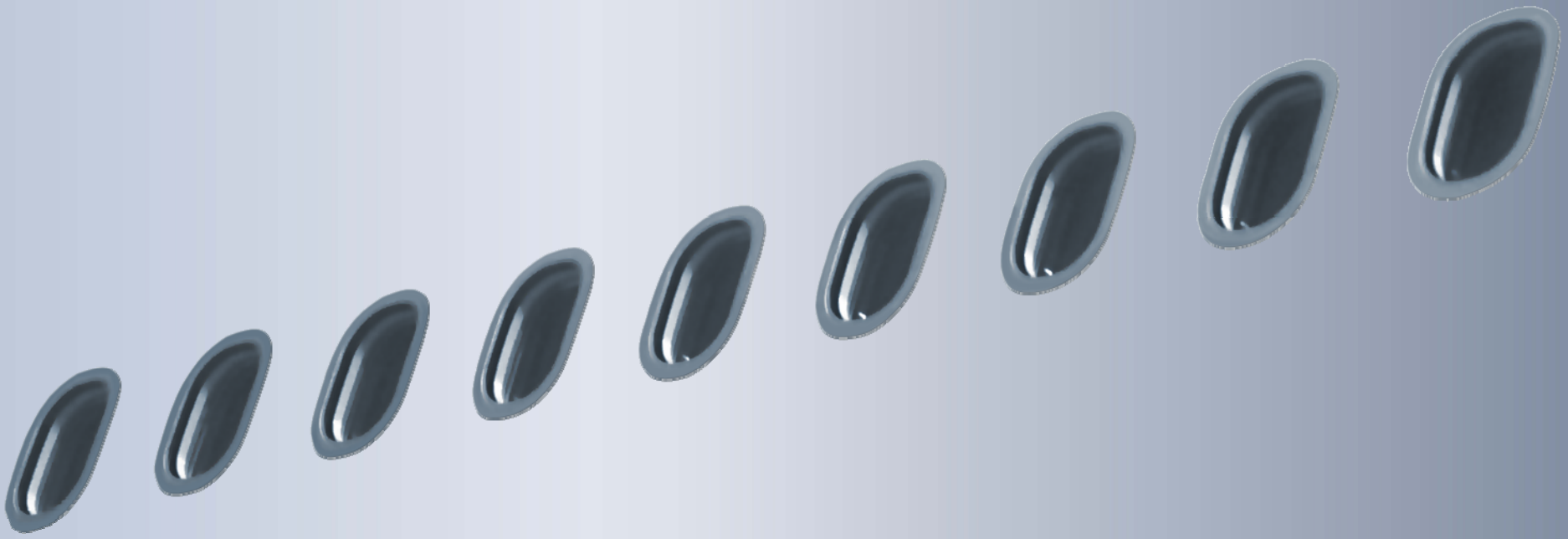


ATSAW

(Airborne Traffic Situational Awareness)

Presented by
Laurent VIDAL - Surveillance systems manager – Support to sales & programs

AIRBUS

CONTENTS

ADS-B Applications

ADS-B OUT

ADS-B IN

ADS-B OUT:
Capability to transmit ADS-B data

ADS-B IN:
Capability to receive ADS-B data

- **ADS-B data provided by transponder**
- **Need transponder ADS-B OUT capable**

- **ADS-B data received by TCAS**
- **Need TCAS ADS-B IN capable**

For ground use:

- ADS-B NRA: Non Radar areas
- ADS-B RAD: Radar areas
- ADS-B APT: Airport surfaces

For airborne use:

ATSAW (Air Traffic Situational Awareness)

- Step 2A: ATSAW operation in air
- Step 2B: ATSAW operation on ground

AIRBUS

ADS-B Applications

OBJECTIVES

- **Flight efficiency**:
  - Flight level,
  - Fuel saving,
  - Runway throughput
- **Safety**
  - Traffic situational awareness,
  - Aircraft identification

ADS-B IN:
Capability to receive ADS-B data

- **ADS-B data received by TCAS**
- **Need TCAS ADS-B IN capable**

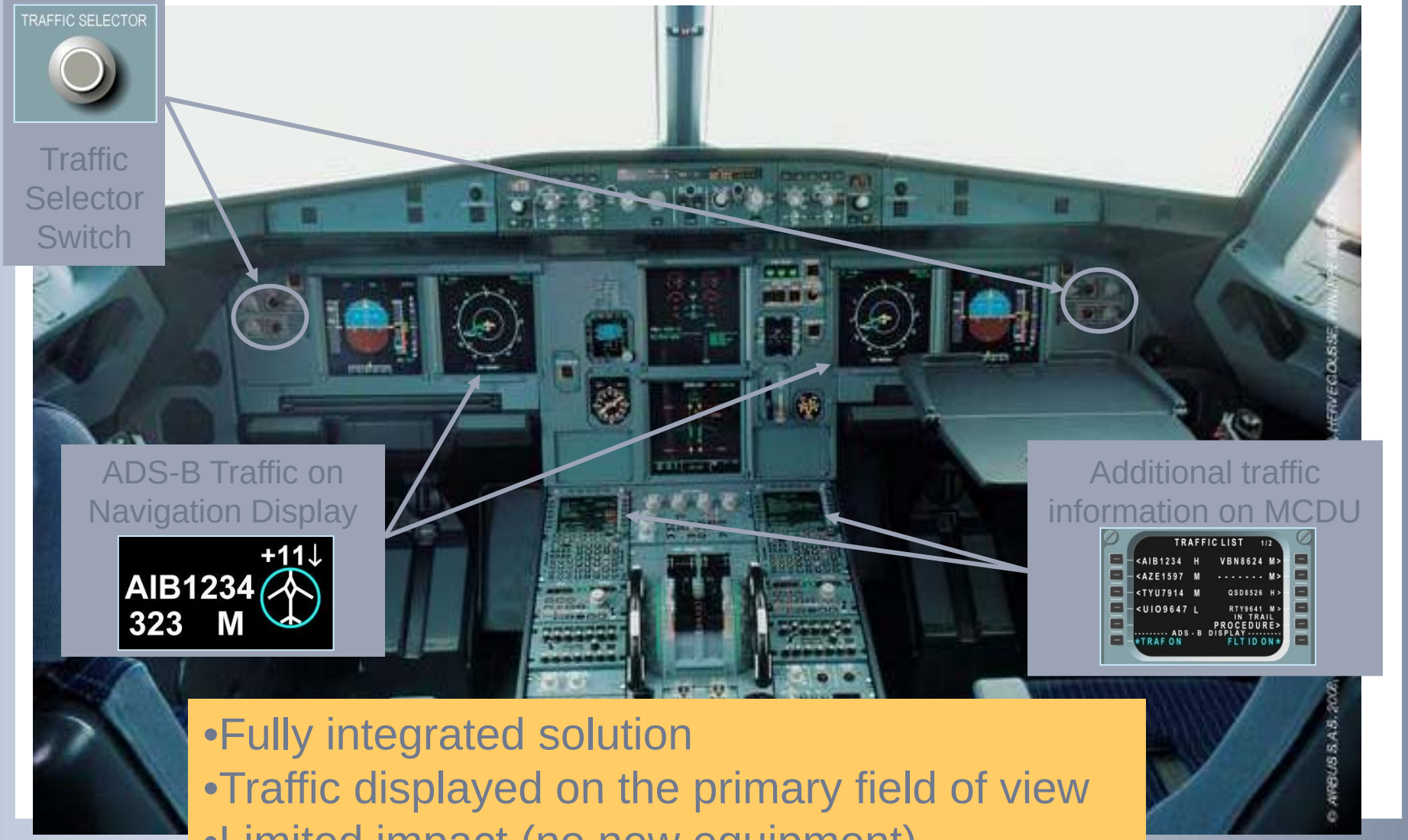
For airborne use:

ATSAW (Air Traffic Situational Awareness)

- Step 2A: ATSAW operation in air
- Step 2B: ATSAW operation on ground

CONTENTS

ATSAW - Cockpit



- Fully integrated solution
- Traffic displayed on the primary field of view
- Limited impact (no new equipment)

ATSAW – Navigation Display

By default

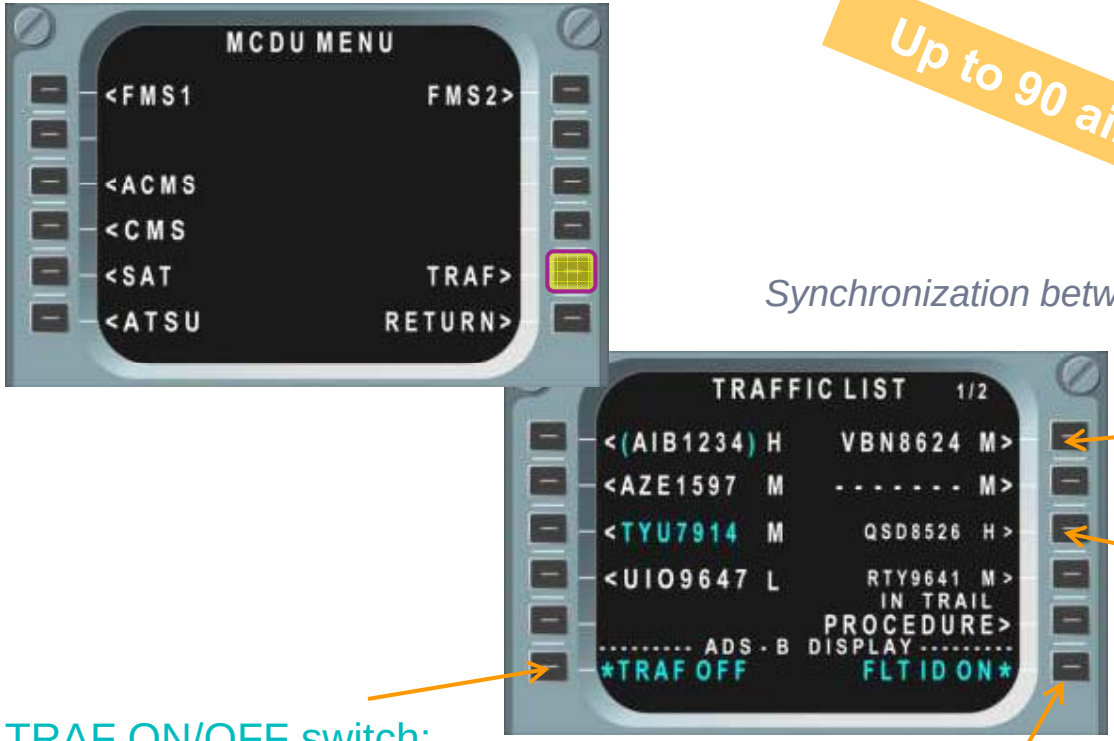
- *Position*
- *Orientation*
- *Relative Altitude*
- *Vertical Tendency*

Using the traffic selector, one aircraft can be selected

- *Default information*
  +
- *A/C ident*
- *Ground Speed*
- *Wake Vortex category*

ATSAW – MCDU page

- Specific Traffic pages on MCDU provides additional traffic information



Up to 90 aircraft

Synchronization between MCDU & ND

- **LARGE** font = aircraft also displayed on ND
- **small** font = aircraft not displayed on ND
- Traffic on ND at top of the MCDU traffic list

- TRAF ON/OFF switch:

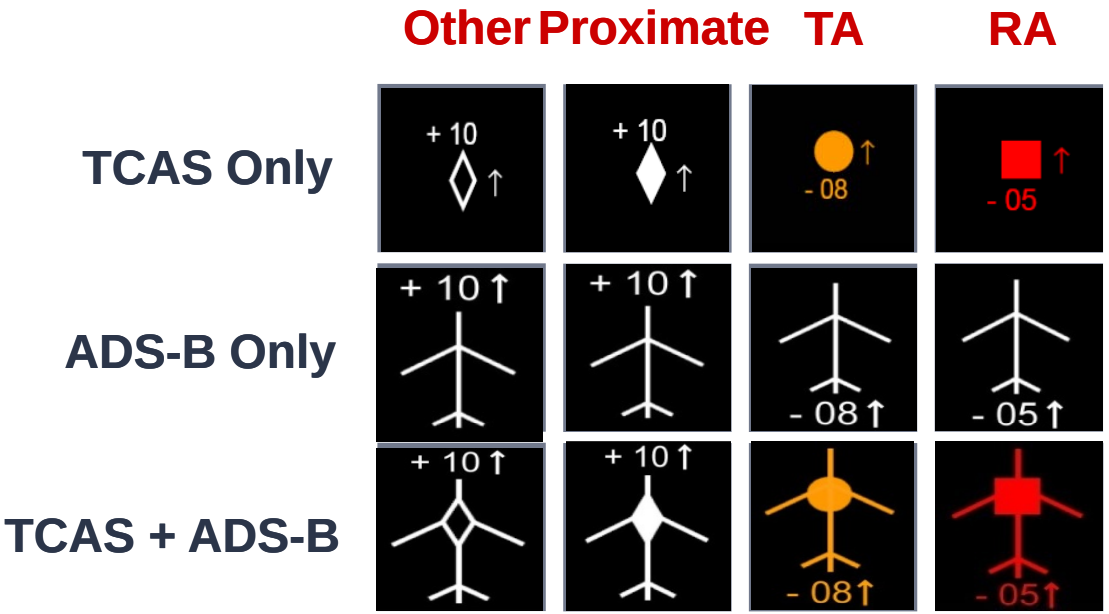
OFF = ADS-B data not displayed

- FLT ID ON/OFFswitch

ON = flight ID displayed for all ATSAW symbols

ATSAW – Symbology & Comparison with TCAS

- Thanks to ADS-B, ATSAW provides:
  - more information
  - longer range (up to 150 NM) than current TCAS (40 to 80 NM).
  - intruders direction represented by an oriented symbol
- Merge TCAS and ADS-B information when both available to provide a unique traffic symbol to the flight crew



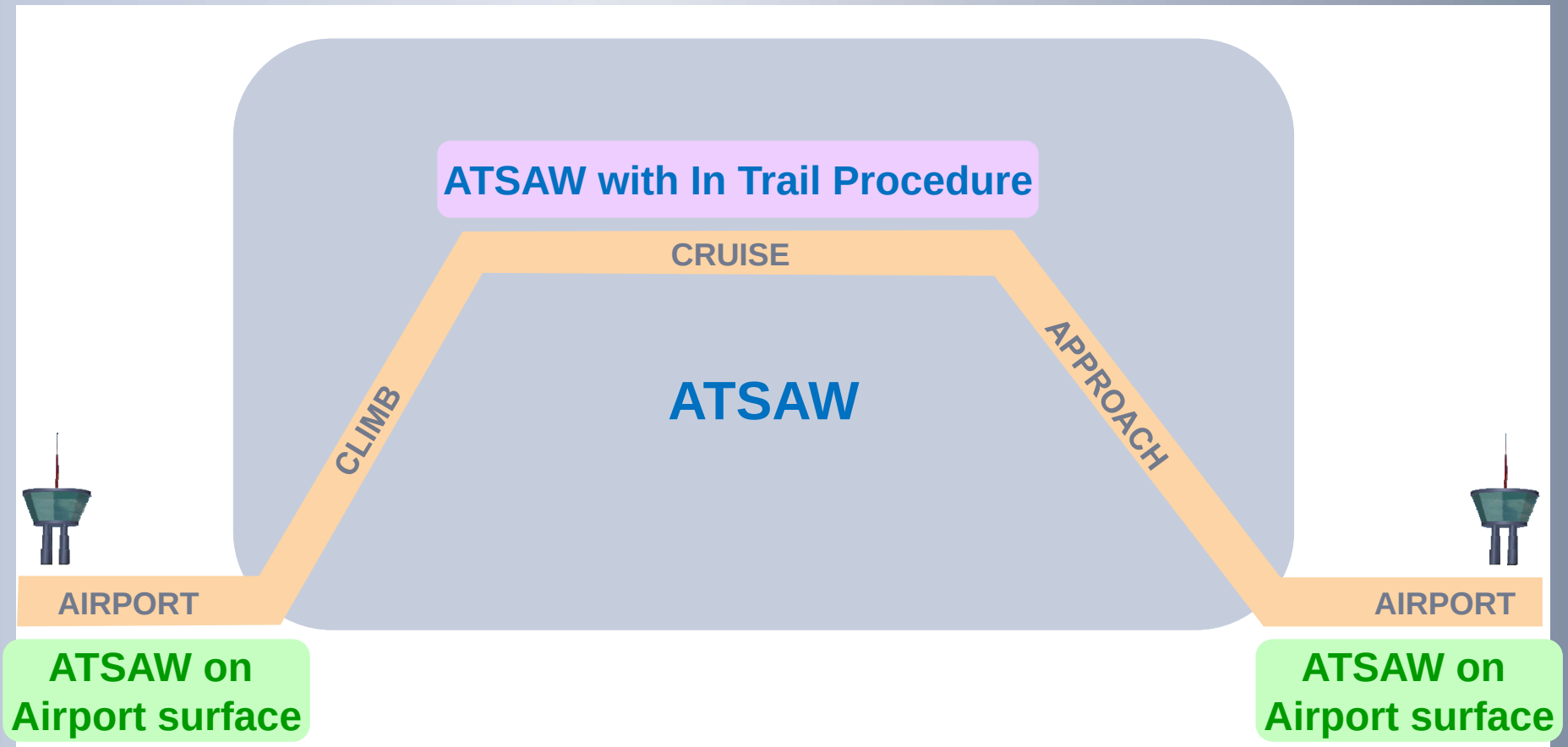
ATSAW – Symbology & Comparison with TCAS

- If no correlation between TCAS & ADS-B information, TCAS symbol is only displayed (if available)

- Also ATSAW symbols are not displayed if:
  - ADS-B data are outdated by 3 sec, or
  - Integrity and accuracy of ADS-B data are invalid, or
  - Track or position from other aircraft is missing, or
  - GPS position of own aircraft is lost for more than 5 min, or downgraded.

CONTENTS

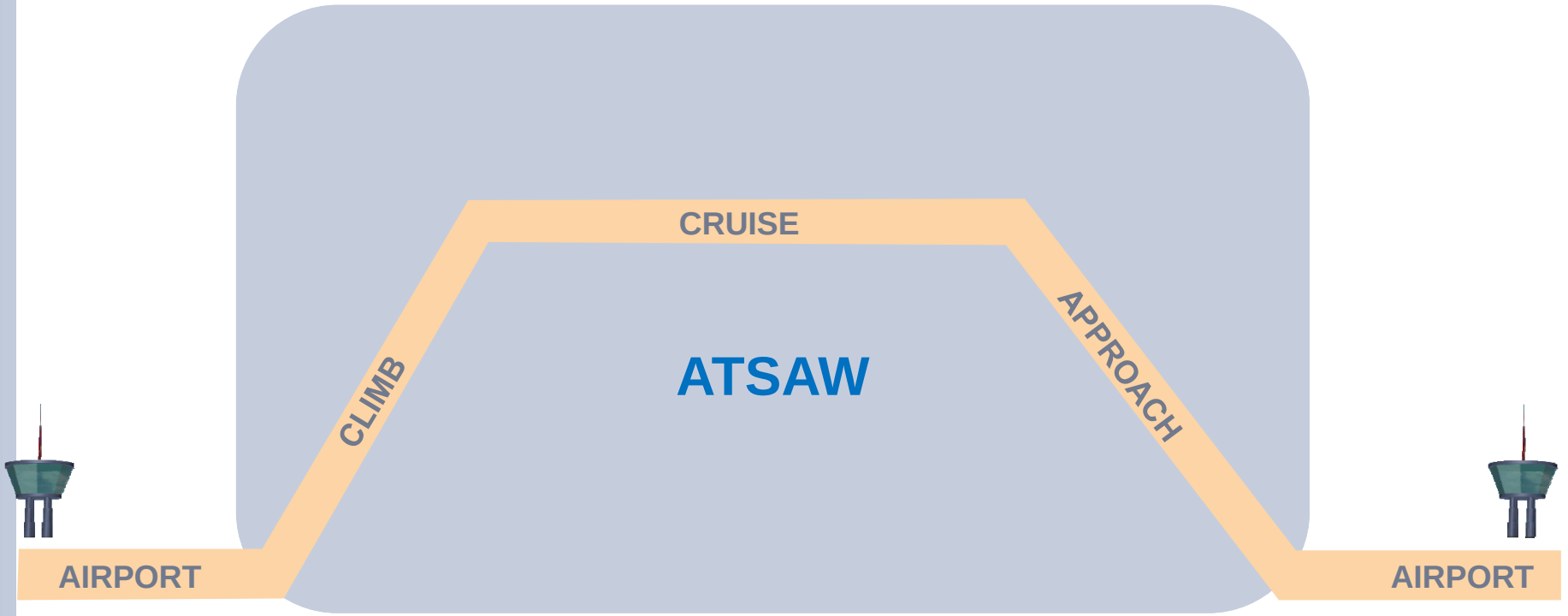
ATSAW



- **Step 2A (ATSAW operation in air): ATSAW, ATSAW with ITP**
- **Step 2B (ATSAW operation on ground): ATSAW on Airport Surface**

CONTENTS

ATSAW IN AIR



- ATSAW improves traffic situational awareness in all flight phases

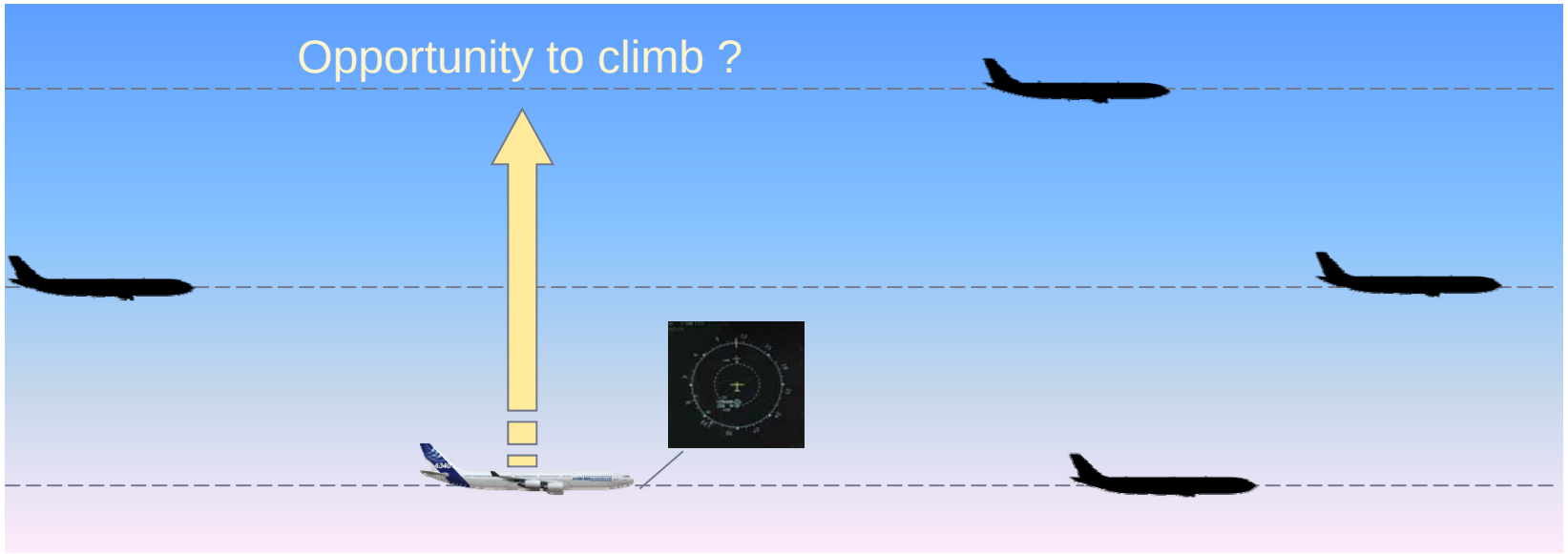
ATSAW

- ATSAW improves flight efficiency

➔ Improves cooperation with ATC (better understanding of ATC instructions)

➔ Improves the detection of opportunity to Flight Level change in standard separation

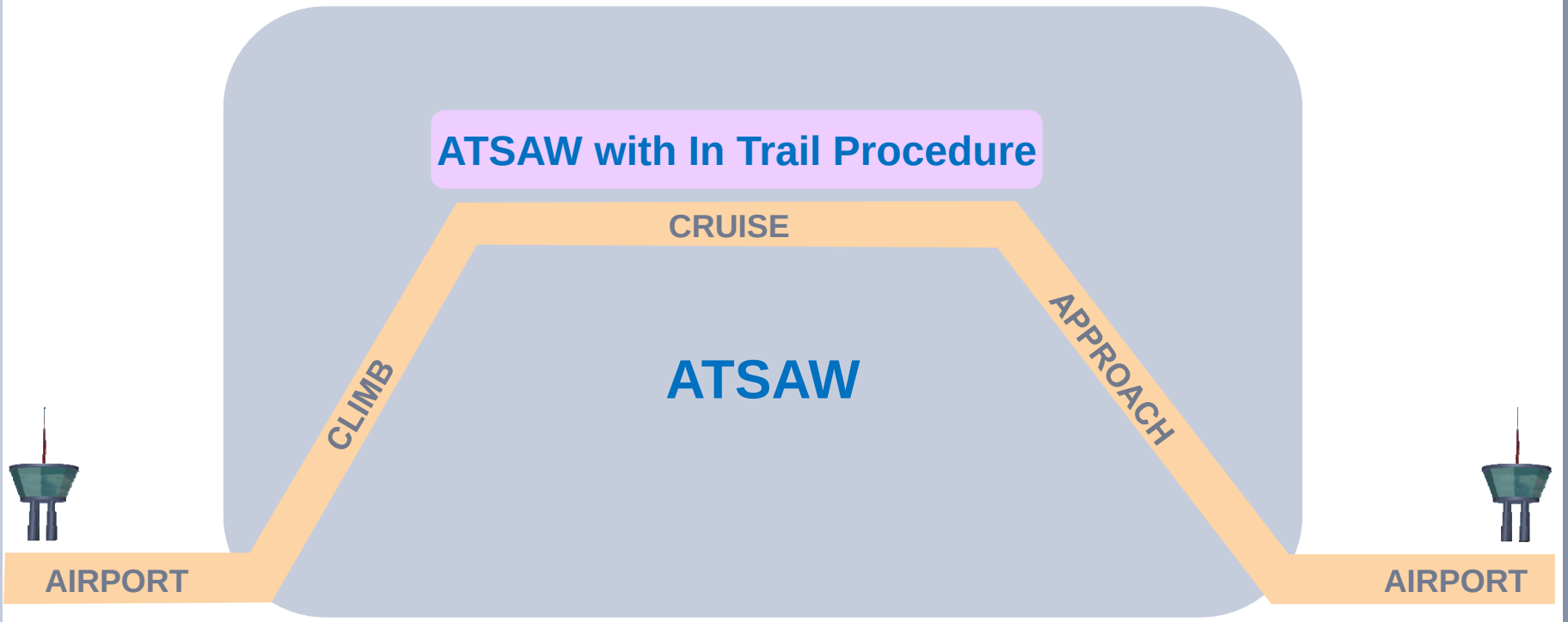
- **Fuel saving**
- Reduction of CO2 emission



ATSAW

- ATSAW reduces pilots workload
  - ➔ Eases the out-the-window scans
  - ➔ Reduces mental effort for traffic awareness
- ATSAW improves efficiency in approach
  - ➔ **Enhances identification and information of target aircraft**
  - ➔ Helps the flight crews to acquire and then to maintain visual contact with the preceding aircraft
  - ➔ Enables to maintain as long as possible visual separation
  - ➔ Enables to safely perform approach procedures with own visual separation from the preceding aircraft on a more regular basis
    - ➔ **Increases runway capacity**
- ATSAW paves the way to future Spacing applications

ATSAW

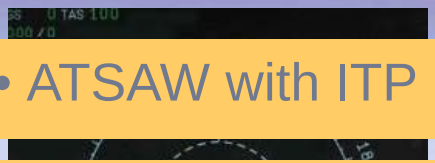


- ITP is a specific ATSAW procedure for flight level change defined in EUROCAE/RTCA document ED-159/DO-312
- ITP defines to reduce longitudinal separation during the FL change (down to 15NM)
- ITP is only certified in North Atlantic

ATSAW

Standard Longitudinal Separation Requirement = 10min (80 NM)

As per ICAO PANS-ATM, Doc 4444, Chapter 5



- ATSAW with ITP improves efficiency

➔Enables more frequent altitude changes by temporary reducing standard separation

➔ Enables to fly at the optimum flight level

➔**Provides significant fuel saving**

ATSAW Certification & Availability

ATSAW step 2A is certified on A330/340 & A320 aircraft families

- ATSAW for operations in air (step 2A) is available with:

→ **T3CAS** from ACSS
  - *Certified on A320 & A330/A340 aircraft family*

→ **TCAS TPA-100B from** Honeywell
  - *Certified on A320 & A330/A340 aircraft family*

→ **TCAS TTR-2100 from** Rockwell Collins
  - *Development launched (Certification end 2013)*

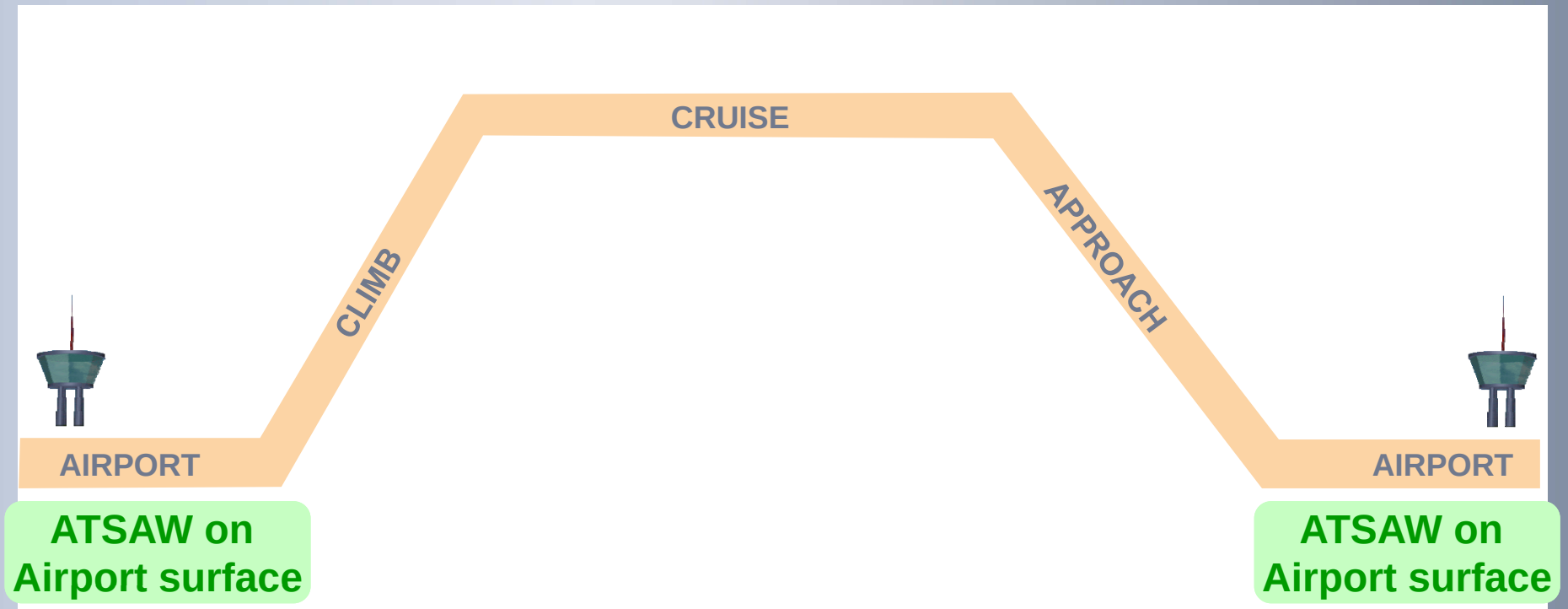
Several airlines have already equipped their aircraft with ATSAW

Validation and Flight Trials

CRISTAL: EUROCONTROL Validation Project
CASCADE: EUROCONTROL ADS-B Implementation

CONTENTS

ATSAW ON GROUND



- **Step 2B (ATSAW applications on ground): ATSAW on Airport Surface**

  *ATSAW application on airport surface is defined in EUROCAE document **ED-165***

ATSAW

- Objective:
  - To improve the safety on airport surface
- Method:
  - To display aircraft and vehicle positional information on runways and taxiways (using airport moving map - OANS)
- Applicability:
  - On runways, taxiways,
  - In all weather conditions, day and night.

- ATSAW enhances the safety:

➔ **Awareness of traffic situation (Runway occupancy)**

➔ **Collision risk anticipation**

ATSAW

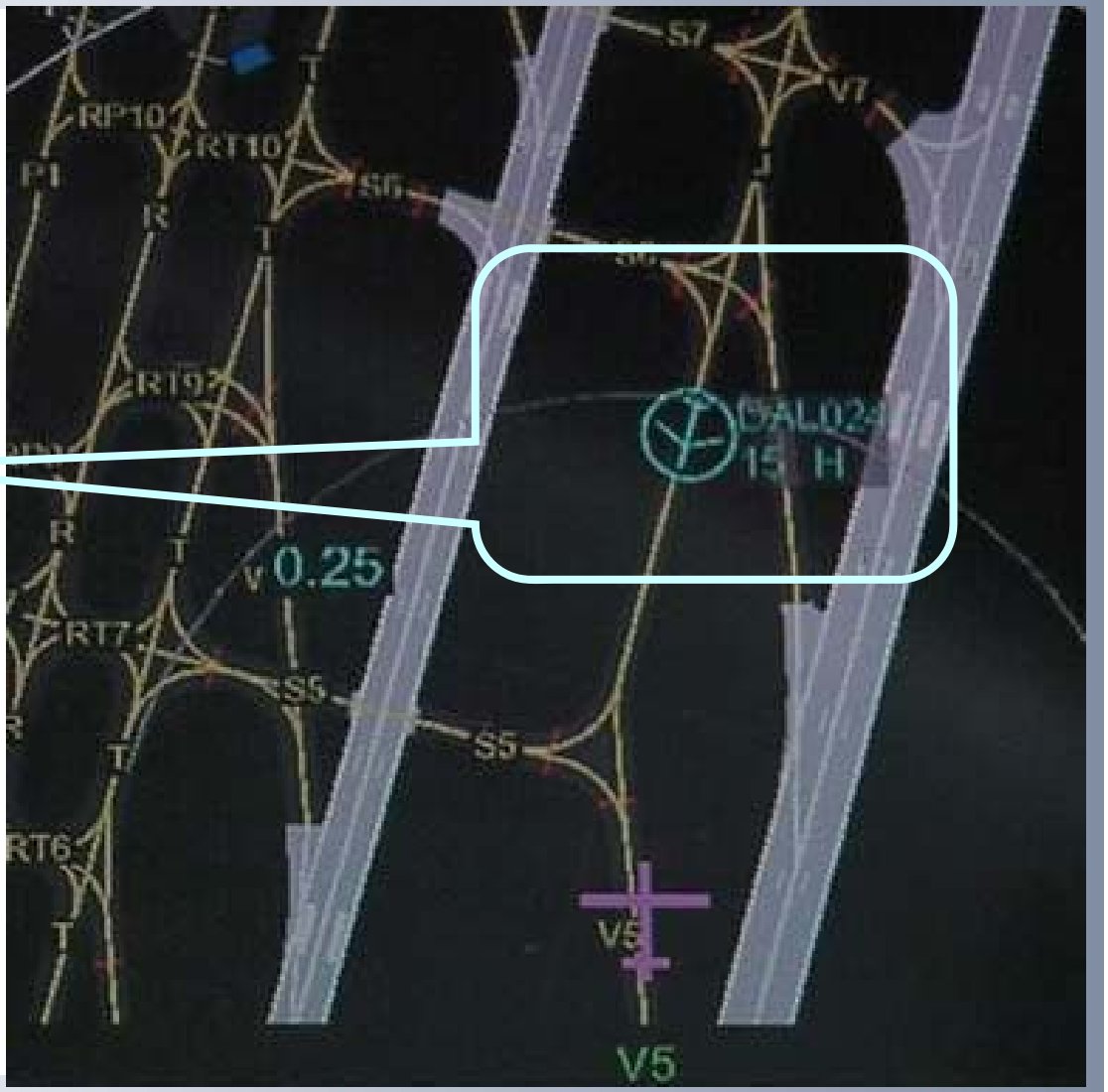
MOVING MAP

(provided by OANS Onboard Airport Navigation System)

+ TRAFFIC

(ADS-B data)

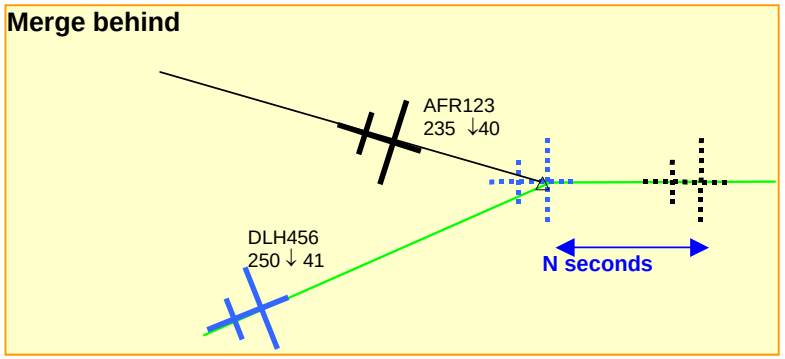
- OANS batch 1 planned to be certified beginning 2013
- OANS batch 2 (capable of ATSAW) planned to be certified beginning 2014
- ATSAW on airport surface planned to be certified end of 2014 with OANS batch 2



CONTENTS

NEXT STEPS (SESAR)

- Spacing applications are the next step after ATSAW
- Objectives:
  - Enable the flight crews to achieve and maintain automatically a given spacing with designated aircraft
- 3 maneuvers:
  - Remain Behind
  - Merge behind
  - Radar Vector then Merge behind

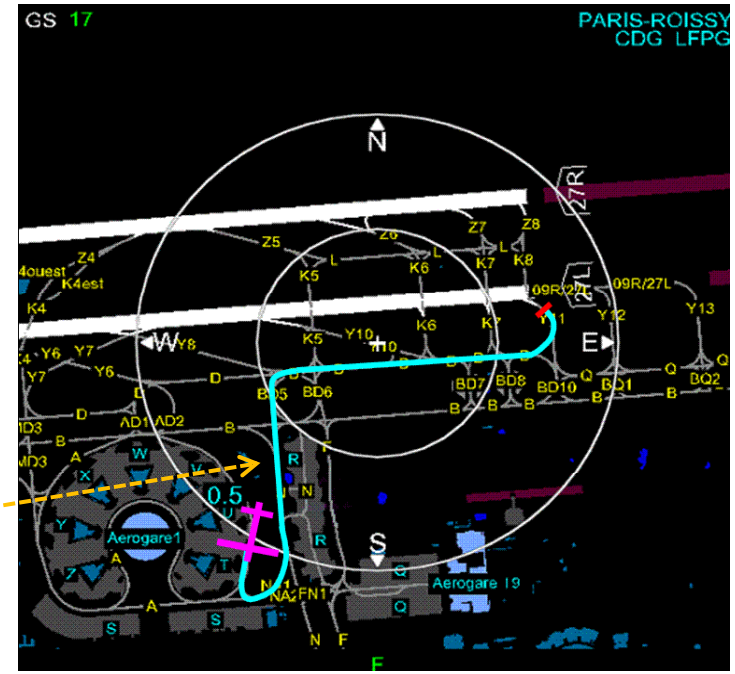


- **Operational benefit**:
  - **Enhance traffic regularity during the approach to dense airports to increase airport capacity.**
- Procedural and ground system impacts:
  - To be addressed in parallel by ANSPs within SESAR

NEXT STEPS (SESAR)

- Taxi clearance function:
  - Computes and displays Taxi Path from the gate to the runway.
  - Needs taxi path information transmitted:
    - Automatically (by datalink)
    - or Manually (Flight crew interaction)

Taxi clearance



- Surface Airport Alerts: ATSA-SURF IA (Indicating & Alerting)
  - Next step of ATSA-SURF (ATSAW on airport surface)
  - Computes potential conflict with ADS-B OUT equipped aircraft
  - Provides the crew with indication & alerts in case of potential conflict

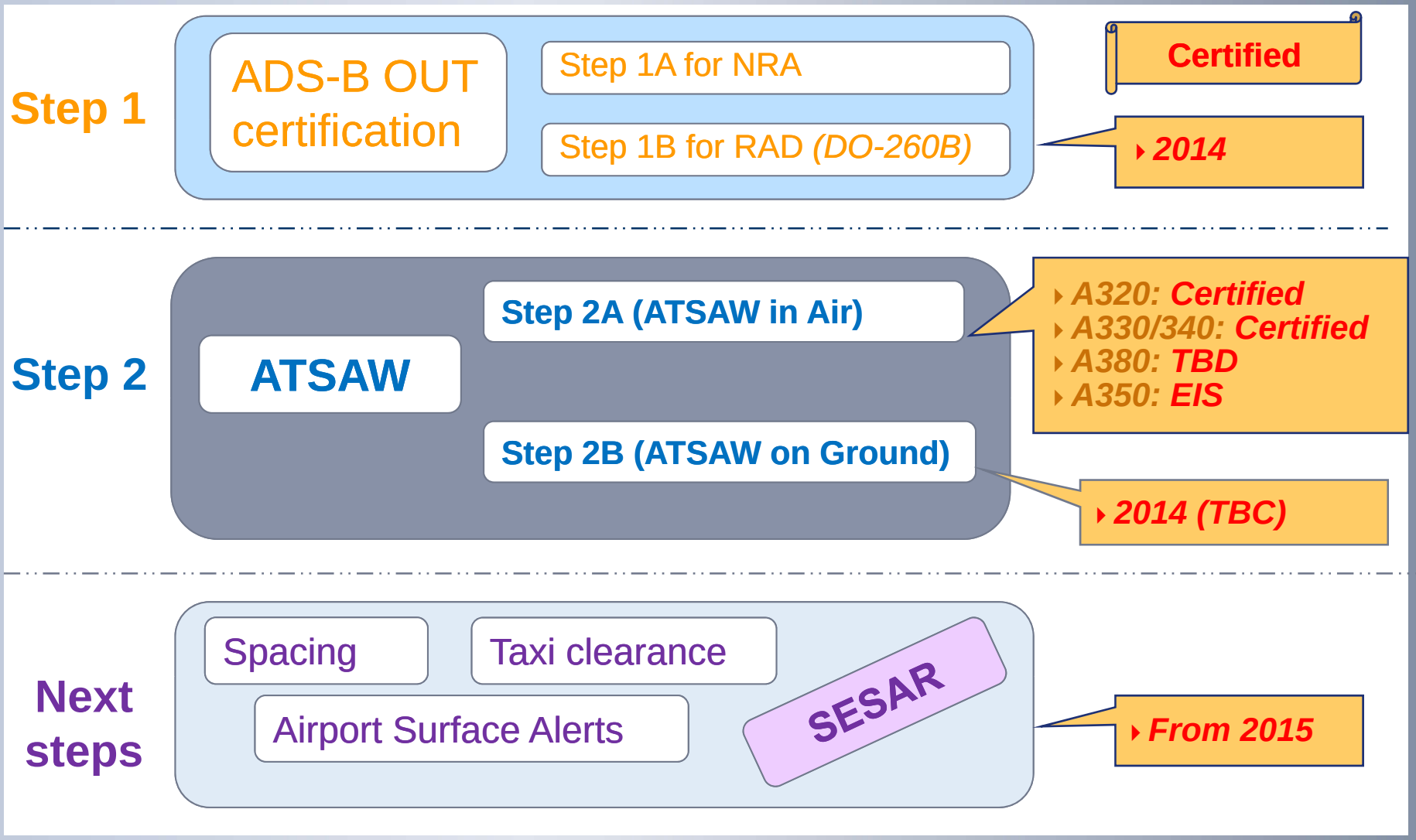
CONTENTS

ATSAW – Benefits summary

	ATSAW in flight (Step 2A)	ATSAW on ground (Step 2B)
EFFICIENCY	•**Fuel saving** •Flight time optimisation •**Increase runway throughtput** •Reduction of radio call •Reduction of Nox •Decrease of missed approaches	•Improve taxiing operations (time & fuel saving) •Increase airport capacity •Depature clearance at the right time •Gate occupancy awareness
SAFETY	•**Awareness of traffic situation** •**Enhanced identification of target aircraft** •Readiness for avoidance actions •Correlation of radio communication and traffic display	•**Runway & taxiway occupancy awareness** •**Collision risk anticipation**

ATSAW helps gaining experience and confidence for future applications

ATSAW – ROAD MAP



THANKS FOR YOUR ATTENTION...

QUESTIONS?

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