International Civil Aviation Organization

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Agenda Item 13: Innovation and New Technologies

HF MODERNIZATION FOR FLIGHT INFORMATION CENTER USING SPIRA-CONE ANTENNA TECHNOLOGY

(Presented by Indonesia)

SUMMARY
This paper provides information about High Frequency (HF) Modernization in Flight Information Service (FIS) with Spira-Cone Antenna Technology in Indonesia.

1. INTRODUCTION

1.1 Flight Information Service is a service provided with the aim of providing advice and useful information to carry out safe and efficient flights. The Flight Information Service may be provided independently or in conjunction with the Air Traffic Control Service.

1.2 Flight Service Station (FSS) is a unit of Air Traffic Services (ATS) that has the task of providing flight navigation services in the form of Flight Information Service and Alerting Service in uncontrolled airspace with airspace dimensions in accordance with the area or sector that is the responsibility of each FSS unit with the boundary from the ground/ocean surface to the highest altitude FL245 in the Flight Information Region (FIR) Indonesian.

1.3 Previously, Indonesia had 14 FSS units in AirNav Indonesia, which are located in Medan, Palembang, Jakarta, Pontianak, Banjarmasin, Balikpapan, Bali, Kupang, Ujung Pandang , Manado, Ambon, Biak, Jayapura and Merauke.

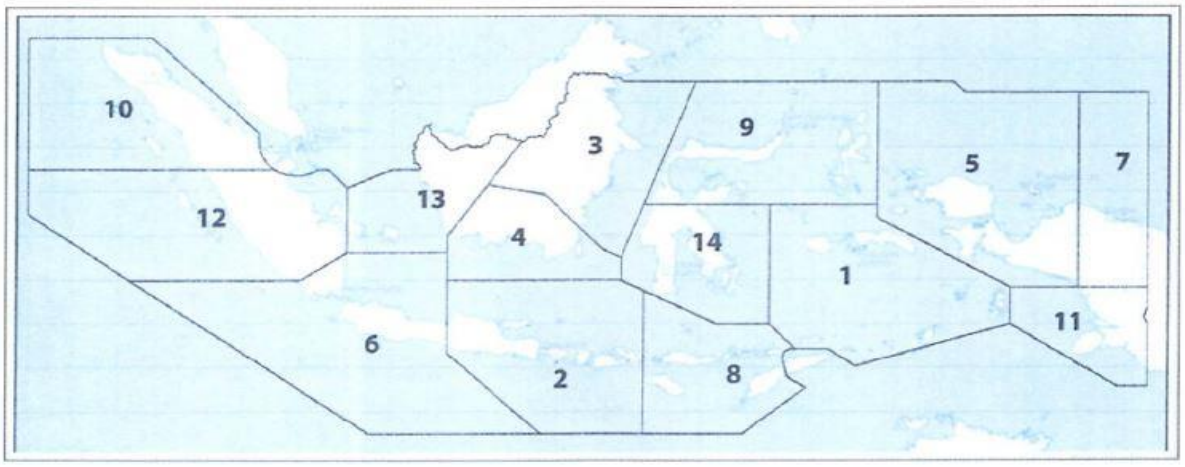

Figure 1. Indonesian Airspace on FSS Services Previous

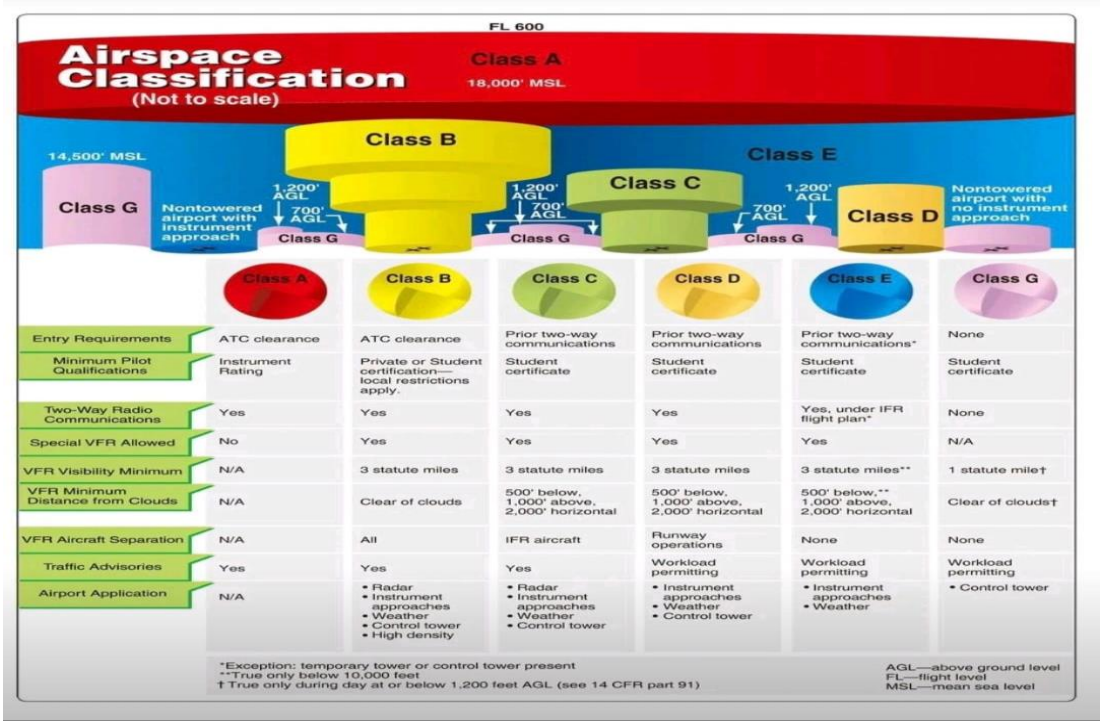

Figure 2. Cross-section of Indonesian airspace

1.4 The main issues in FSS services in Indonesia include the following:

a. HF FSS Radio Facilities do not guarantee that they can cover and reach the areas for which they are responsible;
b. HF FSS radio facilities operate relying on only one Frequency of the allocated frequency;
c. The HF FSS Radio facility does not radiate in any direction causing uneven coverage;

d. HF FSS Radio facilities have poor sound quality, do not tolerate weather changes, do not provide comfort for officers and do not provide a guarantee of good two-way communication.

2. DISCUSSION

2.1 The Concept of Spira-Cone Antenna Technology offers a unique combination of spiral and conical structures to deliver wideband performance, circular polarization, and compact size. These attributes make it suitable for a variety of applications, including telecommunications where reliable and efficient signal transmission is crucial.

2.2 The Spira-Cone antenna operates with two 'modes'. High mode receives and transmits signals that are relatively close to the location of the antenna while low mode receives and transmits longer distances. Most antennas have only one basic mode so they are limited to the range associated with that mode. This antenna is also omni-directional so it is able to receive and transmit to 360 degrees.

2.3 These advantages allow the use of Spira-Cone antennas as follows:
a. Longer range when compared to conventional HF antennas; and
b. Can be used by multiple service units simultaneously.

2.4 Based on the results of a study with 4 Spira-Cone antennas can cover the entire Indonesian airspace. The placement of Spira-Cone Antennas is placed in 4 locations in Indonesia, namely Merauke, Makassar, Palembang and Balikpapan.

Figure 3. Spira-Cone Antenna Placement Location

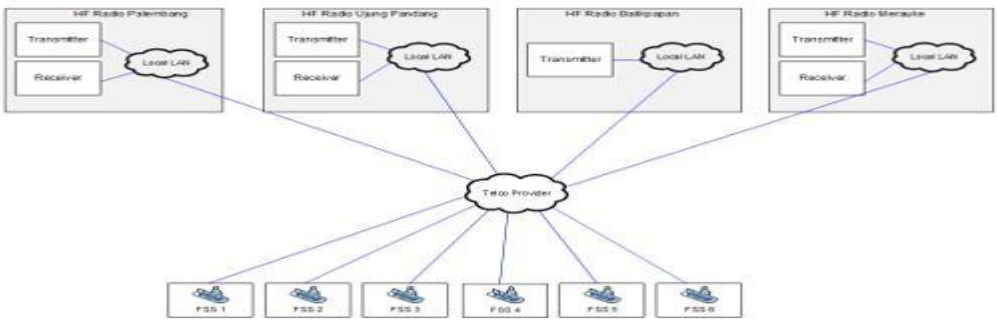

Figure 4. Networking Interconnection

2.5 By using 4 Spira-Cone antennas, only 6 FSS service units are needed. Each FSS can use 2 antennas, so if there is a skip zone or a bad signal on one antenna, then the operator can use another alternative antenna.

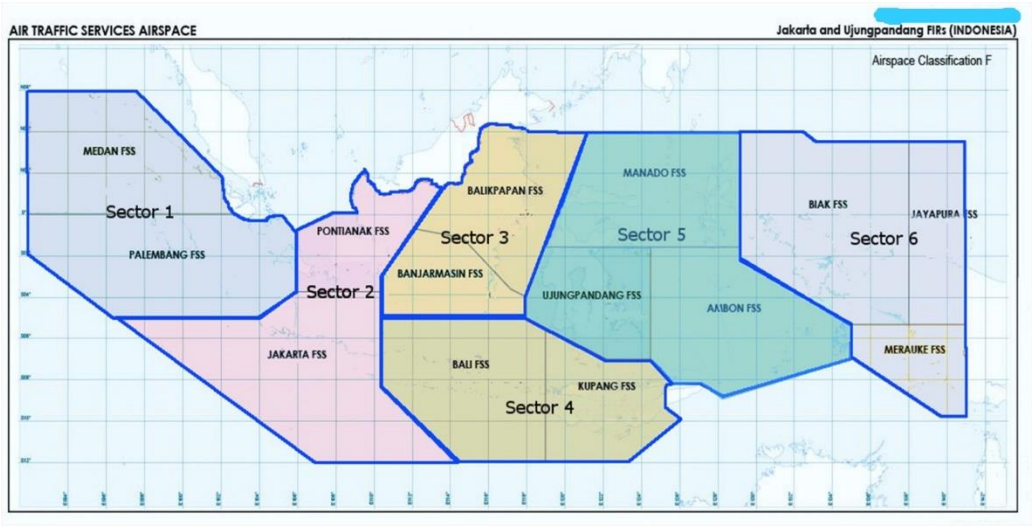

Figure 5. FSS service airspace with spiracone antenna technology

2.6 The placement of service locations in each Sector is as follows:

a. Sector 1: Service locations at Medan branch offices;
b. Sector 2: Service locations at Jakarta branch offices;
c. Sector 3: Service locations at Balikpapan branch offices;
d. Sector 4: Service locations at Bali branch offices;
e. Sector 5: Service locations at Makassar branch offices;
f. Sector 6: Service locations at Jayapura branch offices.

2.7 The frequency allocation used in each sector is as follows:

	Sector 1 kHz	Sector 2 kHz	Sector 3 kHz	Sector 4 kHz	Sector 5 kHz	Sector 6 kHz
Frequency	3416, 5631, 8957	3416, 5631, 8957	3416, 5631, 8882	3416, 5631, 8882	2956, 5631, 89H	2956, 5631, 8834

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 matter as appropriate
