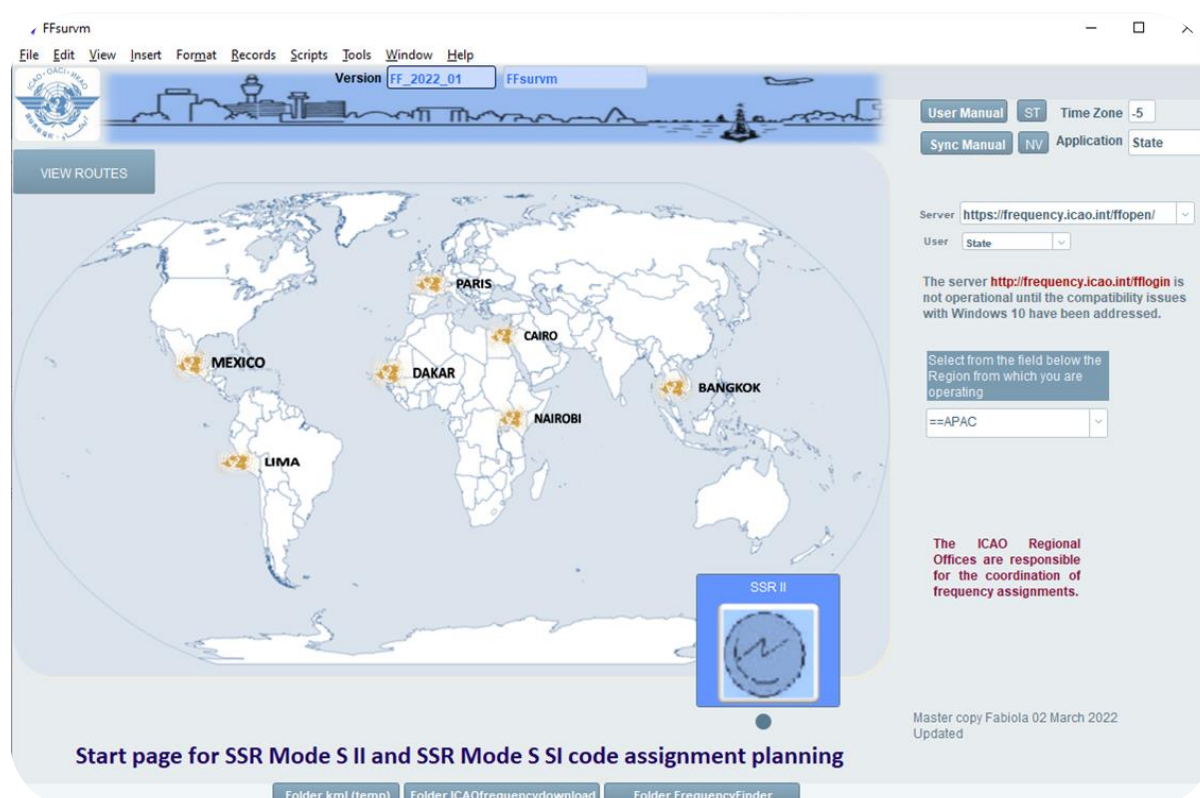


Figure 1. Start page of FF tool selecting the SSR module

2.3 Enhancements of functions brought to the SSR module

In principle, all the functions are the same as for the current version, but the changes for Mode S codes are mainly with the following functions:

2.3.1 Query

2.3.1.1 Selecting the SSR Mode – The drop-down menu of the button Select SSR Mode displays (only) the SSR Modes (II and/or SI and/or ADS and/or A/C) that are in the SSR table for the selected Region and country or location, if selected). The Mode can be:

- A/C
- ADS-B
- II
- SI.

2.3.1.2 Selecting the SSR Code – When the button SSR Code is selected, only the SSR Mode S II or the SSR Mode S SI codes that are in use in the selected country can be selected. If a user only selects a Region (and not a country or location) the drop-down with SSR Mode displays all modes in use in the Region and, without selecting a mode, the drop-down menu code displays all codes in use in the region.

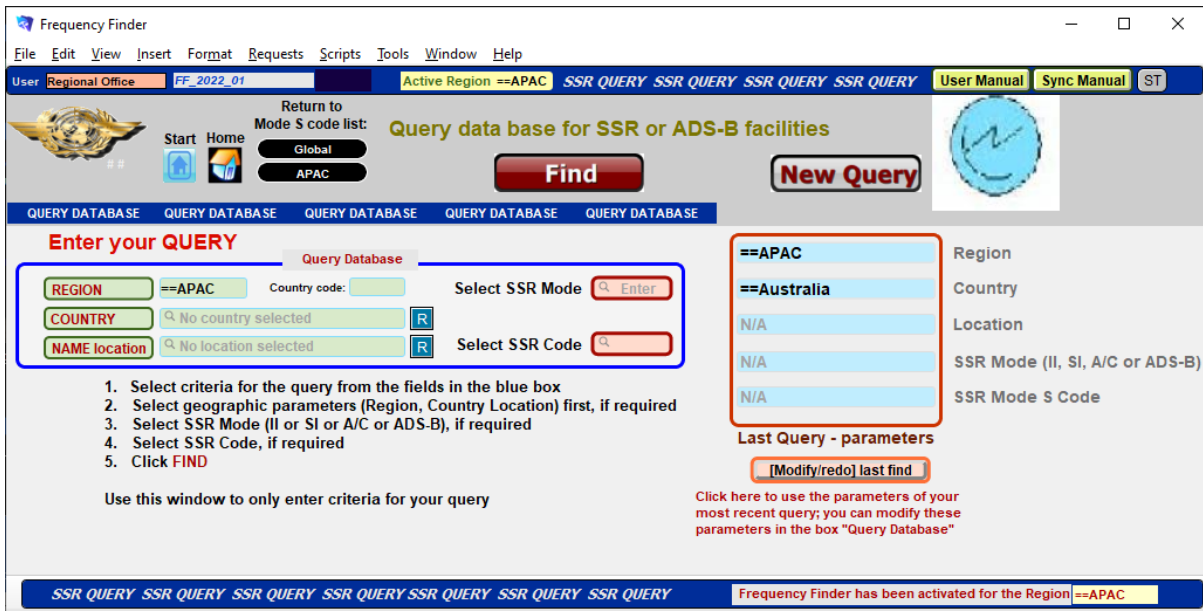


Figure 2. Functions accessible from the window SSR Query

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2.3.1.3 As shown above, in Figure 2, after the parameters for the query have been selected, the button “FIND” will return the SSR table with the found set of the records that meet the query parameters. The toolbar for the window SSR table, when a query is active, is presented in Figure 3.

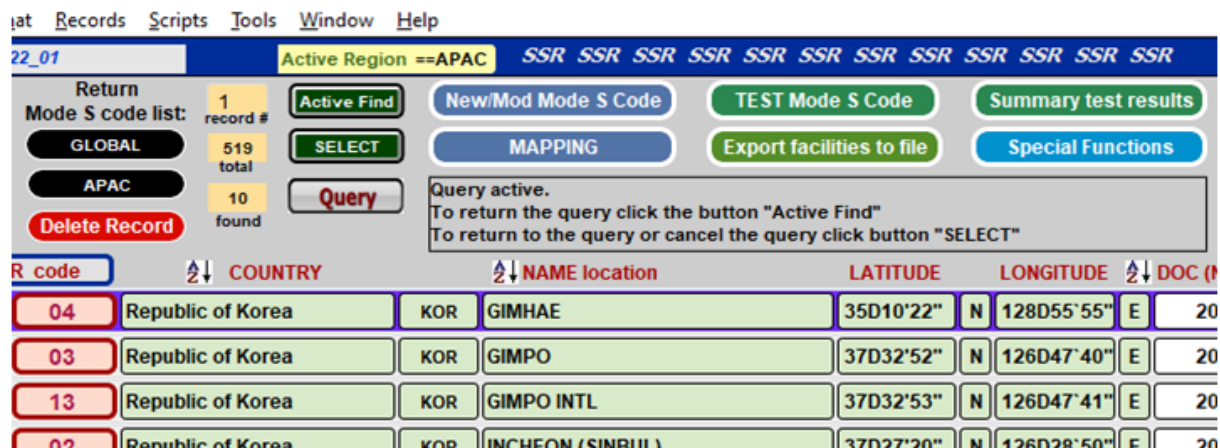


Figure 3. – Display of toolbar in the window SSR Table after a query is performed

2.3.2 The New/Mod or Add Facility function

2.3.2.1 The window to create, add or modify a new facility has not changed. However, changes are in the selection of Radar Mode and II/SI code. Creating a new entry allows the user to add a completely new SSR Mode S II/SI code or a new SSR Mode A/C or new ADS-B facilities to the local SSR Table that can be uploaded to the server by the Regional Office. Further, the user is allowed to add a new facility for a Mode S II/SI code or a new facility with Mode A/C or ADS-B facilities to the location of an existing facility in the local database.

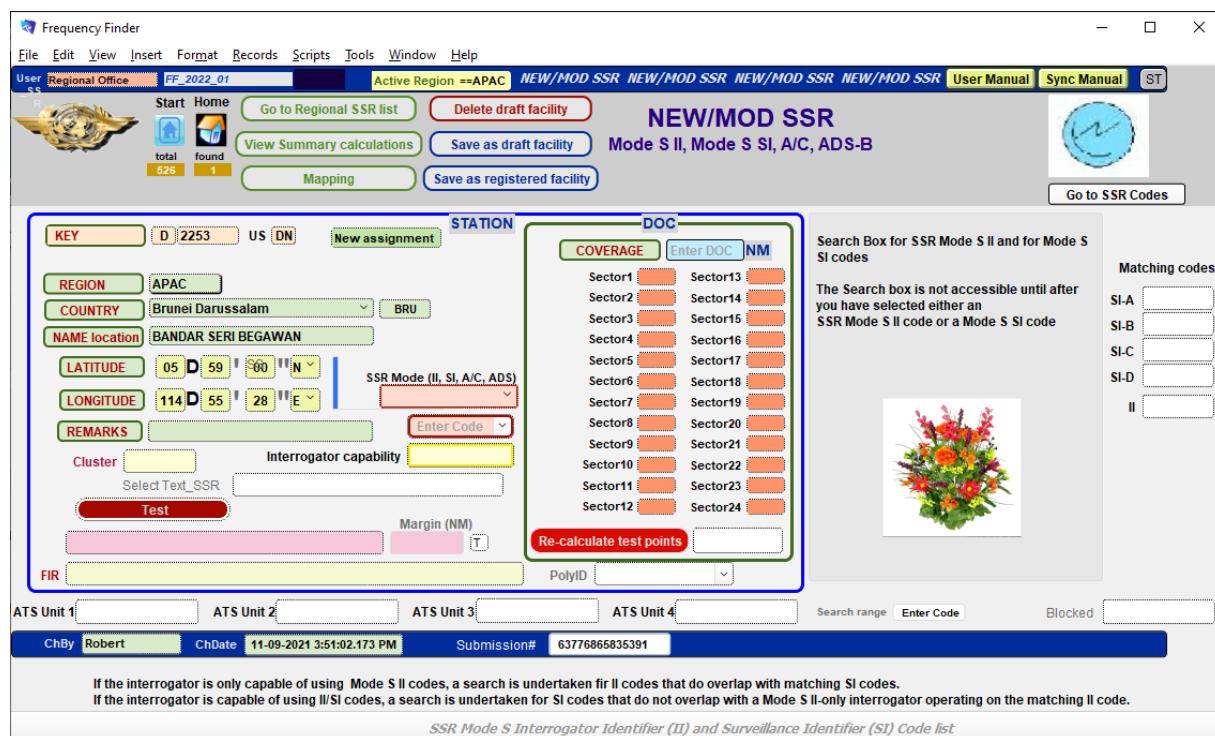


Figure 4. – Display of window for entering a new SSR facility entry

2.4.3 The selection of Modes (II /SI)

2.4.3.1 An interrogator operating with an II code can be either II only capable or II/SI capable. If the Interrogator Identifier (II) has been selected from the drop-down menu, the dialog box to insert the SSR mode of the interrogator is displayed, which allows selecting II only or II/SI.

2.4.3.2 II only refers to Interrogators complying with the provisions of Annex 10 Volume IV up to Amendment 71 (1996). II/SI capable Mode S interrogator refers to interrogators complying with provisions of Annex 10 Volume IV Amendment 73 and after 1998. The compatibility criteria for II only capable and II/SI capable interrogators are different. Please refer to DAPs WG/5–WP/05 for more details about II only capable and II/SI capable.

2.4.3.3 When mode SI has been selected from the drop-down menu of the field SSR/ADS Mode, this field is set to display Mode S SI code. In this case, the field Interrogator capability will be automatically set to II/SI.

Note - Material for II/SI capable transponders that do not provide for II/SI operations, as introduced at the recent SP/TSG meeting is in progress.

2.4.4 Coverage. The coverage can be inserted in the box DOC (Re. Figure 4) in the field Coverage (circular coverage) or in each of the fields Sector 1 – Sector 24, if the coverage is sectorized.

2.4.5 The search function

2.4.5.1 The Search box has been modified to allow Frequency Finder to find compatible Mode S II or SI code for Mode S facilities as shown in Figure 5. The Search box is only accessible if, for the SSR facility, either the Mode S II code or the Mode SI code has been selected.

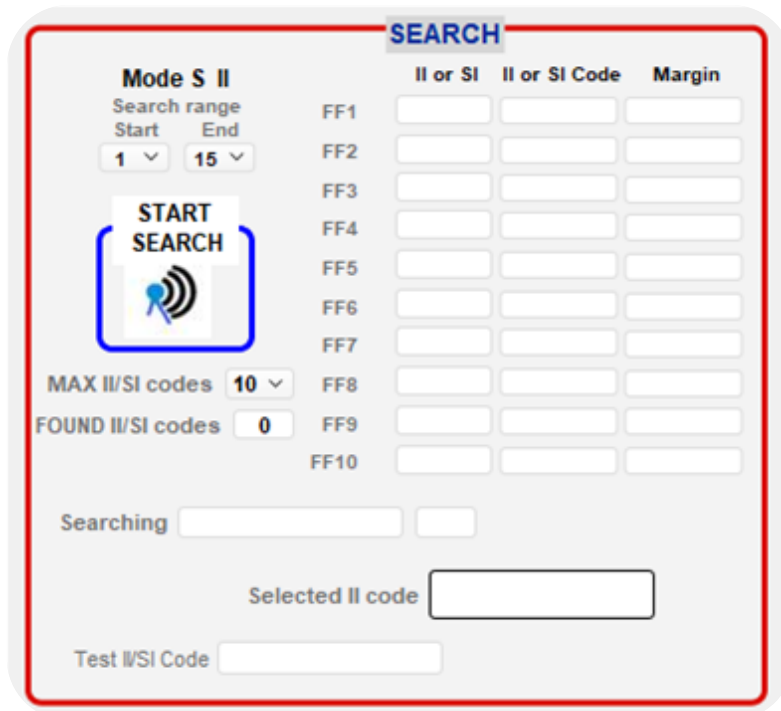


Figure 5 – SEARCH BOX

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3. ACTION BY THE MEETING

3.1 It is foreseen, that the modified versions of Frequency Finder including Mode S II/SI code assignment planning will be distributed to the Regional Offices during the second or third quarter of 2022. The meeting is therefore invited to:

- a) note the information contained in this paper;
- b) make extensive usage of the SSR module of the Frequency finder tool;
- c) provide feedback on FF tool usage, suggestions, bugs and recommendations; and
- d) discuss any relevant matter as appropriate.

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