INDRA presentation

African ANSPs Meeting
Lome, Togo, 28 March–1st April 2022

Presented by:
Guillermo Roselló – ATM Business development


indra
Creating Skies
Together

Indra in Air Traffic Management

Global player

Guaranteeing safe, efficient and profitable flights, in a difficult context with constantly increasing air traffic

Innovative solutions

For our partners business success which improve service resilience

Environmental benefit

Enabling flights CO_2 and noise footprint reduction, whilst improving capacity

+ 5,700

Implementations in over 190 countries

+ 100

Years of experience in ATM solutions

+ 85%

Passengers worldwide travel making use of Indra ATM technology at some point during the flight

World leaders in ATM

World leaders in ATM/CNS industry with + 5.700 installations in over +190 countries

Pioneers in the implementation of Air Traffic Management systems based in **4D trajectories, enabling more efficient flights**: the reduction by 30-40 nautical miles per route makes possible annual savings of €140 million in fuel.

Indra's technology is implemented in **+300 control centres and +325 towers** across 74 countries.

60% of Chinese airspace is controlled through Indra **radars.**

World leaders in navaids: **+900 systems deployed in China** and **+300 in Australia**, among many other countries.

Indra **Instrument Landing Systems** have assisted so far **100 million landings** in **+1,200 runways** worldwide, making possible a 15% capacity increase of the Heathrow Airport runways in low-visibility conditions (from 26 to 30 landings/hour).

The **world's largest remote tower programme in Norway**, which includes the **remote control of 15 airports** by 2021 in its 1st phase, is being implemented by Indra.

Co-leaders of the **Single European Sky** initiative and **SESAR**, its technological pillar.

We are present in Africa in 49 out of 54 countries with our ATM solutions




Global player

Automation/Simulation
+ 725 Implementations

Communications
+ 700 Implementations

Navigation
+ 3,400 Implementations

Surveillance
+ 575 Implementations

Aeronautical Info
+ 225 systems

More than
25%
world's airspace is managed with Indra Air Automation systems

Solutions for all segments

Our solutions and services

Indra Air Solutions

The only company in the world with a technology portfolio that covers every segment of the ATM industry

Space based CNS

- ADS-B surveillance + Real time VHF communications + Datalink from a satellite constellation in low earth orbit

Indra Air Automation

- ATC Systems
- Turnkey control centers
- Advanced CWP
- ATC Simulation
- InNova Tower solutions
- Remote Tower solutions

Indra Air Communication

- GAREX VCS
- Cometa®
- Neptuno VR

Indra Air Navigation

- GBAS GAST-D
- ILS
- DME & DVOR

Indra Air Surveillance

- PSR 2D
- PSR 3D
- MSSR
- Transportable PSR & MSSR
- ADS-B
- WAM/MLAT

Indra Air Drones

- UTM System
- U-Space Consulting
- ATM/UTM Integration
- Anti drone Systems

Indra Air Information

- AIS-AIM
- MHS
- SWIM
- MET
- ATM

Indra Air Services

- ATM Systems as a service
- Aftermarket & Support services
- Advisory & consulting
- ATM & CNS Training

Indra Air Surveillance

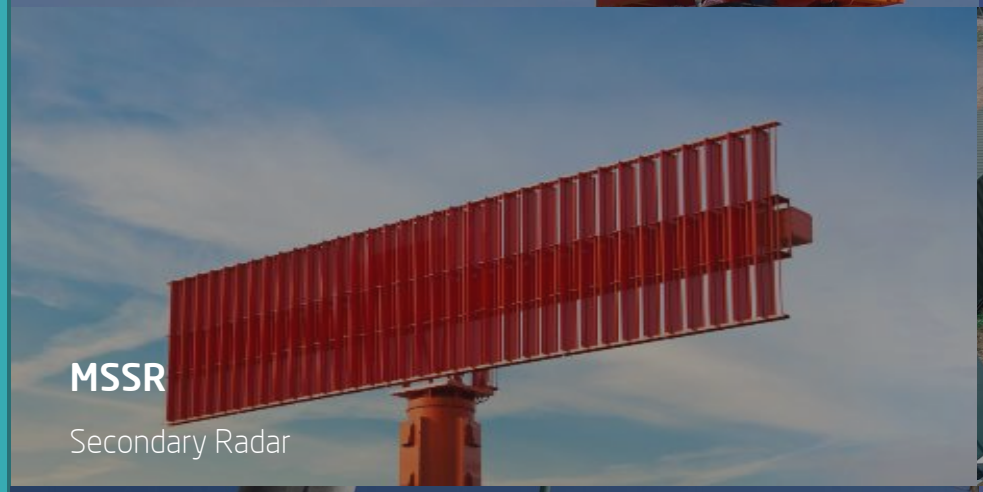
+ 580 References in more than 90 countries

PSR 2D

2D Primary Surveillance Radar

PSR 3D

3D Primary Surveillance Radar

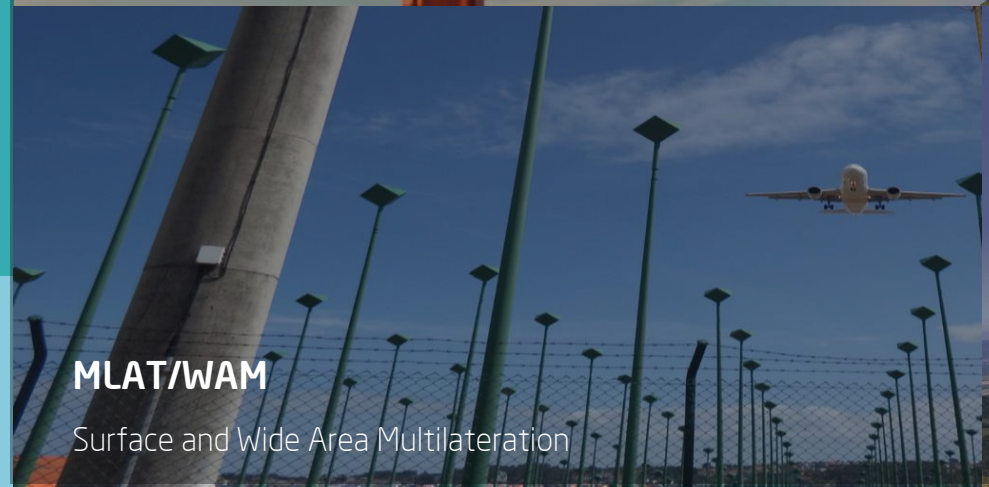


MSSR

Secondary Radar

Transportable Radar Station

Multiple stand-alone and co-mounted configurations



MLAT/WAM

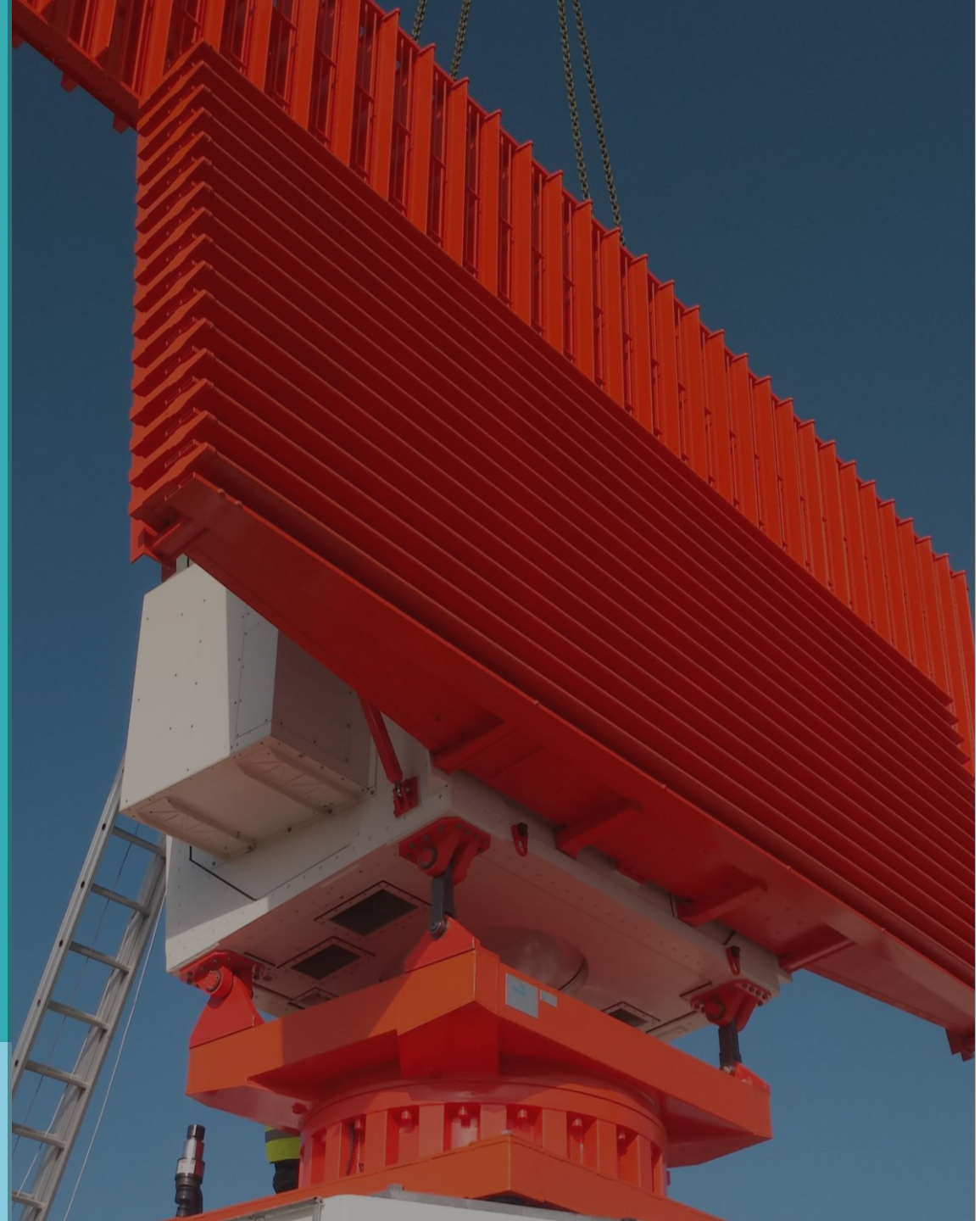
Surface and Wide Area Multilateration

ADS-B

Automatic Dependent Surveillance

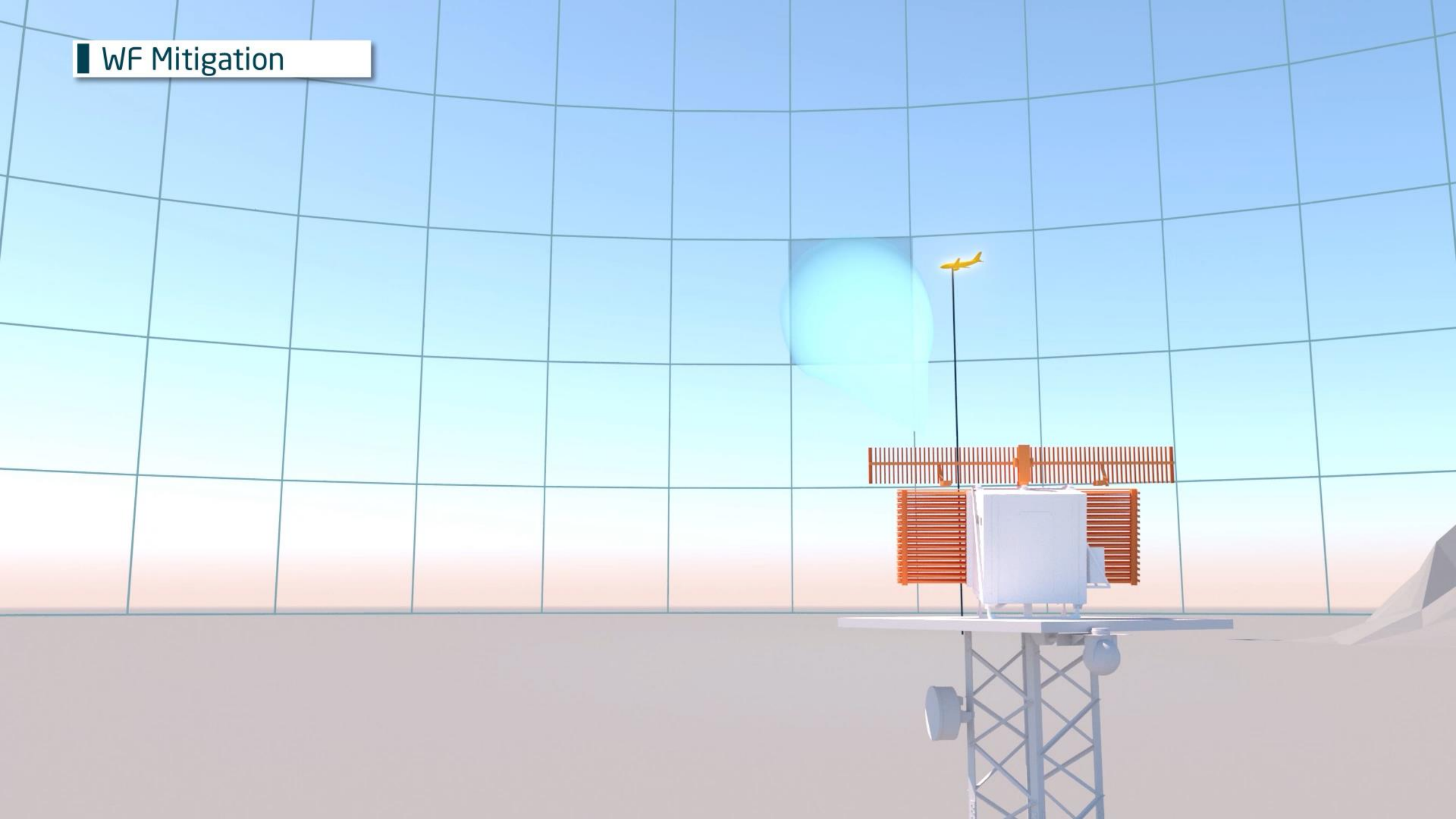
Indra Air Surveillance

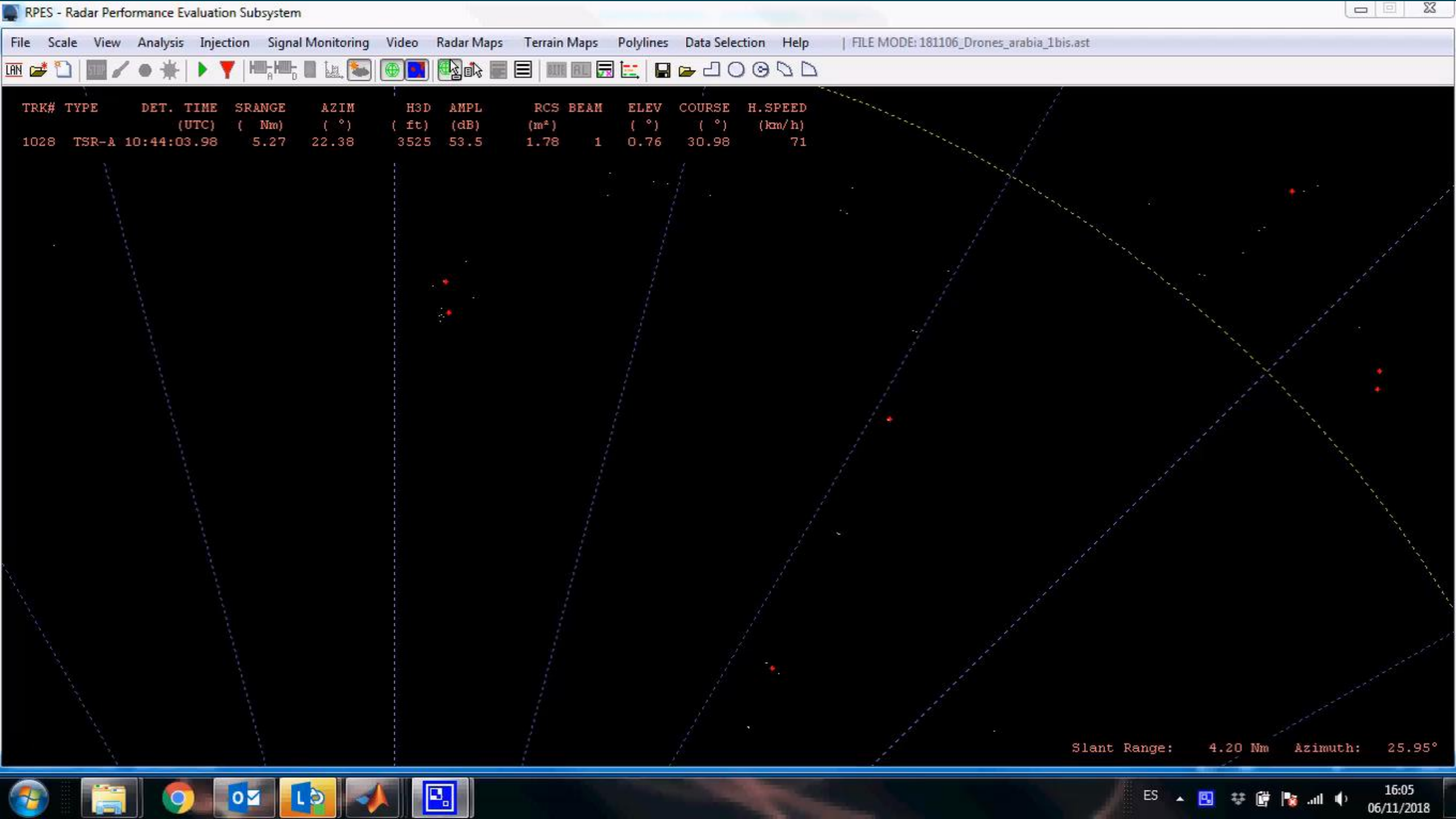
Primary Surveillance Radar 3D L-Band



- New enhanced solution for TMA coverage
- En-route and approach detection range configurable 70/110/160/220 NM.
- 3D detection (including target's height).
- Up to 14 pencil beams electronically steered in elevation (elevation scanning programmable in acimut sectors)
- Inherent Clutter & Wind farm mitigation.
- Rotate speed configurable up to 4sec
- Small antenna size, less infrastructure
- Monopulse techniques in azimuth and elevation, improving the accuracy and the resolution of the system
- Perfect adaptation in hard environments.
- Weather information.
- Drone detection capacity

WF Mitigation




RPES - Radar Performance Evaluation Subsystem
File Scale View Analysis Injection Signal Monitoring Video Radar Maps Terrain Maps Polylines Data Selection Help
FILE MODE: 181106_Drones_arabia_1bis.ast
TRK# TYPE DET. TIME (UTC) SRANGE (Nm) AZIM (°) H3D (ft) AMPL (dB) RCS (m²) BEAM ELEV (°) COURSE (°) H.SPEED (km/h)
1028 TSR-A 10:44:03.98 5.27 22.38 3525 53.5 1.78 1 0.76 30.98 71
Slant Range: 4.20 Nm Azimuth: 25.95°
ES
16:05
06/11/2018

Indra Air Surveillance

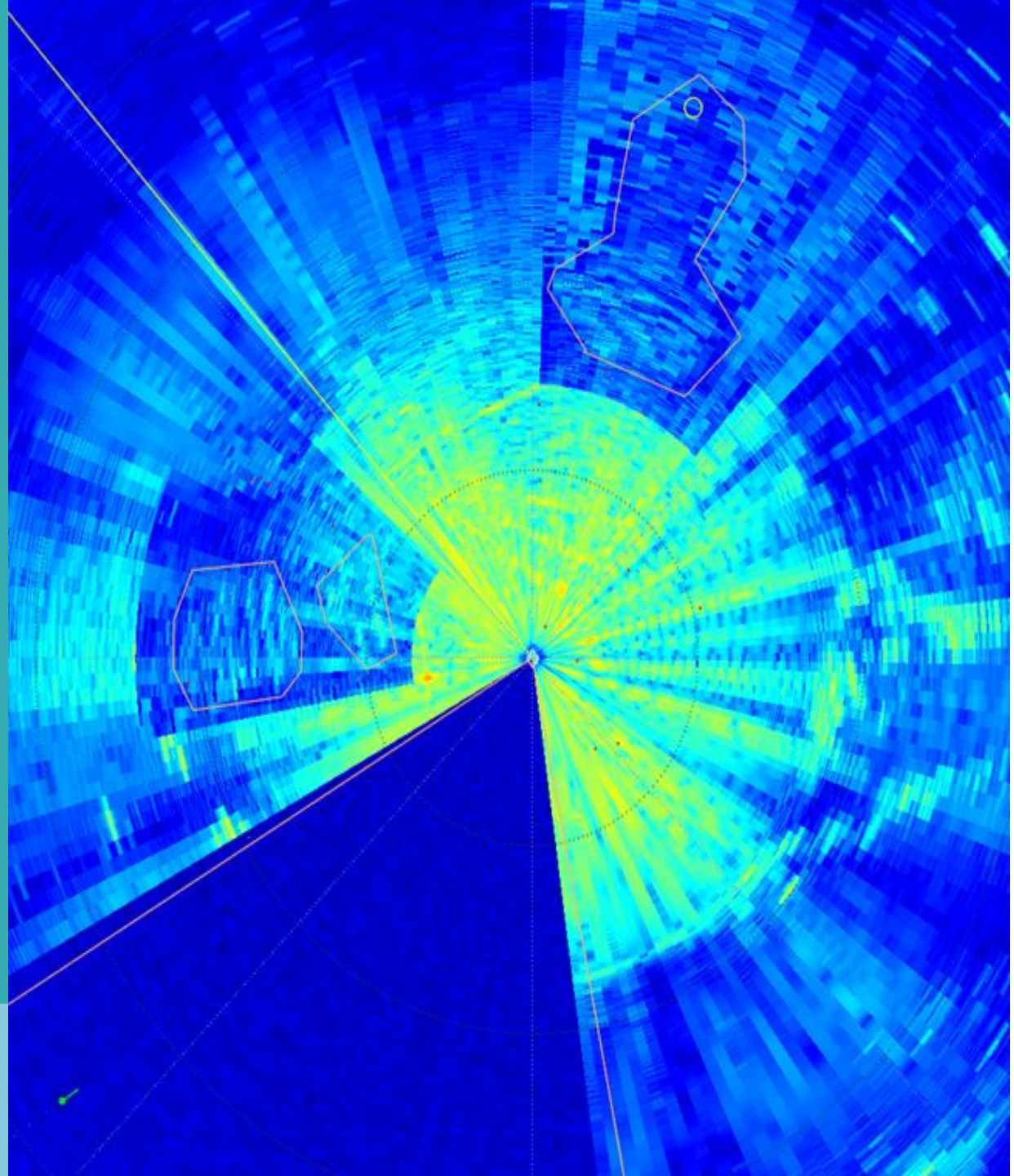
Transportable Radar Station

Different configurations available (2D & 3D) and Secondary radar stand-alone

Video Transportable

- A radar system plus a transportability solution that allows transport, deployment and dismantling the station easily in a short period of time.
- It can be used as an emergency backup system or for long periods complying with the requirements defined for the safety of air traffic management.
- Main elements of the solution are:
  - MSSR standalone: Transportable shelter (for radar electronics and energy equipment) and a12 meters deployable tower which ensures the system provides a proper coverage of the air space.
  - PSR-MSSR: Transportable shelter (for radar electronics and energy equipment) and platform for antennas, spine and drive unit.
- Housed in two standard 20-feet ISO containers it can be transported to its final location without requiring the use of a crane for its deployment

Indra Vision Surveillance



- Safety
  - Non Cooperative Surveillance for TMA
  - Double layer C S : ICS +DCS
  - Performance Monitoring
- Efficiency
  - Minimal infrastructure
  - New Maintenance Policies
  - ¿Surveillance as service?

Possible Models of Interest for Surveillance in AFI region

- Synergies between civilan and defense
  - Optimization of public budgets
  - Optimization use of information
- Non cooperative surveillance for general aviation
  - Reduction of accidents rates
  - Safety & Security improvement
- Transportable solutions
  - Agility in the response to different events
  - Flexibility in the service configuration
- Surveillance as a Service
  - Investment optimization
  - Multiple stakeholders

Indra Air Automation

IRTOS Remote Tower System

Fully integrated remote tower platform for single or multi- airport set up

- A complete solution for digital, remote and contingency towers.
- Operate single or multiple airports from one CWP.
- Up to 60% cost reduction.
- Heads-Up Display (HUD) with unmatched image quality.
  - Panoramic view.
  - Pan-tilt-zoom.
  - 4K resolution.
  - Dedicated or common video wall.
- Heads-Down Display (HDD) that maximizes situational awareness.
  - A single 40" screen integrated with comprehensive ATC tools.
  - Advanced safety nets and automated functionality.
  - User-friendly HMI.
  - Used in the world's largest remote tower programme (Avinor, Norway).

Satellite based CNS

Powered by

STARTICAL ENAIRE | indra

A global coverage similar to the continental one is key to reducing the separation between aircraft in oceanic and remote areas, as it will increase efficiency and capacity while reinforcing the necessary security levels.

Startical will provide Satellite Based VHF AMS(R) communications and ADS-B surveillance all over the world, including oceanic and remote areas

International Telecommunication Union

The frequency spectrum is a limited resource. ITU decides every 4 years at its World Radiocommunication Congress how to use this limited resource

The aeronautical sector is one of the main users of the spectrum with priority for being considered safety life communications and the Aeronautical Sector needs, not only to maintain its portion of the spectrum, but it will also need to expand it due to the growing needs for safety communications

Space-to-Earth communication is a key factor for future

ITUWRC SHARM EL-SHEIKH2019

RESOLUTION 428 (WRC-19)

Studies on a possible new allocation to the aeronautical mobile-satellite (R) service within the frequency band 117.975-137 MHz in order to support aeronautical VHF communications in the Earth-to-space and space-to-Earth directions

AI 1.7

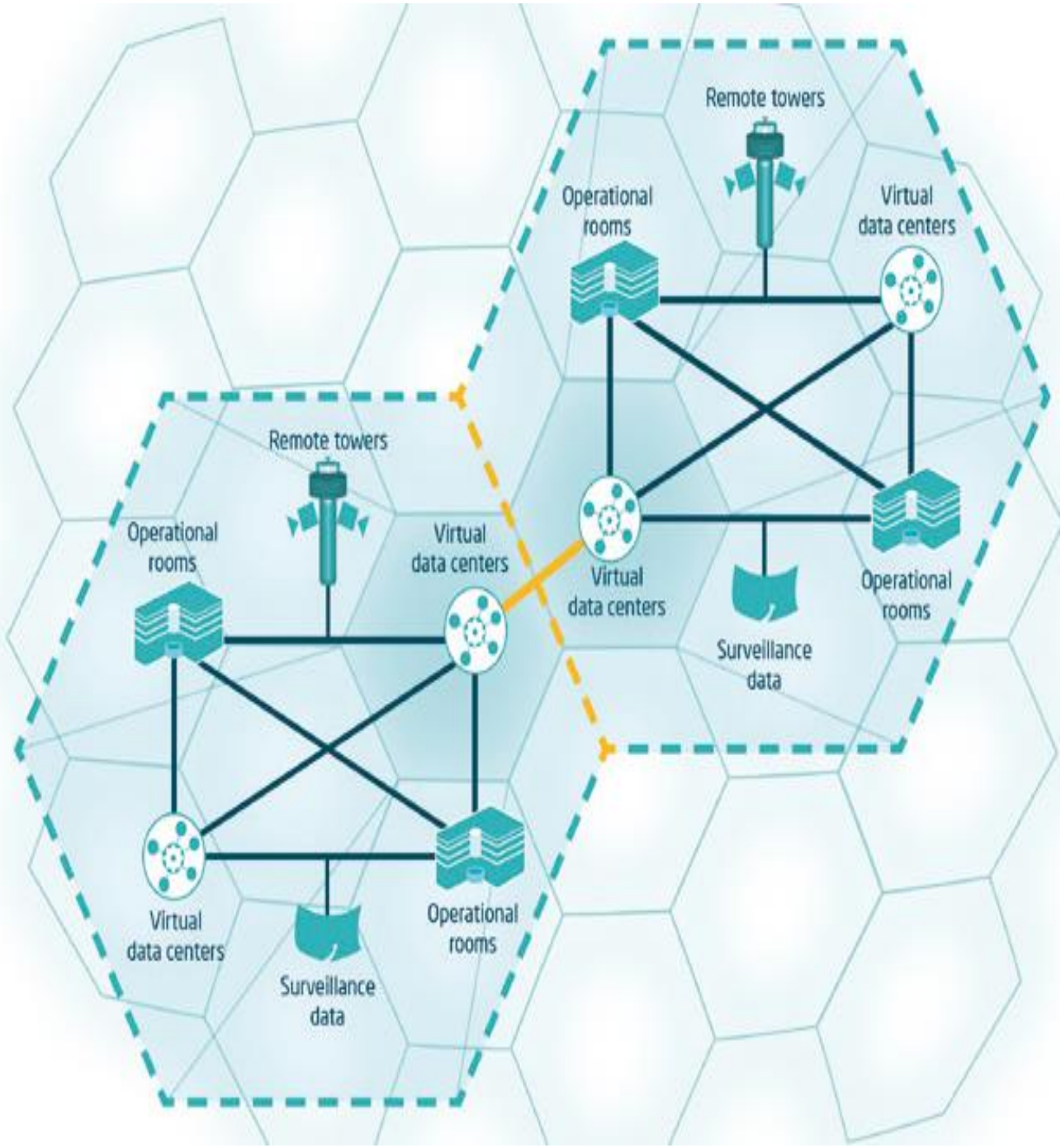
Radio Regulations		
Allocation to services		
Region 1	Region 2	Region 3
117.975-137 AERONAUTICAL MOBILE (R)		
AERONAUTICAL MOBILE SATELLITE (R)		
5.111 5.200 5.201 5.202		

This Aeronautical Mobile Satellite (en route) Service within the frequency band 117.975-137MHz is a necessary complement for Aeronautical Services including ATS and AOC services.

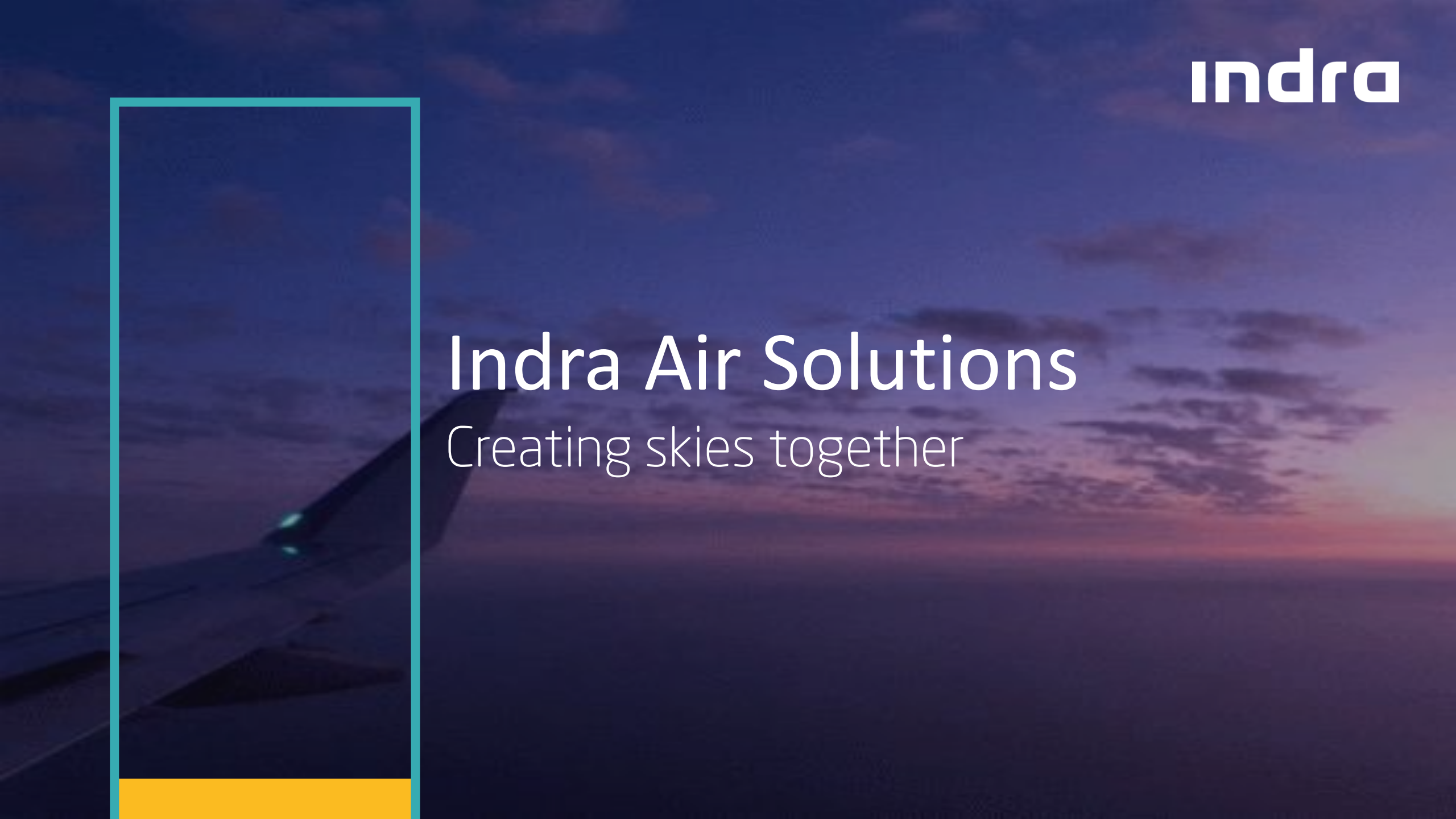
OACI members support is needed in:

- ITU 2023
- OACI working group: FSMP

New ways of working during pandemic and new focuses



- Remote training
- Remote FAT
- Remote validation of systems
- Business continuity and resiliency


Indra Air Solutions
Creating skies together


indra
At the core