

*International Civil Aviation Organization*



ICAO

**Twenty Sixth Meeting of the Communications/  
Navigation and Surveillance Sub-group (CNS SG/26) of  
APANPIRG**

Bangkok, Thailand, 5 - 9 September 2022

**Agenda Item 7:** Surveillance

7.2: Other Surveillance Related Issues

**ATS SURVEILLANCE AND DIRECT CONTROLLER AND PILOT COMMUNICATION  
VHF COVERAGE CHARTS FOR APAC REGION**

(Presented by the Secretariat, Hong Kong China and Thailand)

**SUMMARY**

The need to enhance the surveillance and Direct Controller and Pilot Communication (DCPC) VHF coverage where gaps exist in APAC Region along some of the busy air traffic routes at boundaries between FIRs has been identified during APANPIRG/29 in 2018. As such, the coverage charts were generated for inclusion in APAC Seamless ANS Plan version 3.0 in 2019.

With the need for a regular update, the ICAO APAC Regional Office has launched a survey to update information concerning existing/planned coverage. This Working Paper presents the outcomes from the survey thus identifying the areas of improvements in both surveillance and DCPC VHF coverage in the region.

**1. INTRODUCTION**

1.1 Identified the need to enhance the surveillance and Direct Controller and Pilot Communication (DCPC) VHF coverage where gaps exist in APAC Region along some of the busy air traffic routes at boundaries between FIRs, the Conclusion APANPIRG/29/22 was endorsed in 2018, where there is a mechanism to produce charts and regularly update them in a sustainable manner to show the latest situation in ATS surveillance and DCPC VHF coverage in the Asia Pacific Seamless ANS Plan, so that resources in enhancing the surveillance and DCPC VHF coverage to address the gaps can be prioritized and optimized in a holistic, collaborative and harmonized manner.

1.2 With the need for a regular update, the ICAO APAC Regional Office issued the State Letter AP027/22 (CNS) in January 2022 for States/Administrations to update their ATS Surveillance and DCPC VHF coverage information. Thanks to support from various States/Administrations, the initial version of charts are given in this paper for discussion.

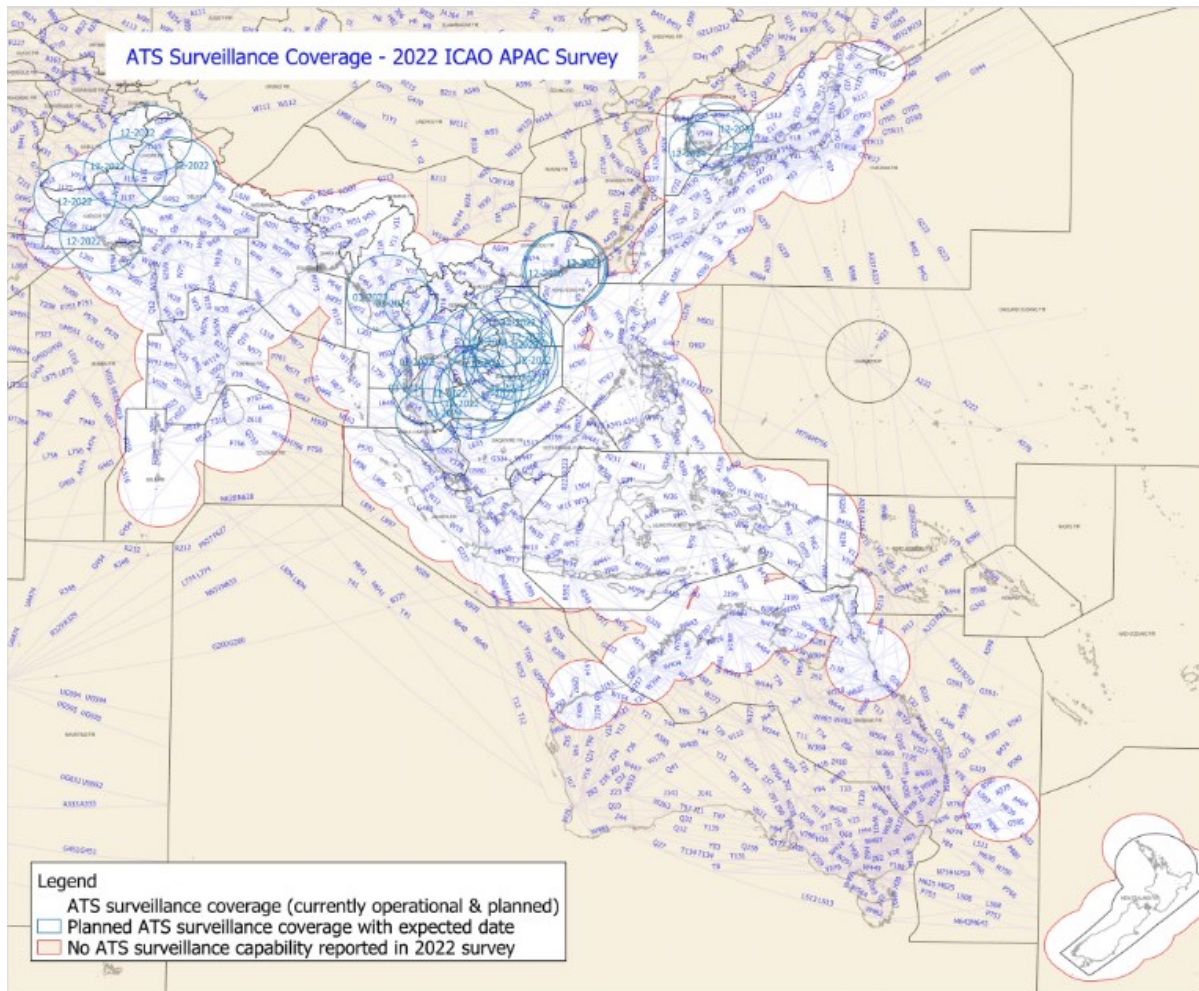
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**2. DISCUSSION**

2.1. As of Mid-August 2022, there were 16 States/Administrations provided their updated coverages, and all plottable data provided has been applied to the update of coverage maps. Based on the inputs from States/Administrations, the overall pictures of ATS surveillance and DCPC VHF coverage are given as follows in Figures 1 and 2 respectively. Detailed comparison in each main area of region identified in the APAC Seamless ANS Plan:-

Figure 1: Updated ATS Surveillance Coverage:





(a) Highest Priority: South China Sea airspace between China, Hong Kong China and the Philippines

Figure 3a: ATS Surveillance coverage in the area of 2019

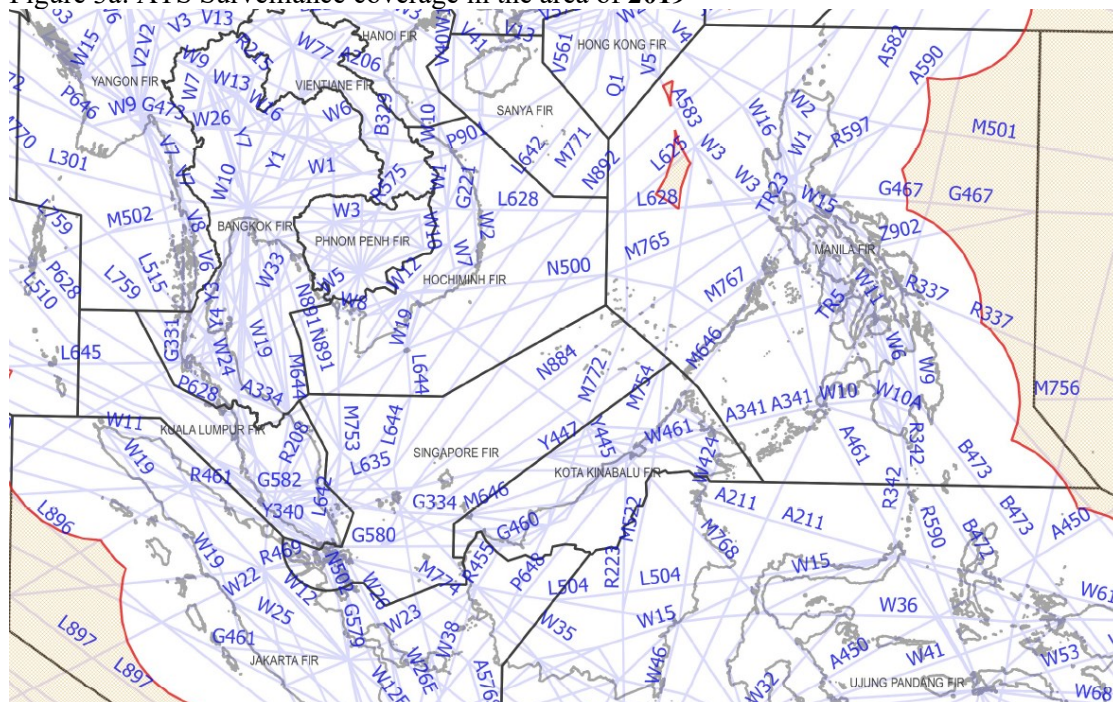
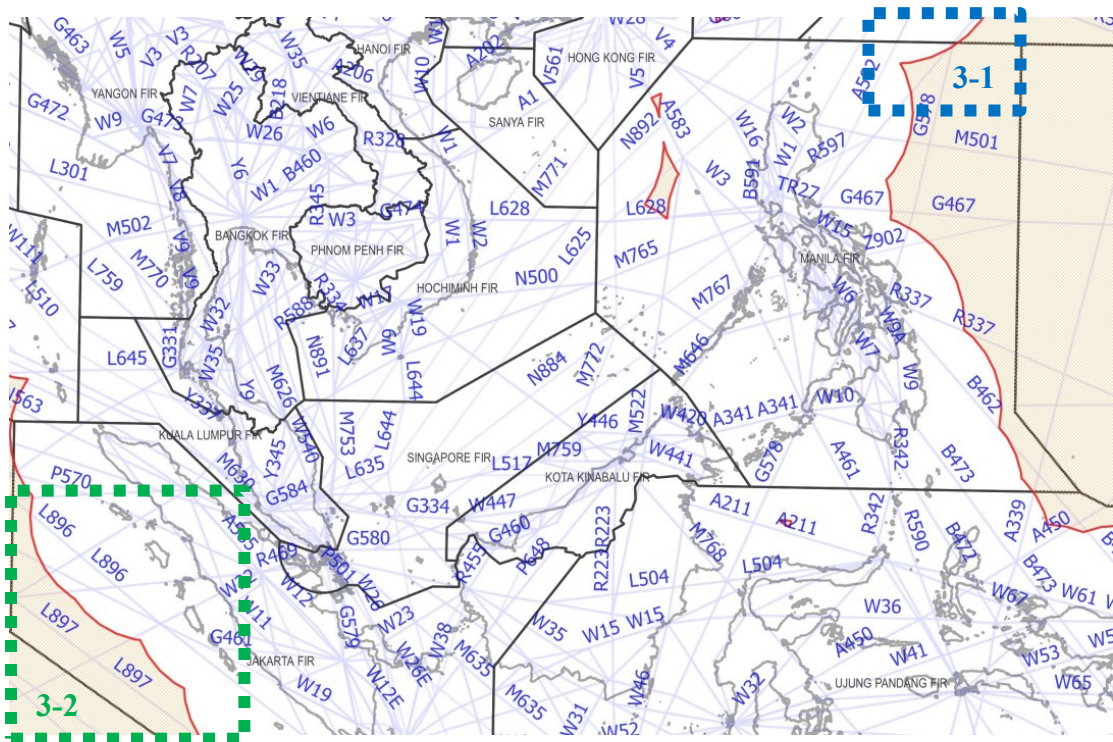


Figure 3b: ATS Surveillance coverage in the area of 2022, with major changes highlighted



2.3. The reduction in area marked as 3-1 was found to be correcting an incorrect entry back in 2019 of an ADS-B Station. It is noted that an increase in ATS surveillance coverage in the area marked as 3-2.

Figure 4a: DCPC VHF coverage in the area of 2019

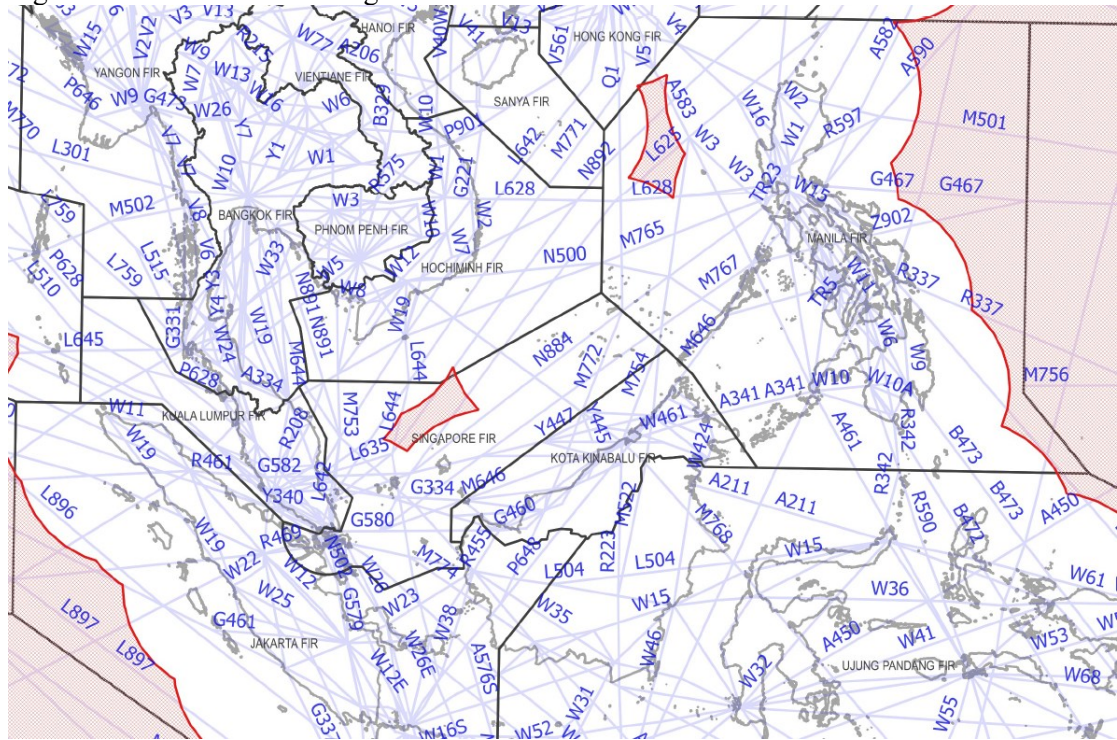
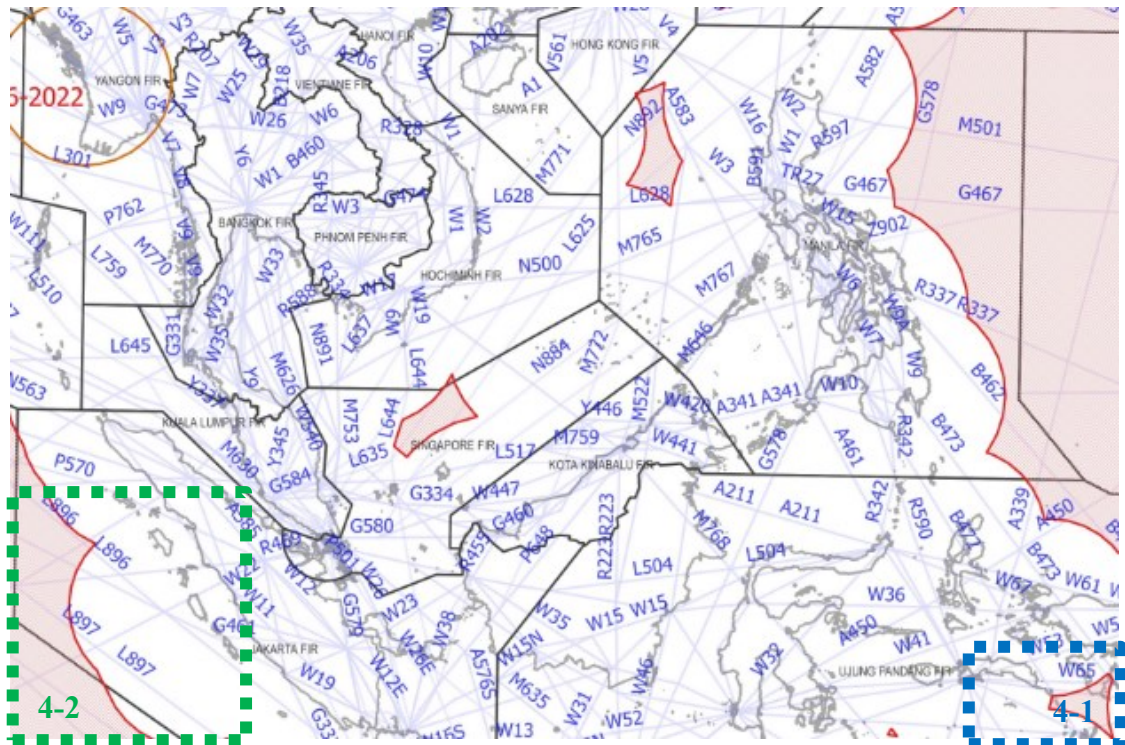


Figure 4b: DCPC VHF coverage in the area of 2022



2.4. The small gap identified in area marked as 4-1 compared to last input according to base station locations. Besides, similar to ATS surveillance coverage, it is noted that an increase in DCPC VHF coverage in the same area marked as 4-2.

(b) Priority 2: Bay of Bengal airspace between the Indian subcontinent and the Andaman Islands

Figure 5a: ATS Surveillance coverage in the area in 2019

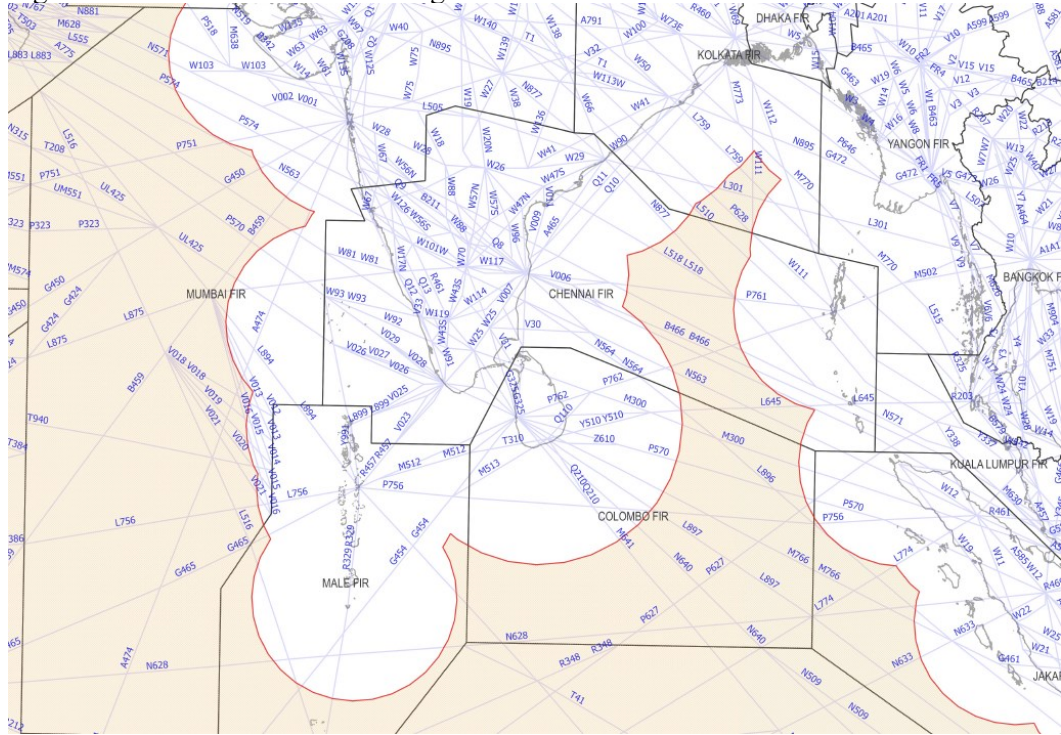
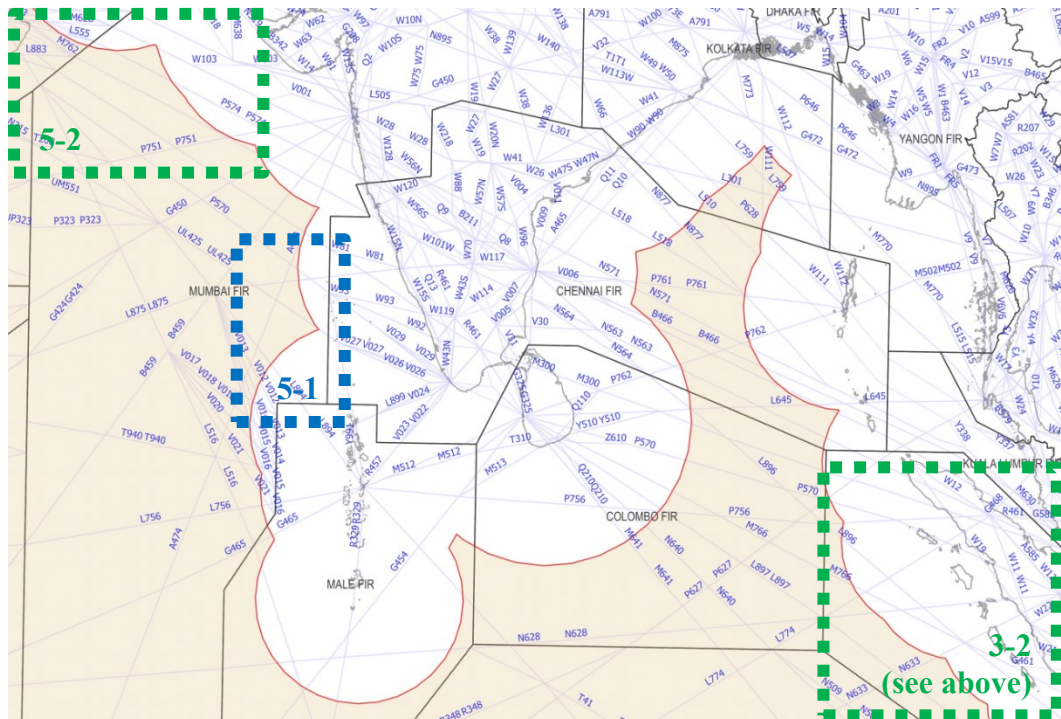


Figure 5b: ATS Surveillance coverage in the area in 2022



2.5. The reduction of coverage identified in area marked as 5-1 compared to last input. It was observed from the replied data that three (3) planned ADS-B stations as of 2019 have not been implemented and the plan was not found in the reply of this round. As a result, the coverage around the area has been adjusted. On the other hand, it is noted that an increase in ATS surveillance coverage in the area marked as 5-2.

Figure 6a : DCPC VHF coverage in the area in 2019

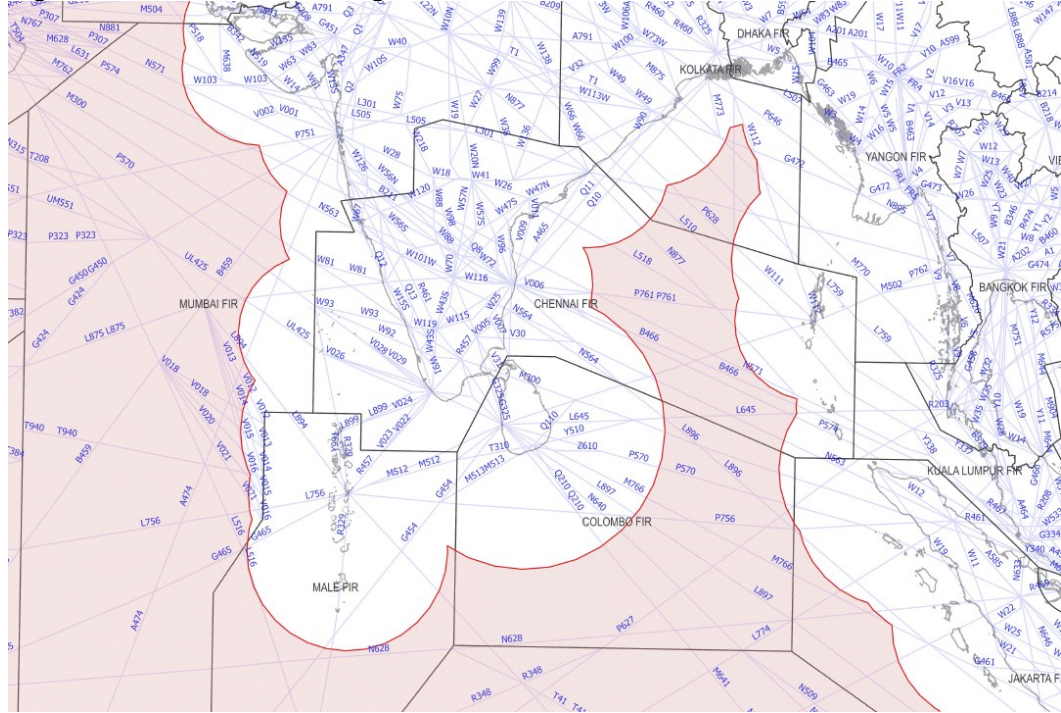
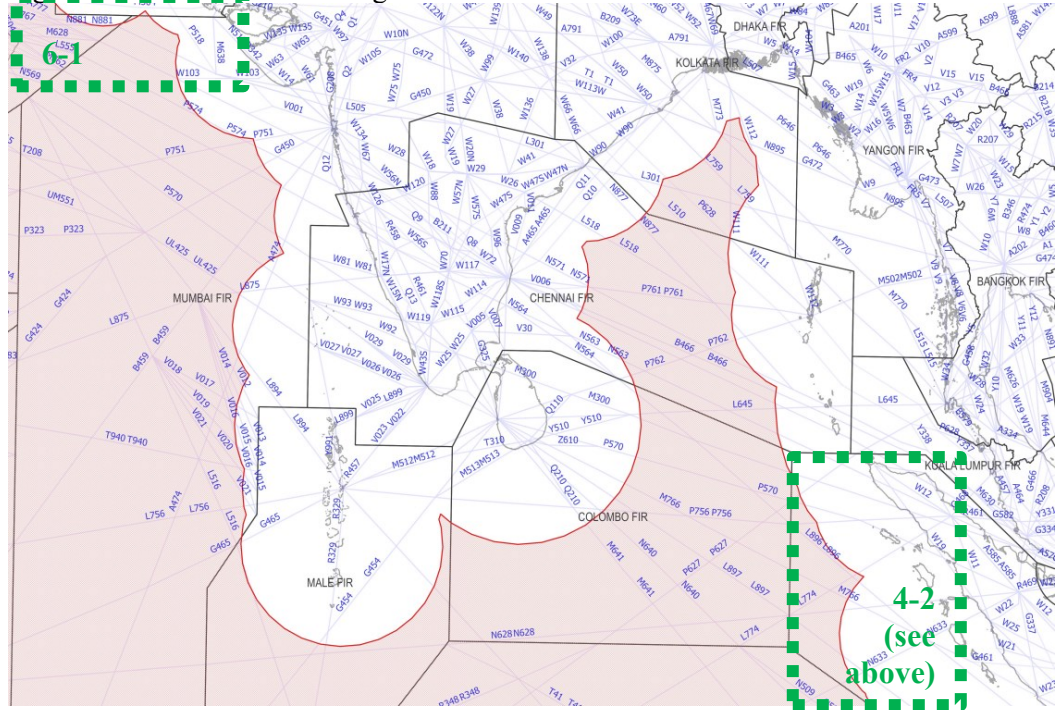


Figure 6b : DCPC VHF coverage in the area in 2022



2.6. It is noted that an increase in DCPC VHF coverage in the area marked as 6-2.

- (c) Priority 3: airspace between Indonesia and Australia (between Java and West Australia), and airspace between the Philippines and Indonesia

Figure 7a : ATS Surveillance coverage in the area in 2019

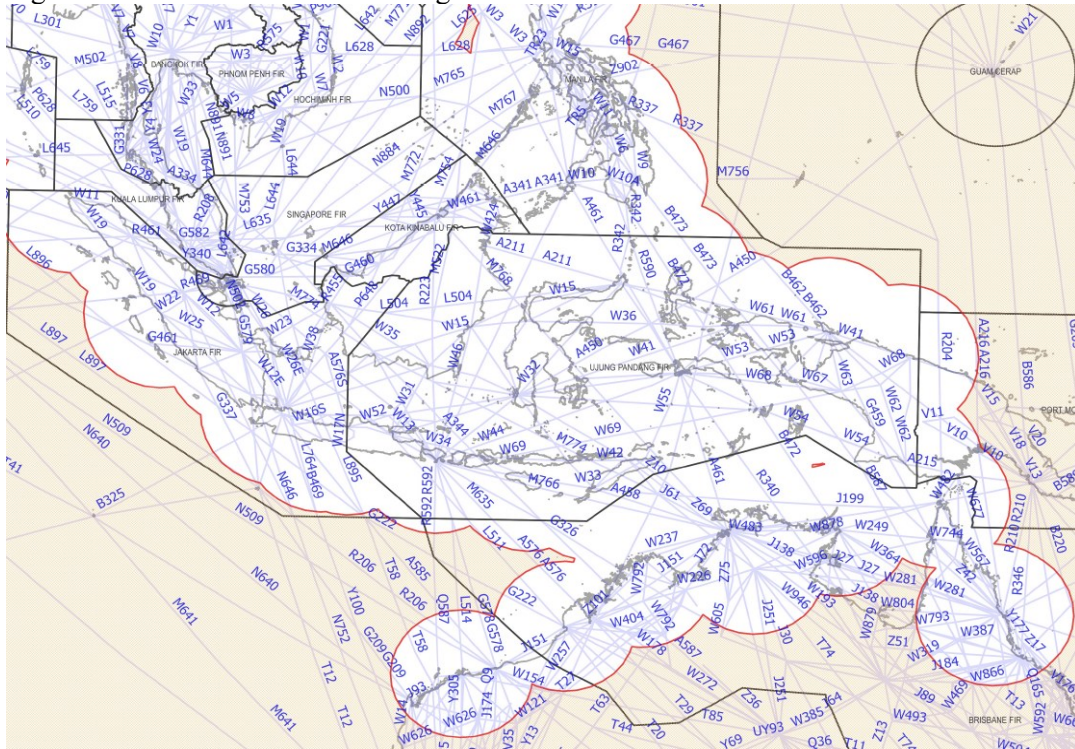
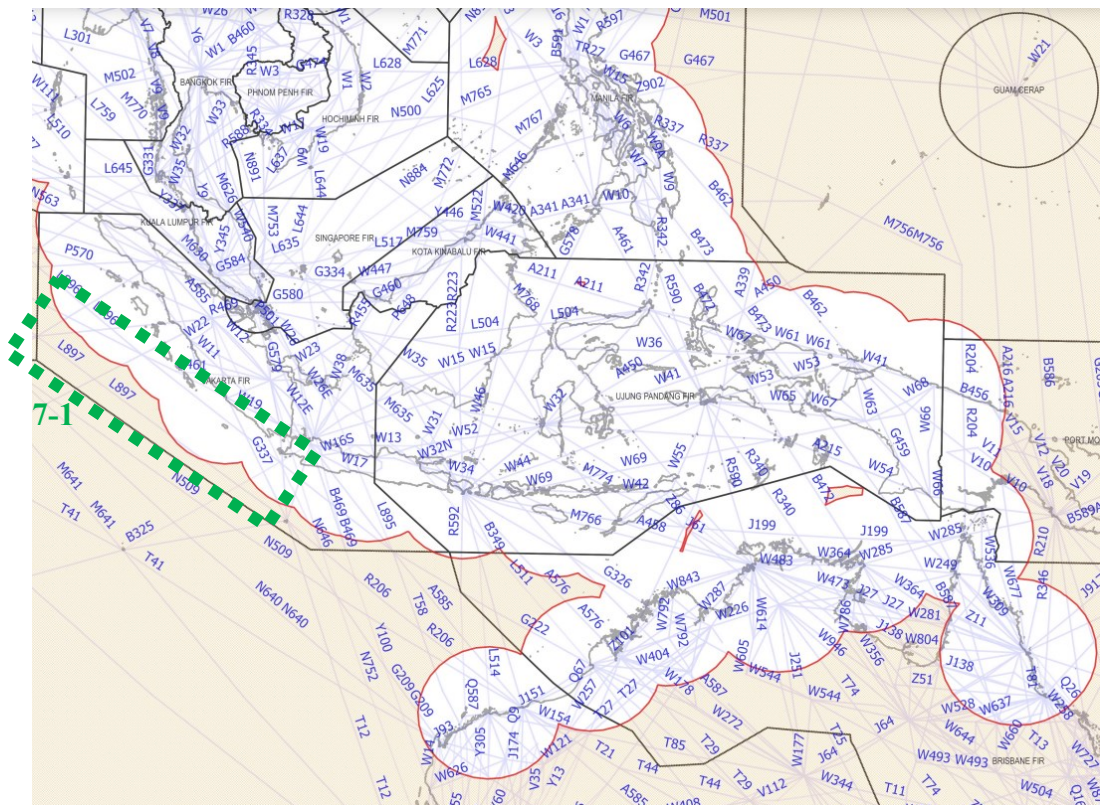


Figure 7b : ATS Surveillance coverage in the area in 2022



2.7. It is noted that an improved ATS surveillance coverage in the area marked as 7-1.

Figure 8a : DCPC VHF coverage in the area in 2019

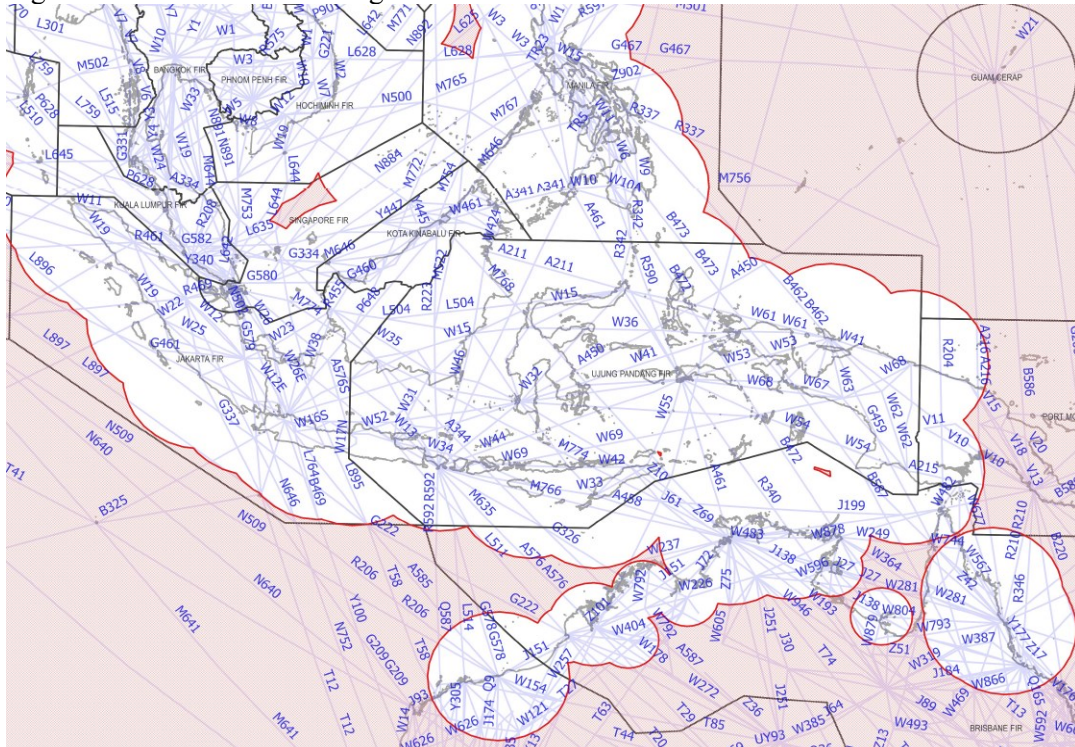
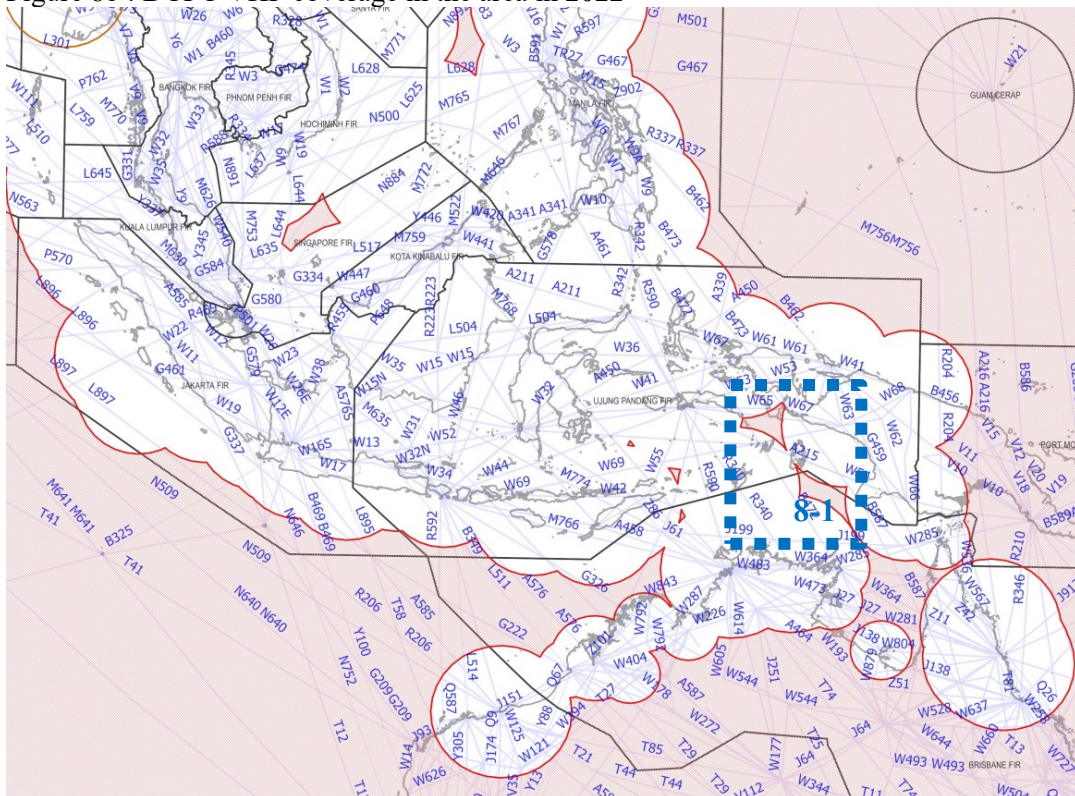


Figure 8b : DCPC VHF coverage in the area in 2022



2.8. It is noted that no major changes in DCPC VHF coverage in the area except the updated coverage observed marked as 8-1.

(d) Priority 4: Coral Sea between Papua New Guinea and Australia

Figure 9a : ATS Surveillance coverage in the area in 2019

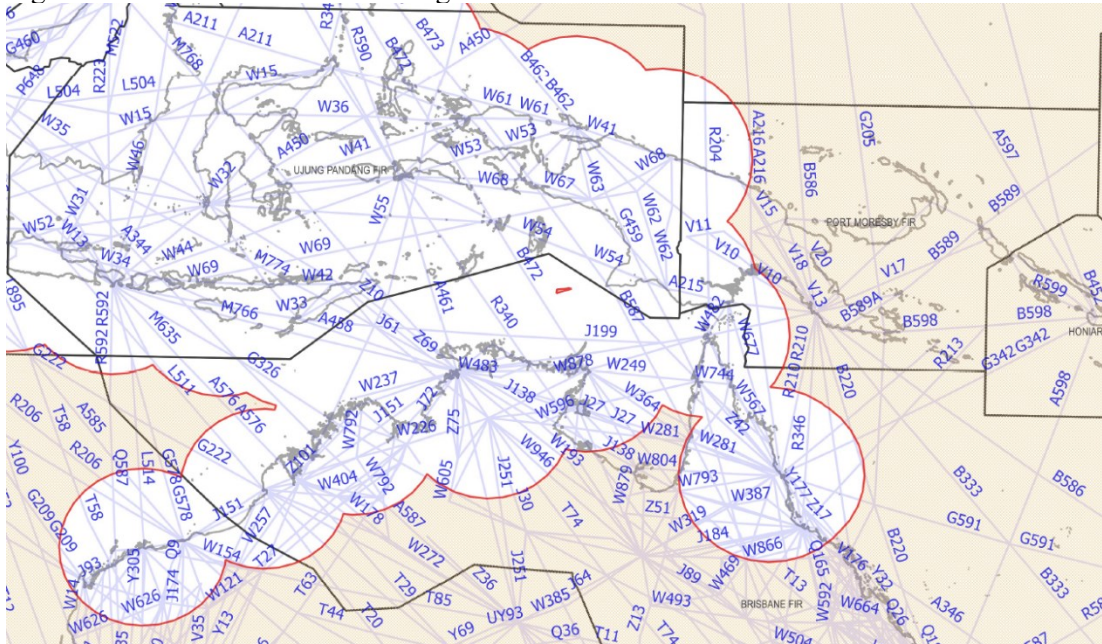
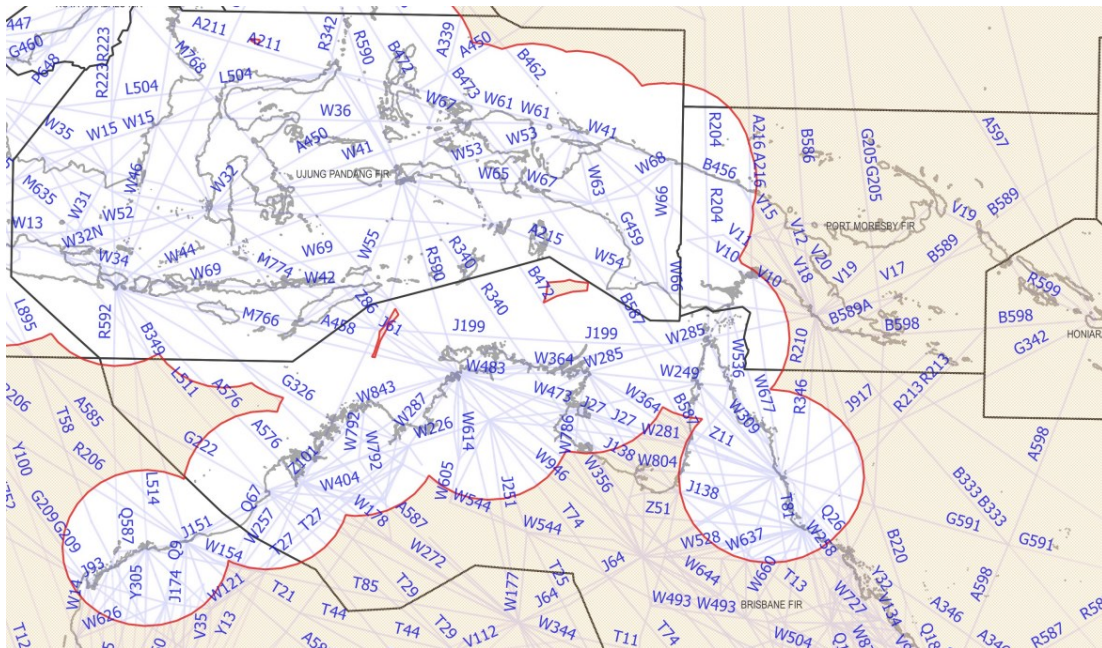


Figure 9a : ATS Surveillance coverage in the area in 2022



2.9. It is noted that no major changes in ATS surveillance coverage in the area.

Figure 10a : DCPC VHF coverage in the area in 2019

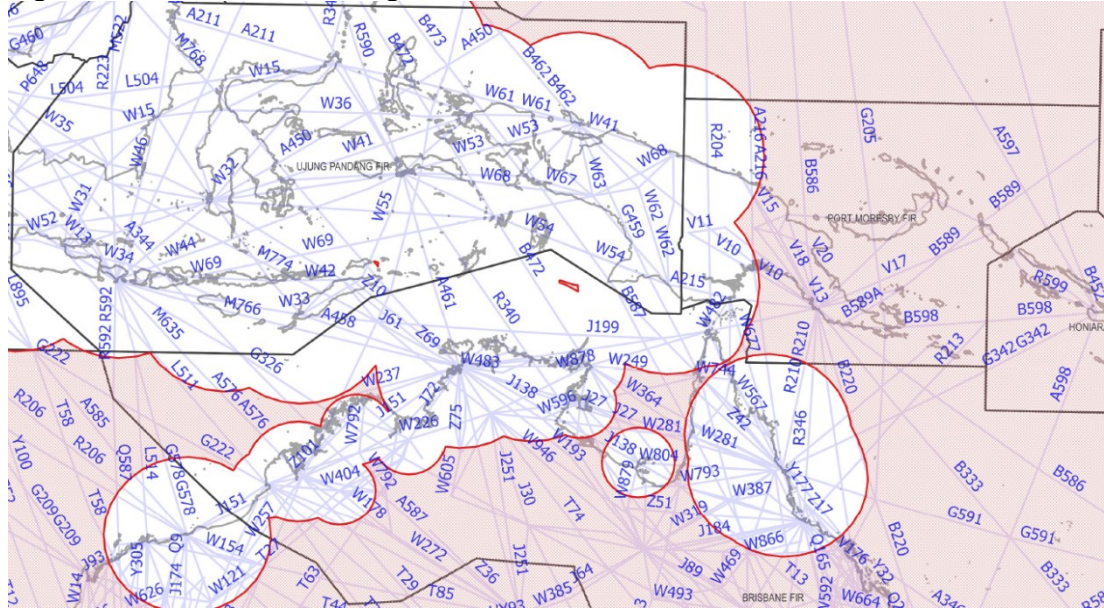
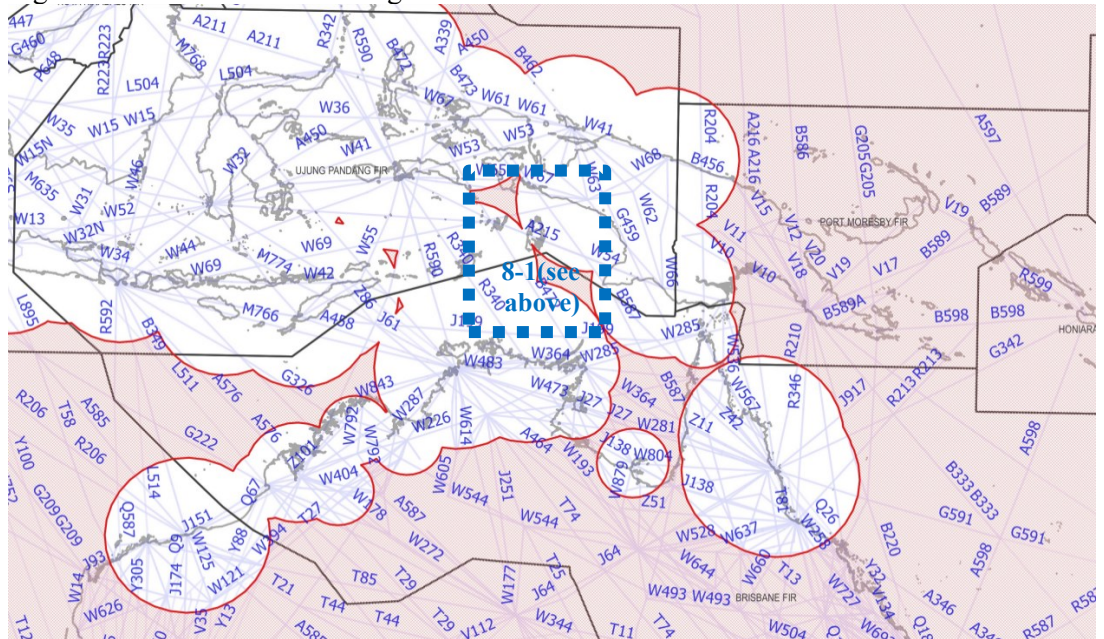


Figure 10b : DCPC VHF coverage in the area in 2022



2.10. It is noted that no major changes in DCPC VHF coverage in the area in general, except the area marked as 8-1 as identified in paragraph 2.8.

Observation and Conclusion

2.11. During plotting of coverage map, it is observed that data could be incorrect, causing the change in coverage area, including following causes:

- Previously planned base stations were no longer in plan nor implemented. Some may be relocated, while others could be change in plan.
- Typo in lat-longs
  - e.g. xx° N mistyped as xx° S, or xxx° E mistyped as xxx° W
  - e.g. missing digits, found while cross-checking with online maps
- Misunderstood of lat-long formats e.g. xx° yy' zz" (degree-minute-second) does not equal to xx.yyzz°

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2.12. Based on the coverage charts as shown, relevant States/Administrations are encouraged to work with appropriate parties to derive plans in addressing the coverage gaps identified above, such as surveillance data sharing between FIRs or adoption of space based surveillance as appropriate. For States/Administrations which have not yet responded to the survey, they are reminded to contribute relevant information to complete the charts.

2.13. It is proposed that the updated coverage charts of the ATS surveillance and DCPC VHF coverage to be reviewed by States via CNS Sub-group and incorporated into the next update of the Asia Pacific Seamless ANS Plan.

**3. ACTION BY THE MEETING**

3.1. The meeting is invited to:

- a) note the information contained in this paper;
- b) encourage relevant States/Administrations to work with appropriate parties and/or other States/Administrations to derive plans in addressing the coverage gaps identified in the coverage charts; and
- c) remind States/Administrations which have not yet responded to the survey to contribute relevant information to complete the coverage charts.

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**Appendix 1 – Summary of Response to the Survey as of August 2022**

| <b>States</b>  | <b>Data Received 2022</b> | <b>Plotted on Map</b> |
|--|---------------------------|-----------------------|
| <b>Group 1 APAC Contracting States with RVSM Airspace</b>    |                           |                       |
| Afghanistan  |                           |                       |
| Australia  | YES                       | YES                   |
| Bangladesh   |                           |                       |
| Cambodia   |                           |                       |
| China  | GRAPHICS ONLY             | YES                   |
| China - Hong Kong  | YES                       | YES                   |
| China - Macao  | YES                       | YES                   |
| Democratic People's Republic of Korea                        |                           |                       |
| Fiji   |                           |                       |
| India  | YES                       | YES                   |
| Indonesia  | YES                       | YES                   |
| Japan  | YES                       | YES                   |
| Lao People's Democratic Republic                             |                           |                       |
| Malaysia   |                           | YES (2019s data)      |
| Maldives   |                           | YES (2019s data)      |
| Mongolia   |                           |                       |
| Myanmar  | YES                       | YES                   |
| Nauru  |                           |                       |
| Nepal  |                           |                       |
| New Zealand  | YES                       | YES                   |
| Pakistan   | YES                       | YES                   |
| Papua New Guinea   |                           |                       |
| Philippines Yes Yes  | YES                       | YES                   |
| Republic of Korea  | YES                       | YES                   |
| Singapore Yes Yes  | YES                       | YES                   |
| Solomon Islands  |                           |                       |
| Sri Lanka  | YES                       | YES                   |
| Thailand   | YES                       | YES                   |
| Viet Nam   | YES                       | YES                   |
|  |                           |                       |
| <b>Group 2 APAC Contracting States with no RVSM Airspace</b> |                           |                       |
| Bhutan   |                           |                       |
| Brunei Darussalam  |                           |                       |
| Macao, China   |                           |                       |
| Cook Islands   |                           |                       |
| Kiribati   |                           |                       |
| Marshall Islands   |                           |                       |
| Micronesia   |                           |                       |
| Palau  |                           |                       |
| Samoa  |                           |                       |
| Timor Leste  |                           |                       |
| Tonga  |                           |                       |
| Tuvalu   |                           |                       |
| Vanuatu  |                           |                       |
|  |                           |                       |
| <b>COUNT</b>   | <b>16</b>                 | <b>18</b>             |