

**57th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

*Incheon, Republic of Korea
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AGENDA ITEM 4: AIR NAVIGATION

PAKISTAN SURVEILLANCE COVERAGE

Presented by the Islamic Republic of Pakistan

INFORMATION PAPER

SUMMARY

In order to ensure efficient provision of Air Traffic services, Pakistan CAA has primarily focused on the improvement of Communication Navigation Surveillance (CNS) facilities. This paper provides information on existing **surveillance status, grey areas and future plans of PCAA** to provide 3 tier backup / redundant surveillance system for whole airspace of Pakistan. The backup includes latest MSSRs along with Mode-S and ADS-B surveillance systems. Following Road Map containing three steps has been followed to achieve the target:

- Step I MSSRs / PSRs without Mode S capability (installed in 1996)
- Step II MSSRs / PSRs with Mode S capability (installed in 2017)
- Step III Installation ADS-B ground stations. (2017 to 2021)

PAKISTAN SURVEILLANCE COVERAGE

1 INTRODUCTION

- 1.1 The aviation activities are rapidly growing which demand the states to take measures for airspace management and provide modern surveillance equipment for safety of the aircraft. Pakistan is significantly located with regards to Air Traffic operating from South-East Asian region to Central Asia / Gulf and European region. The statistical analysis of Transit flights utilizing Pakistan airspace shows a consistent growth at **4.5% to 5.0% per Annum (pre COVID-19)**. In this regard Pakistan CAA has been taking revolutionary measures since 1996 to ensure provision of modern CNS facilities for safe & efficient conduct of flight.
- 1.2 Pakistan CAA has augmented its airspace with dual / triple redundant Monopulse Secondary Surveillance Radars (MSSRs)/ Primary Surveillance Radars (PSRs) system. Three steps road map was adopted stated as below:
- Step I MSSRs /PSRs without Mode S capability
 - Step II MSSRs/PSRs with Mode S capability
 - Step III Installation ADS-B ground stations.

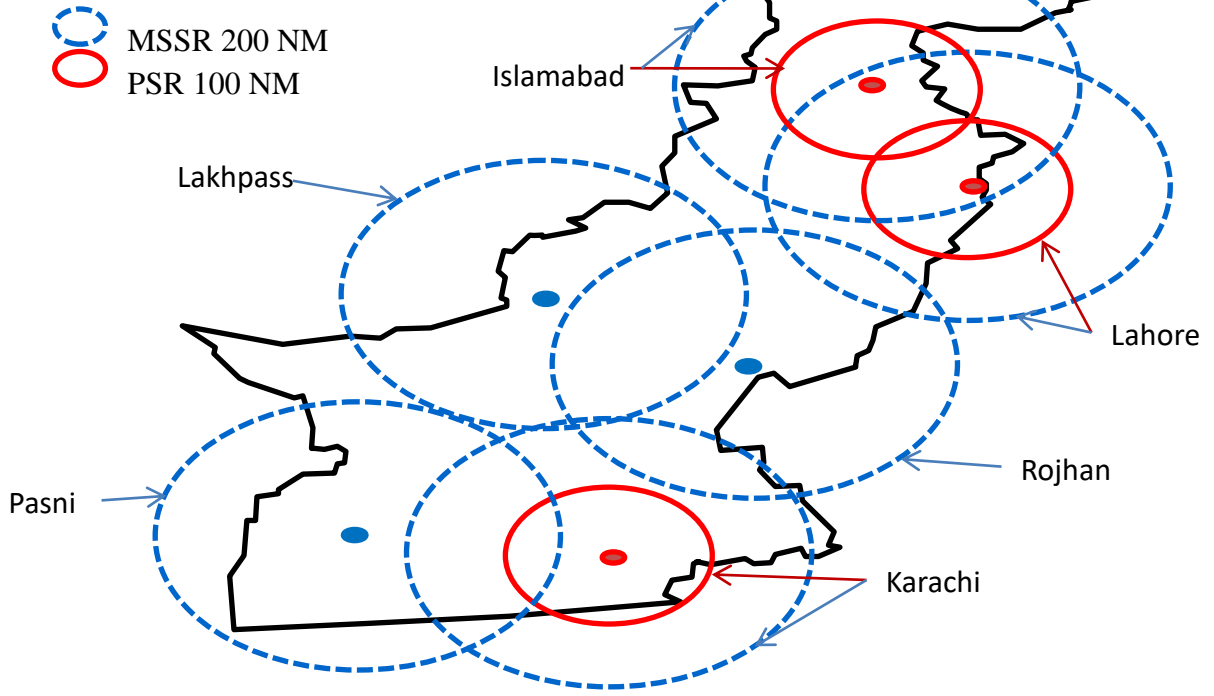
These measures have been taken to enhance safety of airspace, minimize reliance upon pilot position reporting particularly voice position reporting, improved efficiency and to maintain uninterrupted benefits of Radar based surveillance of airspace.

2 DISCUSSION

2.1 SURVEILLANCE COVERAGE (SINCE 1996):

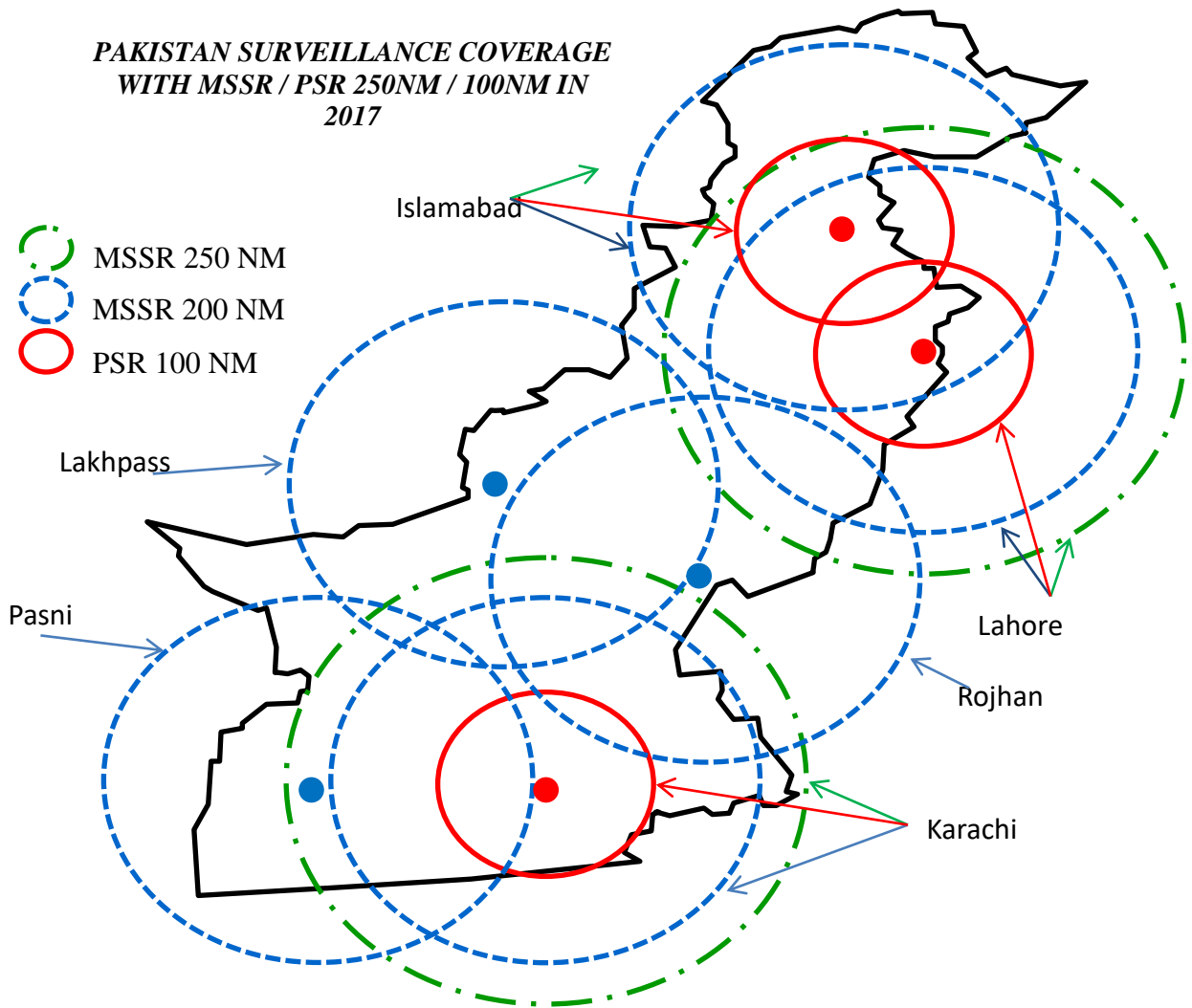
- 2.1.1 Pakistan airspace was fully equipped with surveillance coverage (6 MSSR & 3 PSR) since 1996 except minor grey areas.
- 2.1.1.1 Three (03) MSSRs co-mounted with PSR installed at Karachi, Lahore, and Islamabad International aerodromes of Pakistan.
- 2.1.1.2 Additionally three (03) MSSRs each having coverage range of 200NM installed at remote locations to provide en-route surveillance coverage.
- 2.1.2 For en-route surveillance coverage, remote Radars (MSSRs) installed to provide maximum possible overlapping surveillance coverage to airspace for benefit during scheduled maintenance or un-serviceability of Radar. The only back up, in such cases, was non radar Air Traffic Control services (Procedural Control), which reduced the capacity of airspace to ensure larger separation minima.

**PAKISTAN SURVEILLANCE COVERAGE
WITH MSSR / PSR 200NM / 100NM IN 1996**



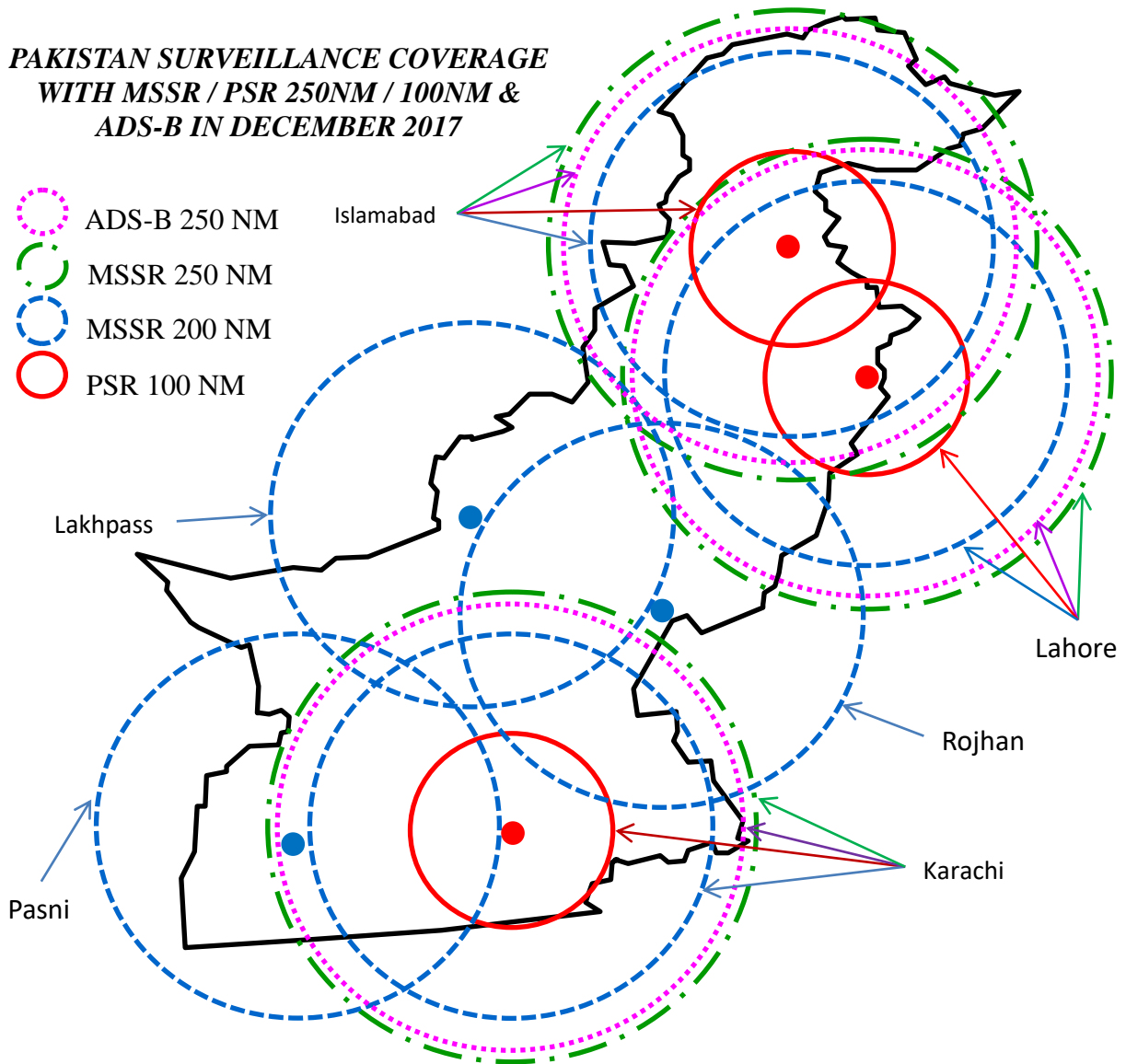
2.2 ENHANCED AND BACKUP SURVEILLANCE COVERAGE SINCE 2017:

2.2.1 In order to provide redundant surveillance system to Pakistan airspace, three (03) advanced / upgraded MSSRs/ PSRs surveillance system along with Mode S transponder capability have been installed at Karachi, Lahore & Islamabad International Airports. Each MSSR/PSR provides the coverage range of 250NM and 100NM respectively.



2.3 ENHANCED SURVEILLANCE COVERAGE USING ADS-B;

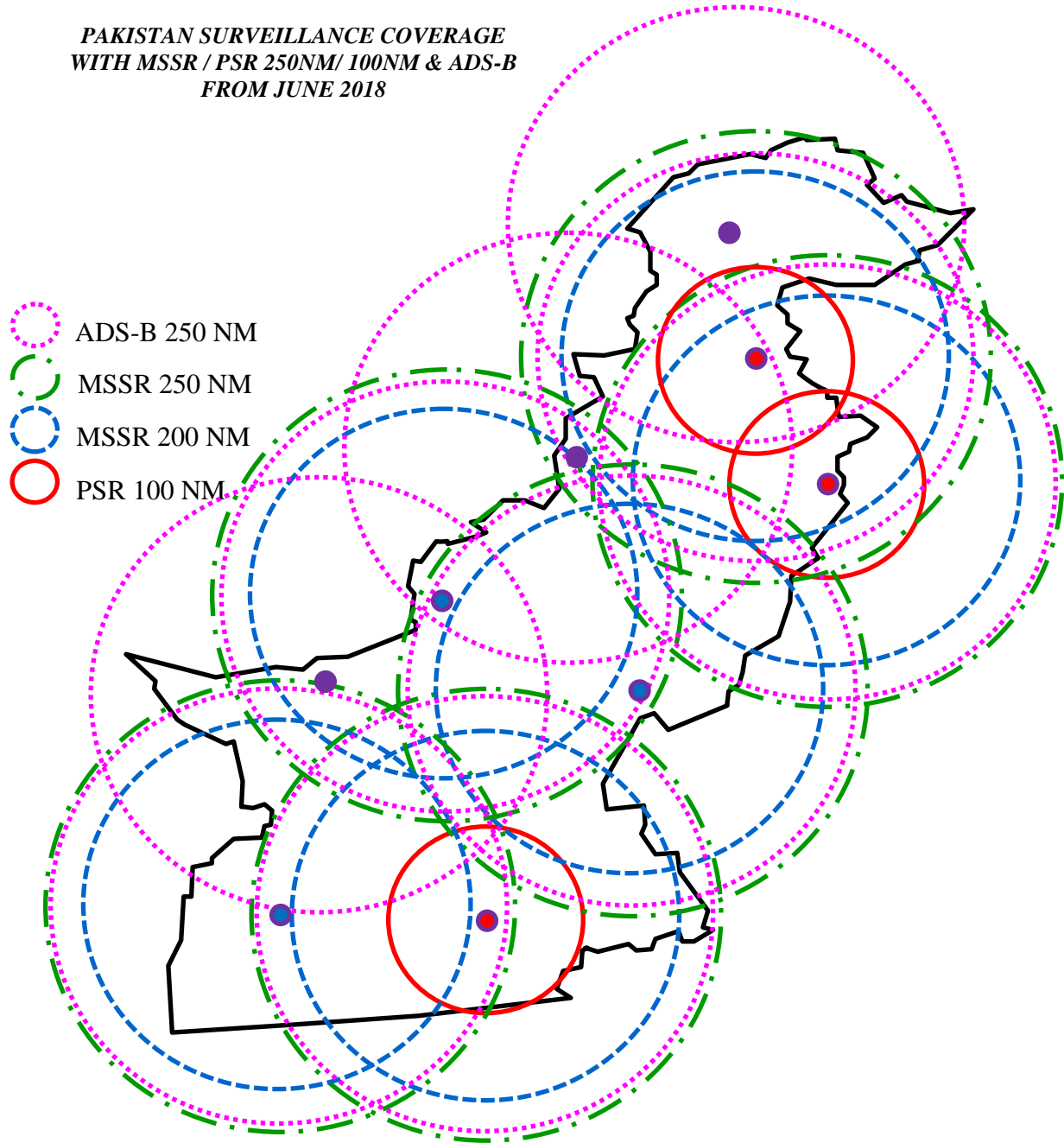
2.3.1 In order to enhance surveillance coverage, four (04) MSSRs collocated ADS-Bs along with five (05) standalone ADS-B stations have been installed.



2.4 SURVEILLANCE COVERAGE OF GREY AREAS USING ADS-B:

2.4.1 There were some minor issues of grey areas mainly due to high mountainous terrain. These terrains are located in North of Pakistan between China/Pakistan border and towards west of Pakistan between Pakistan/Iran border where MSSR coverage was difficult to provide. PCAA has addressed the issue and installed five (05) additional remote Automatic Dependent Surveillance-Broadcast (ADS-B) ground stations.

*PAKISTAN SURVEILLANCE COVERAGE
WITH MSSR / PSR 250NM/ 100NM & ADS-B
FROM JUNE 2018*



2.4.2 Presently surveillance coverage of whole Pakistan airspace has been made redundant using MSSRs whereas triple layer surveillance redundancy is provided using ADS-B ground stations. Moreover, the existing surveillance coverage is fully supported by extended VHF (EVHF) system.

S. No.	Type of Surveillance	Coverage	Quantity	Status
1.	MSSR+PSR with Mode S	250NM / 100NM	3	Primary
2.	MSSR with Mode S	250NM	3	Primary
3.	ADS-B	250NM	3	Primary
4.	ADS-B	250NM	6	Enhanced / Additional

3 ACTION BY THE MEETING

3.1 The Conference is invited to note the information contained in this Paper.

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