

ATM Service Oriented Architecture.

Seminar on Air Traffic Management Automation
System (Teleconference, 27 October 2020)

ICAO APAC



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COVID-19: Dramatic impact on ATM industry

- Difficulties on all phases.

*“Traveling,
meeting,
procurement,
delivery,
installation...”*



COVID-19: Organizations continued operations

- Shifted to remote operations.

*“Demonstrating
that Remote is
real, and it
works...”*



COVID-19: As a growth opportunity for ANSPs / CAAs

- Life and operation continue.
- Now is the best moment to do it.

*“Pushes ATM
industry to
re-invent itself”*



COVID-19: As an Industry innovation opportunity

- Customers cannot do this alone.

*“Adapt together
the products to
the new needs
and formats”*



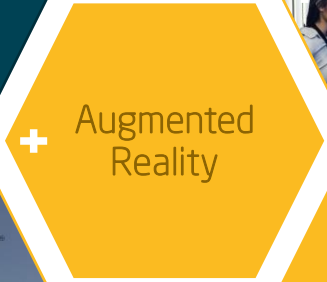
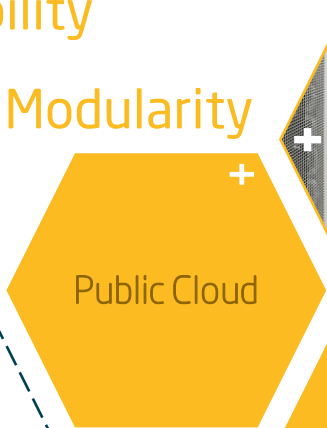
Integrating ATM with new technologies

- Why this time is different?

*“Perfect timing:
ANSPs / CAAs
demands +
mature
technology”*



Service Oriented Architecture: Today



Flexibility

Integration

Interoperability

Scalability

Fallback

Resilience

Trainings

Innovation

Industrial Partner in
124 Sesar projects



SOA: ATM Virtualization Services

ATM INFRASTRUCTURES

WHAT?

- ✓ Separation between ATM hardware infrastructure and ATM operations.

WHY?

- ✓ Increased resilience, availability and physical geo-redundancy.
- ✓ Full control of hardware and software.

WHERE?

- ✓ Indra Private, Hybrid and Public Cloud solutions.



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Indra Private,
Hybrid and
Public Cloud
solutions

SOA: ATM Virtualization Services

ATM ON CLOUD

WHAT?

- ✓ Virtualize the ATM system or Services on the Public Cloud infrastructure.

WHY?

- ✓ Increased resilience, availability and continental geo-redundancy.
- ✓ Reduced maintenance costs and advanced cybersecurity.
- ✓ Fast deployment for trainings.

WHERE?

- ✓ Indra Public Cloud ATM & Training.



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Indra Public
Cloud ATM

SOA: ATM Virtualization Services

UTM HUB

WHAT?

- ✓ Create cloud based systems based on “containers” and Cloud services.

WHY?

- ✓ Solutions scalability.
- ✓ Accelerated deployment.

WHERE?

- ✓ Indra UTM Hub Platform.



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Flight management
Flight Plan

Flight monitoring
Flightplan FP-IND-3b174072

Geofences edition
Cancel FP

Registry
Flight Plan Details

min time: 8/12/2019 10:00:00
max time: 16/12/2019 10:03:34

WGS84 Altitude | Time

Min altitude
Max altitude

Contact
Distance

Pilot name: Jose Mocardon (PILOT-9eb14a)
Operator: TopSanitary S.A (OPERATOR-e8c08d)
DJI Mavic 2 Pro (DRONE-06519e)
Phone number: 638912768

Alarms
▼

Alarms Details
▼

Track information
▼

WGS84 Altitude

829.87 m

Groundspeed

42.52 km/h

Indra UTM
Hub

7 Drones, 0 Planes.

SOA: ATM Virtualization Services

UTM + ATM INTEGRATION

WHAT?

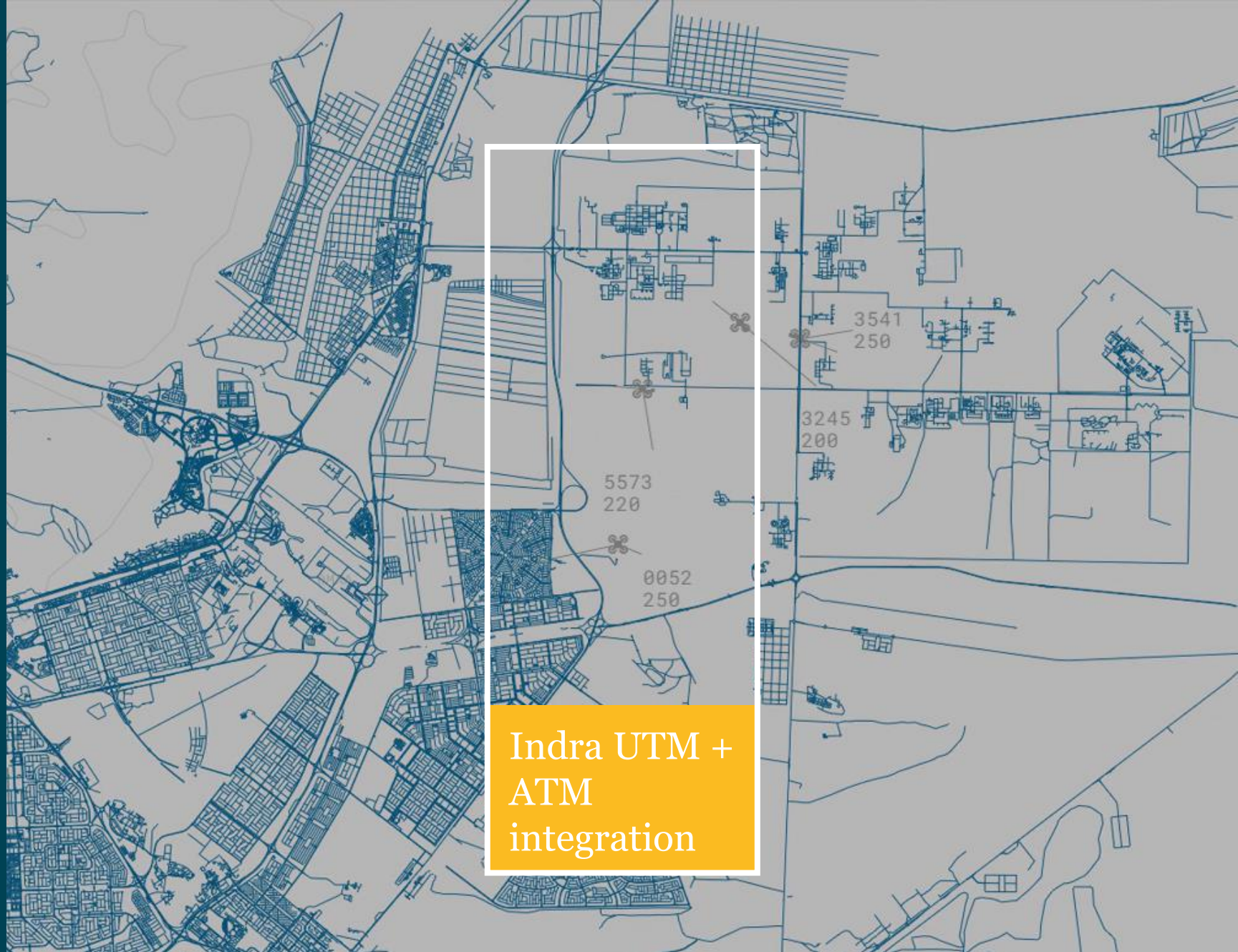
- ✓ UTM surveillance and control services.

WHY?

- ✓ Increased safety and security in both UTM and ATM operations.
- ✓ Real time information exchange.

WHERE?

- ✓ Indra UTM and ATM platforms integration.



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SOA: ATM Virtual Reality Services

WHAT?

- ✓ Replicate real operational environments using Virtual Reality glasses.

WHY?

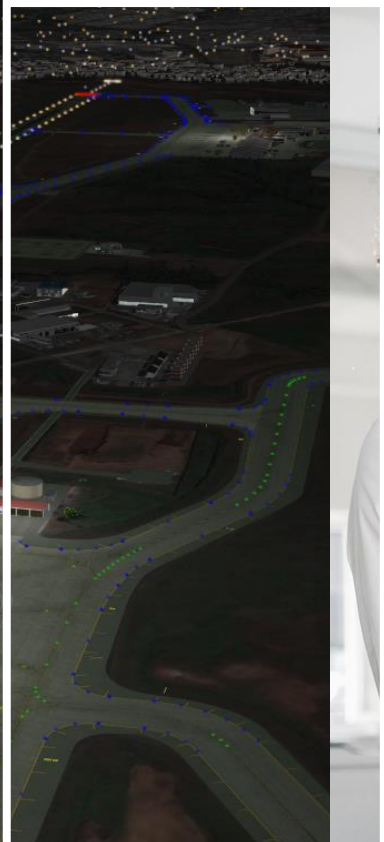
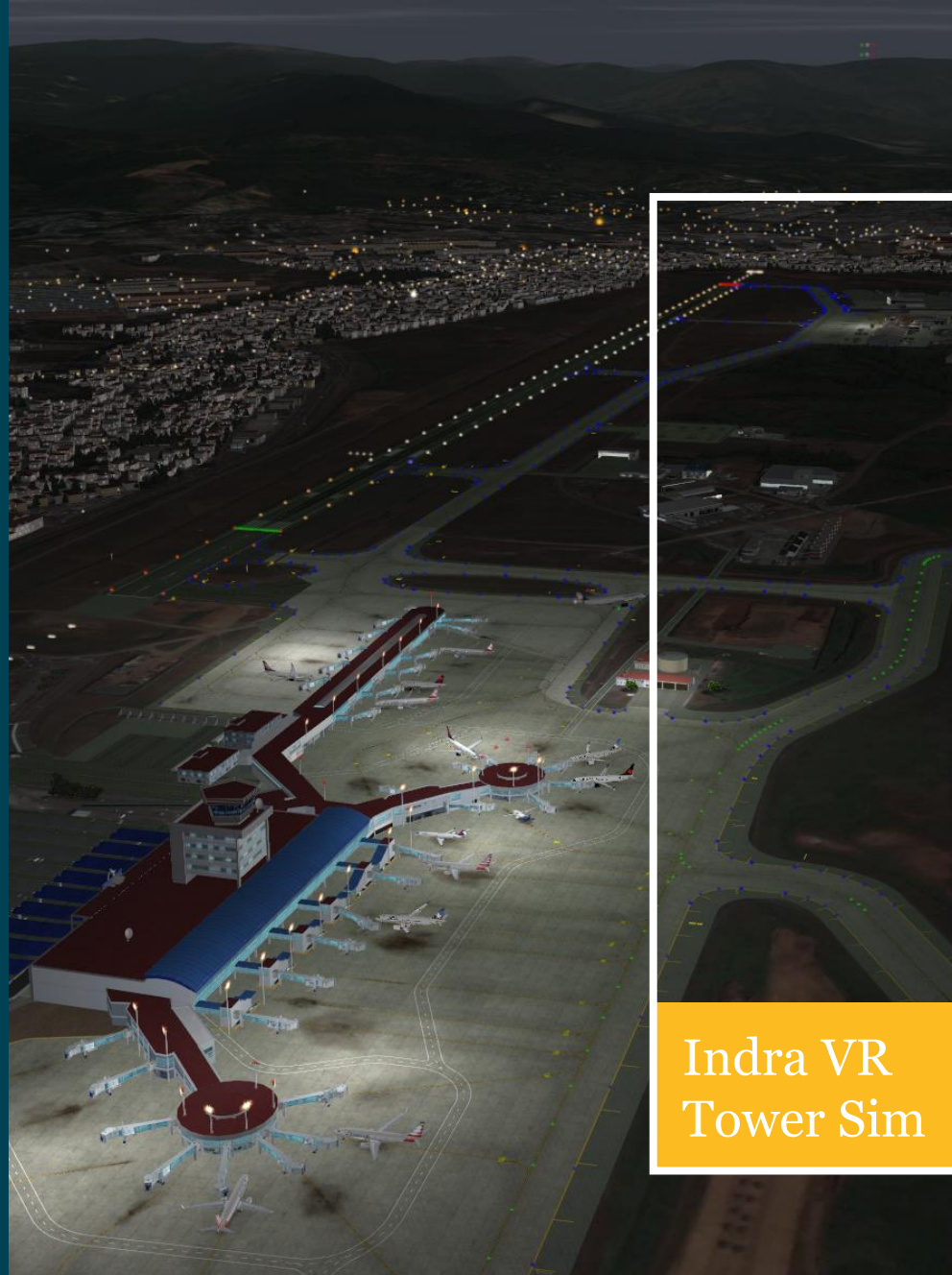
- ✓ Immersive training on the same environment: same TWR, same EFS, but virtual.
- ✓ Reduce training costs with more capacity.

WHERE?

- ✓ Indra VR Tower Sim & Training.



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Indra VR
Tower Sim



SOA: ATM Augmented Reality Services

WHAT?

- ✓ Merge real world objects with processed information.

WHY?

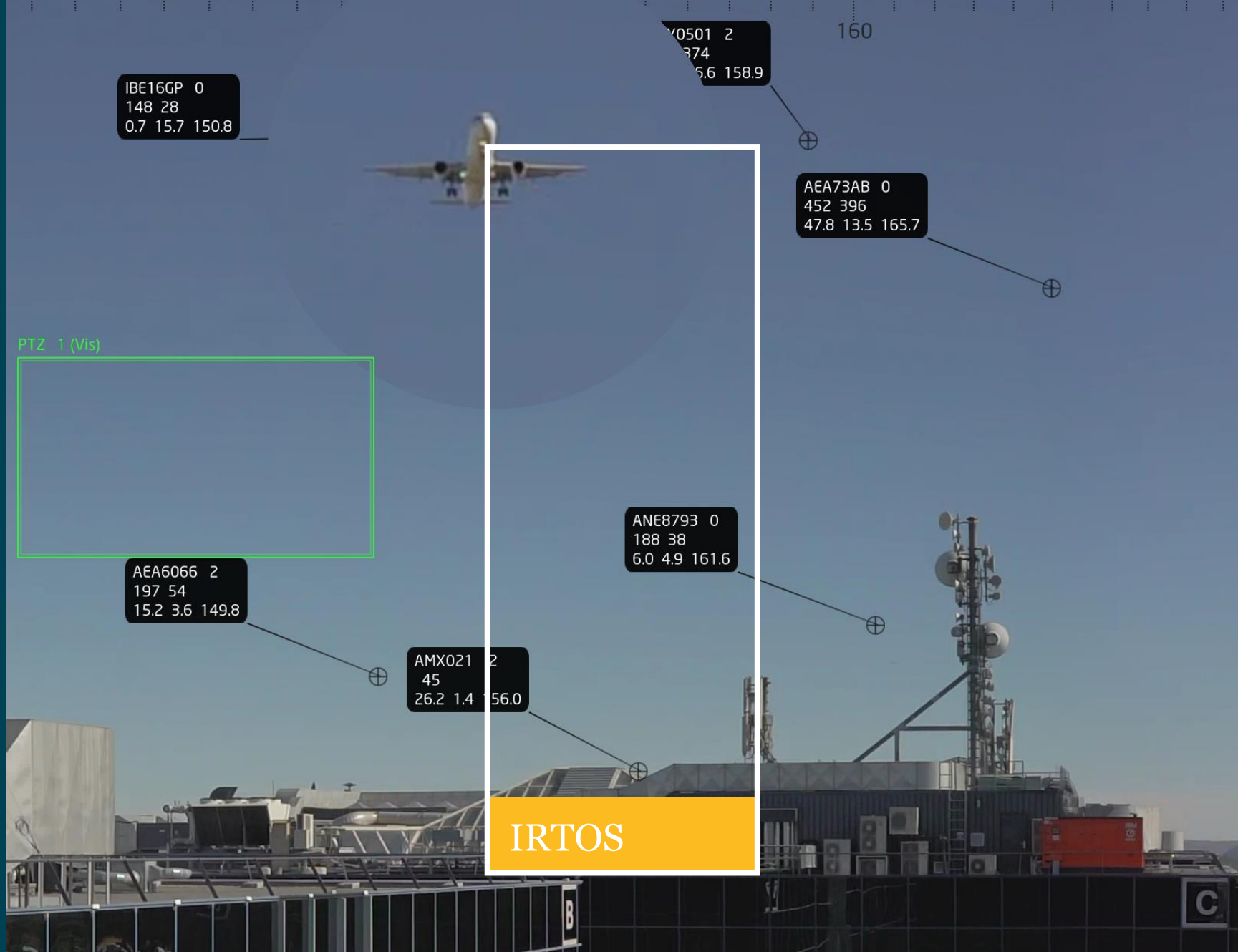
- ✓ Identify objects not seen by human eyes due to weather conditions, low visibility, etc.
- ✓ Reduce workload and identification time to enhance safer operations.

WHERE?

- ✓ IRTOS (Indra Remote Tower and Optical System).



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SOA: ATM AI & ML Services

WHAT?

- ✓ Processing algorithms focused on accelerating repetitive tasks.

WHY?

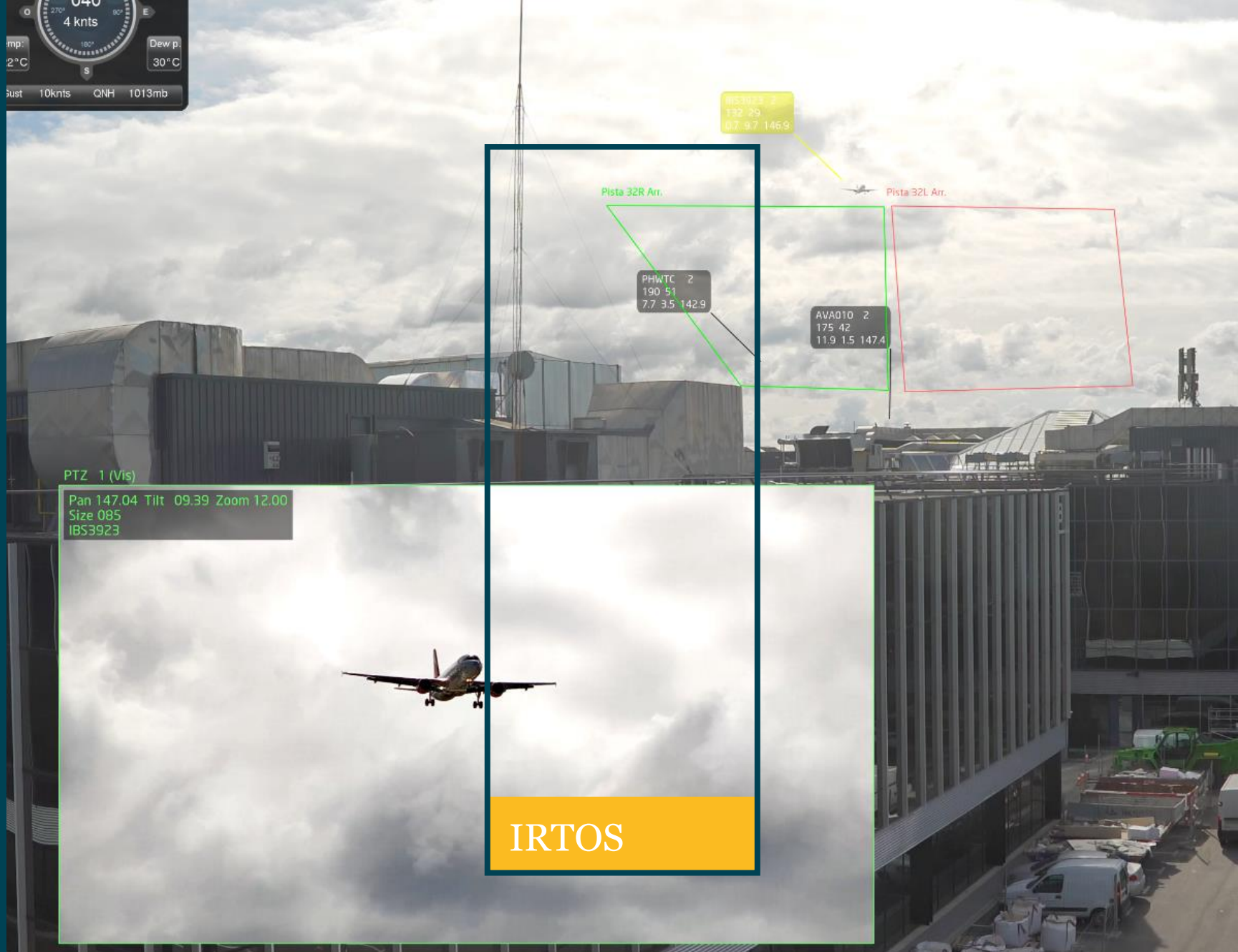
- ✓ Identify objects not seen by human eyes due to weather conditions, low visibility, etc.
- ✓ Distinguish between objects or birds for accurate camera tracking.

WHERE?

- ✓ IRTOS (Indra Remote Tower and Optical System).



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SOA: ATM Cybersecurity Services

WHAT?

- ✓ Deploy and reinforce cybersecurity protection actions.

WHY?

- ✓ Protect against threats.
- ✓ Resilience and recovery.
- ✓ Investigation and forensics.

WHERE?

- ✓ Indra ATM Cybersecurity Monitoring Display.



ATM
Cybersecurity
Monitoring
Display

SOA: ATM Virtual Training Services

WHAT?

- ✓ Virtual platforms that provide the collaborative tools, video and access to train remotely.

WHY?

- ✓ Comply and continue with scheduled training activities.
- ✓ Reduce physical contact.
- ✓ Provide equivalent training quality, but remotely.

WHERE?

- ✓ Indra ATM Academy Platform.

- Controller Working Position (Build A)
- Participants
- Badges
- Competencies
- Grades
- CONTROLLER WORKING POSITION
- CWP Datablock**
- Dashboard
- Site home
- Calendar
- Private files
- My courses
- 3.4 ATM Alerts and Warnings
- CWP-Single Activity
- Data Analysis Tools
- Controller Working Position (Build A)
- Flight Data Display (Build A)
- Control Monitorig

Flight Plan Route - General info

MSAW STCA AFW MTCB PSR T RANGE: 193 NM MSDF INT RAN WR: INT MM 1013 NOWE -116 000 Q EST

Trail 5 R&B Track Map Vector 2 Overlap Zones CEN Config Aipt Filter
Filter Off F Alt Local Map 3D F Label Zoom DCEN SSR F Callsign

MC ETD909 68 A031 220
12:08 001 S
LW MC ETD29B 159 A035 220
ETD29B ONH F25
12:09 145
12:12 KANIP 20
12:14 LABR 257

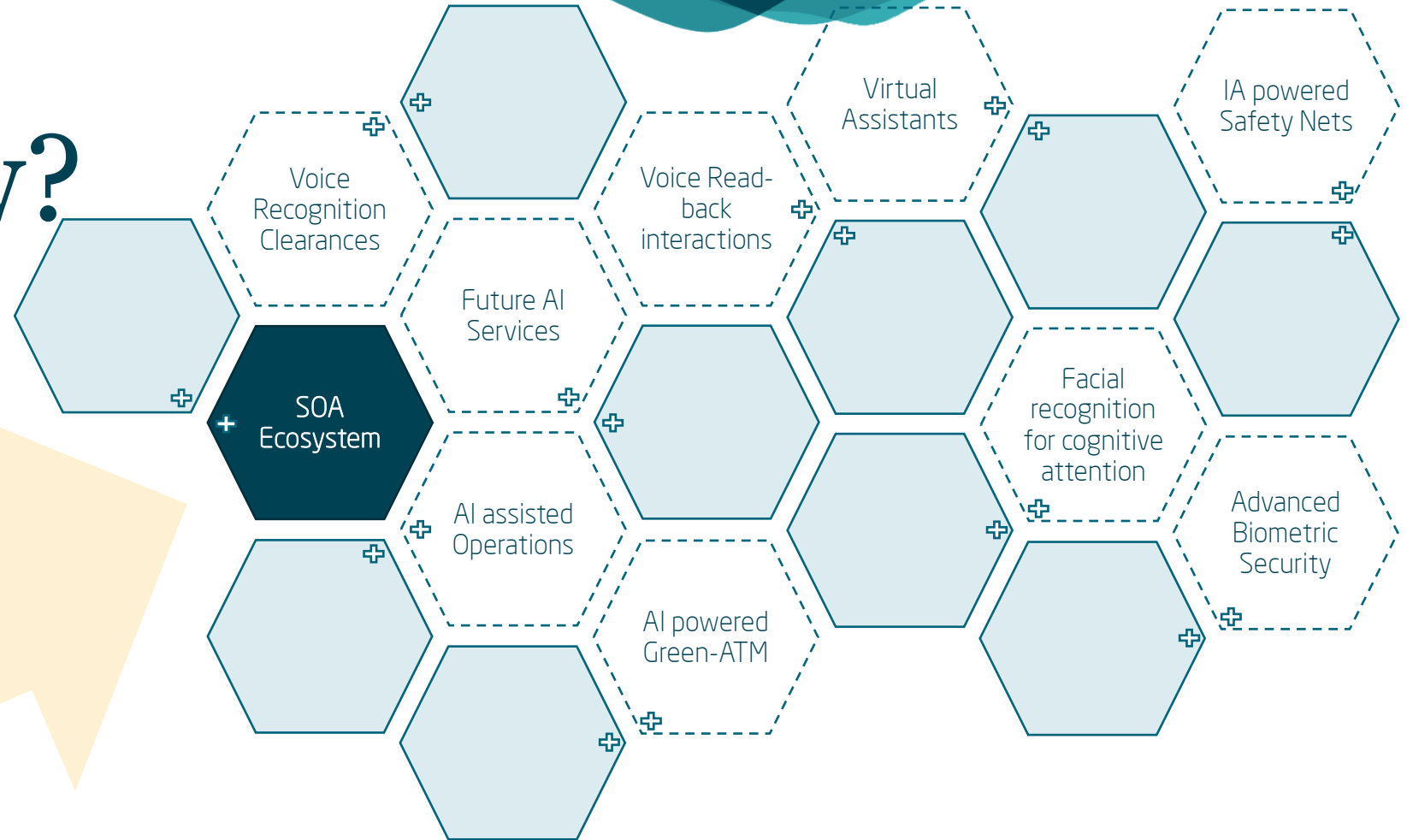
ME427 279
A081+ 030

EXECUTIVE TWR CPDLC VIEW1 ILS 1 LMG RUNW RAM OFF RTE OFF BRIGHT ELW SYNTH OFF STC
PLANNER ARR DATA LINK GND ILS 2 RING MET MSG MTCB FREETEXT ALM OFF LAST POS RBL ALM ADSC OFF MSA

Indra ATM Academy

What to expect tomorrow?

indra



indra

At the core