

Introducing experience from EUROCONTROL in TBS implementation

SDM Workshop on TBS, 24 Octobre 2017

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ATM Airport Unit

Production of Time Based Specification

- Time based Specification was prepared by EUROCONTROL under EC mandate
- The Speciation is based on lower level “local” and “generic” requirements identified in SESAR P6.8.1
- Focus group of experts (NATS, Austrocontrol, THALES) were consulted prior to drafting
- Draft specification was produced ensuring full consistency with NATS products (inclusive but not limited)
- ENPRM process took place between 15 April and 8 July 2016
- 84 comments (from 5 ANSPs and 1 regulator) were processed and clarified
- Publication foreseen by end of 2017

EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION



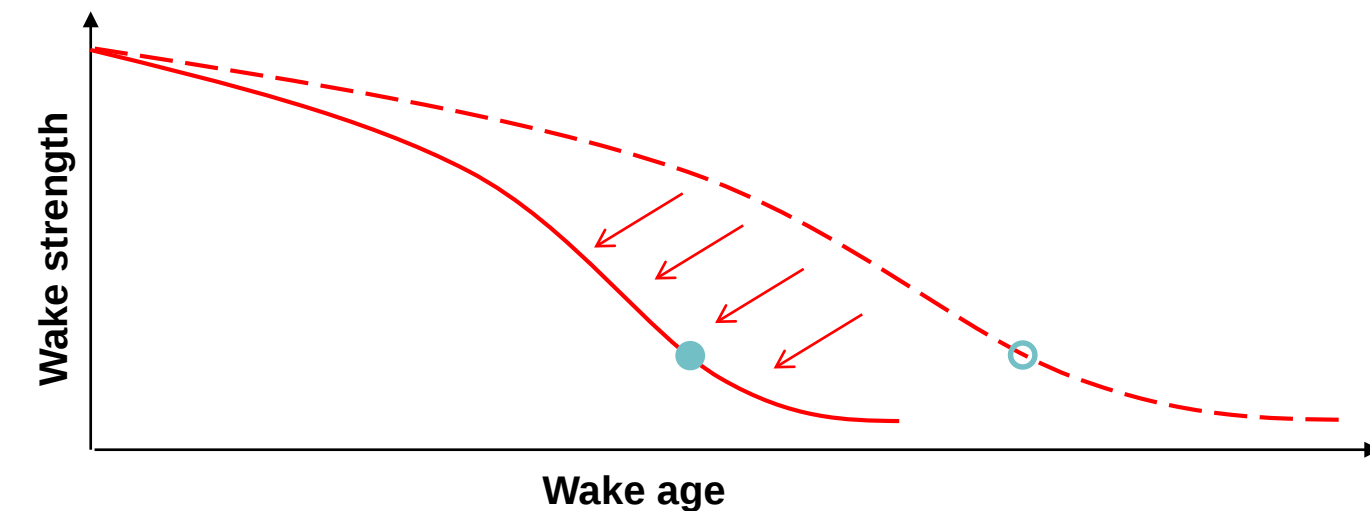
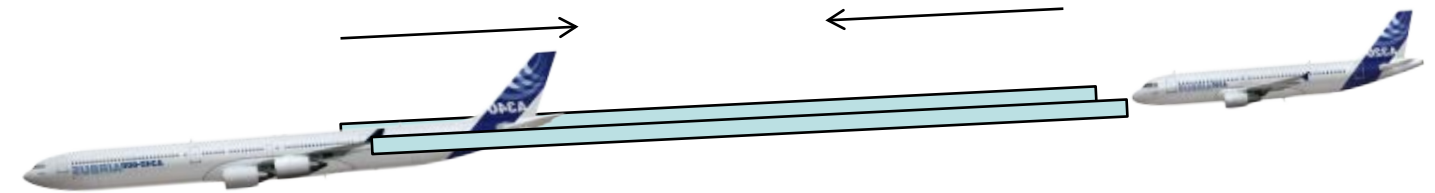
EUROCONTROL
Specification for Time Based
Separation (TBS) for final
approach

DOCUMENT IDENTIFIER : EUROCONTROL-SPEC-XXX

Edition Number :	0.4
Edition Date :	18/01/2018
/Status :	Working Draft
Intended for :	Restricted
Category :	EUROCONTROL Specification

Production of Time Based Generic Safety Case

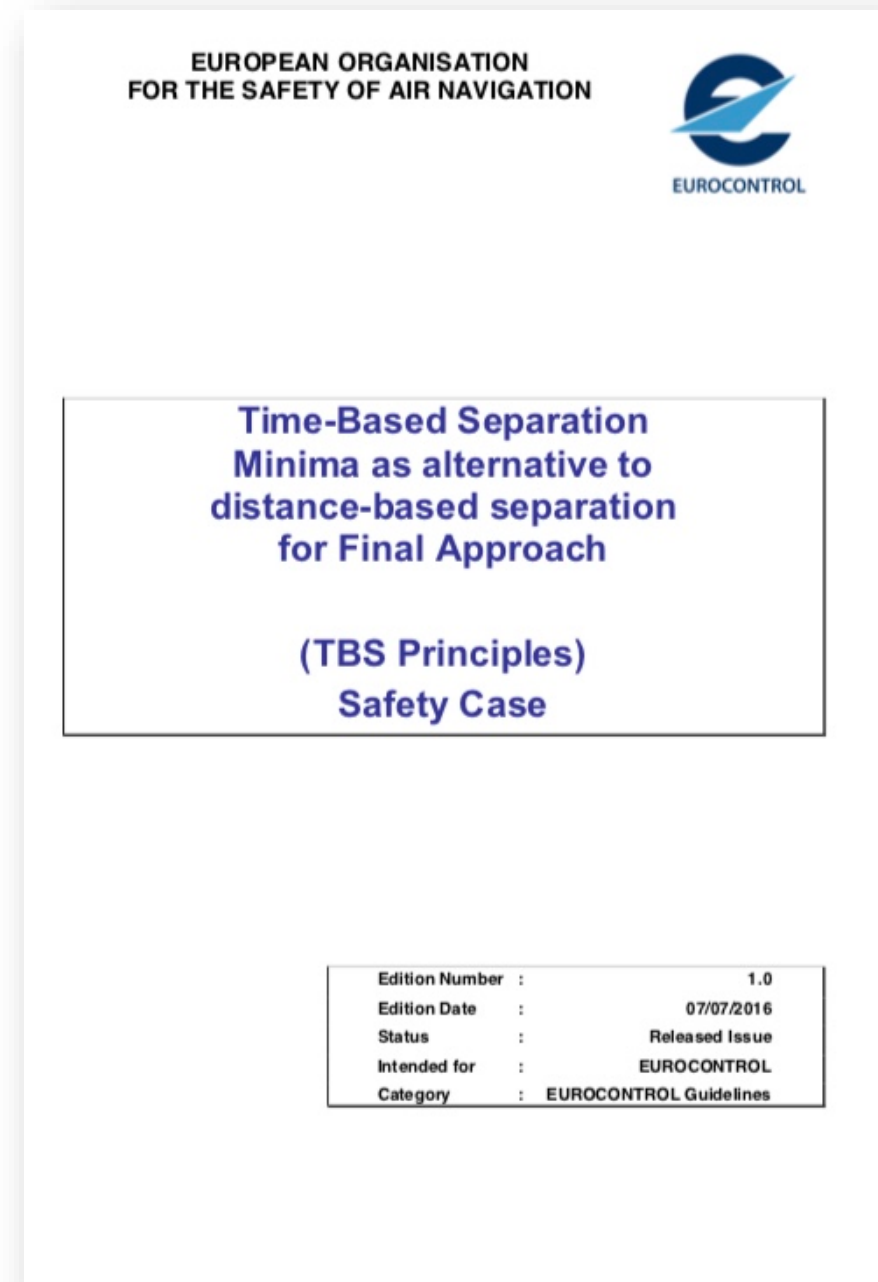
- Time Based Generic Safety Case was prepared by EUROCONTROL on the basis of the SESAR results
- The Safety Case
 - Describes TBS Principle
 - Addresses wake turbulence risk
 - Justifies safe separation reductions from wake point of view
 - Is a key but not sufficient element for deployment



Wind effect on wake decay always mitigates TBS reductions

Production of Time Based Generic Safety Case

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- The Safety Case
 - Describes TBS Principle
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 - Is a key but not sufficient element for deployment
- Safety Case for TBS principles in final review with EASA will be direct input for deployment

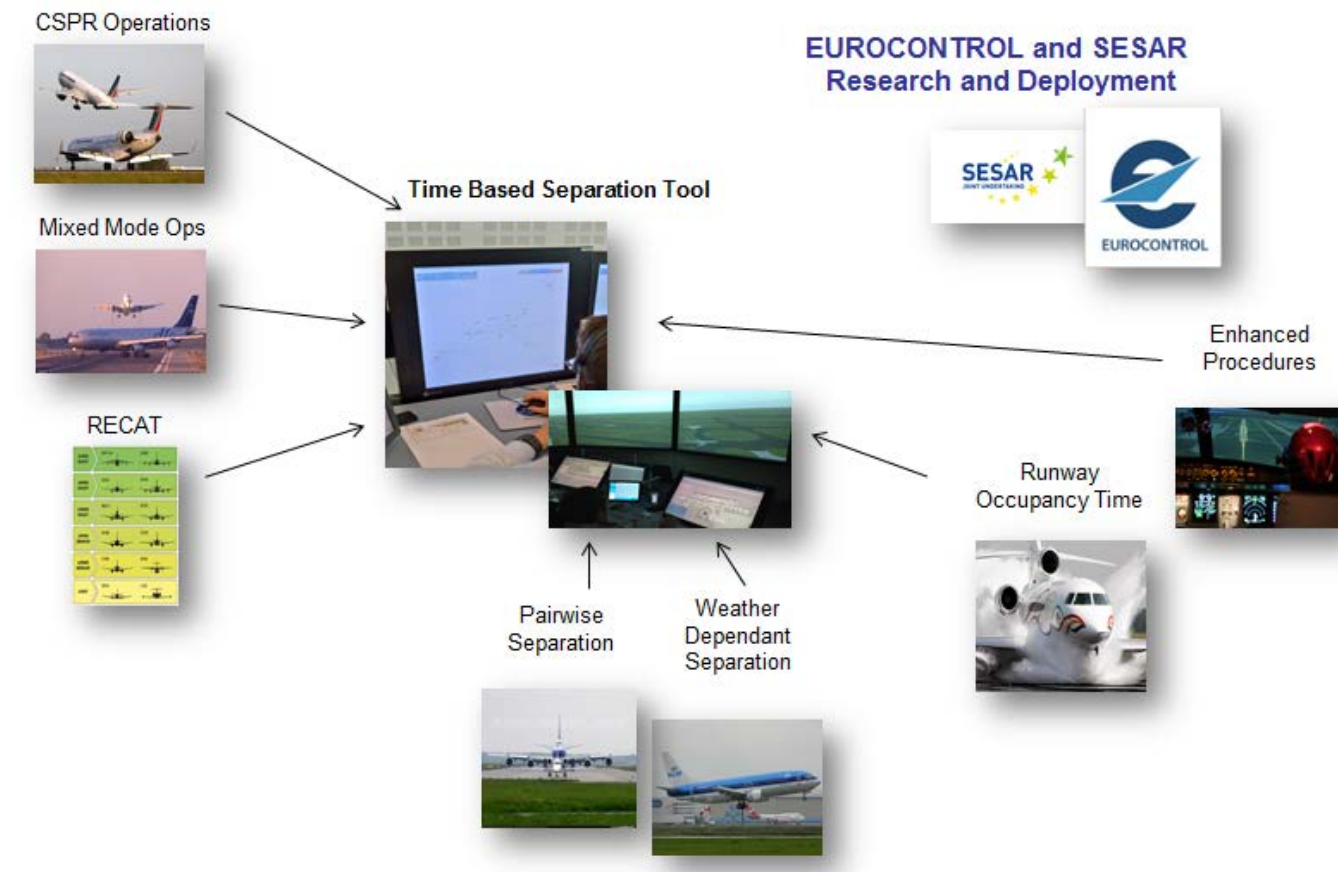


Information to Stakeholders and Regulation Authorities

- Misunderstanding about Time Based Separation
- Need for detailed and reliable prediction of expected benefit
- Explanation of Wake Measurement and Wake Risk Assessment (TBS Generic Safety Case)
- Explanation of the TBS Spec (TBS Guidance)
- Creating the move – OPEN days SESAR context
- Followed by new open days for promoting solution developed in SESAR and proposed by European industry

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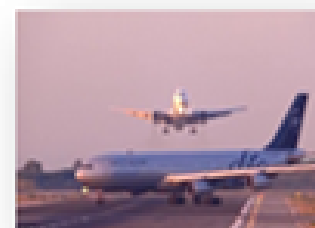


EUROCONTROL and SESAR Research and Deployment

CSPR Operations



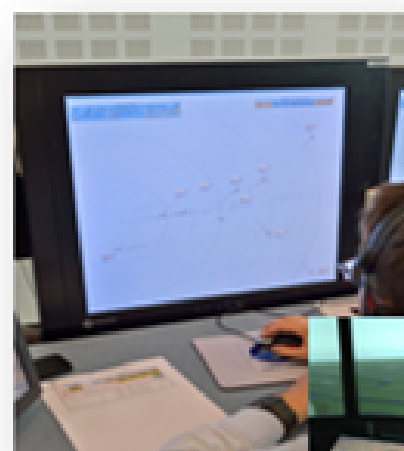
Mixed Mode Ops



RECAT



Time Based Separation Tool



Enhanced
Procedures

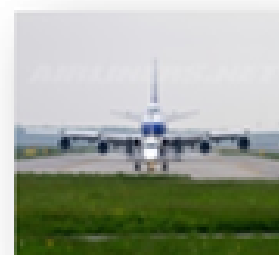


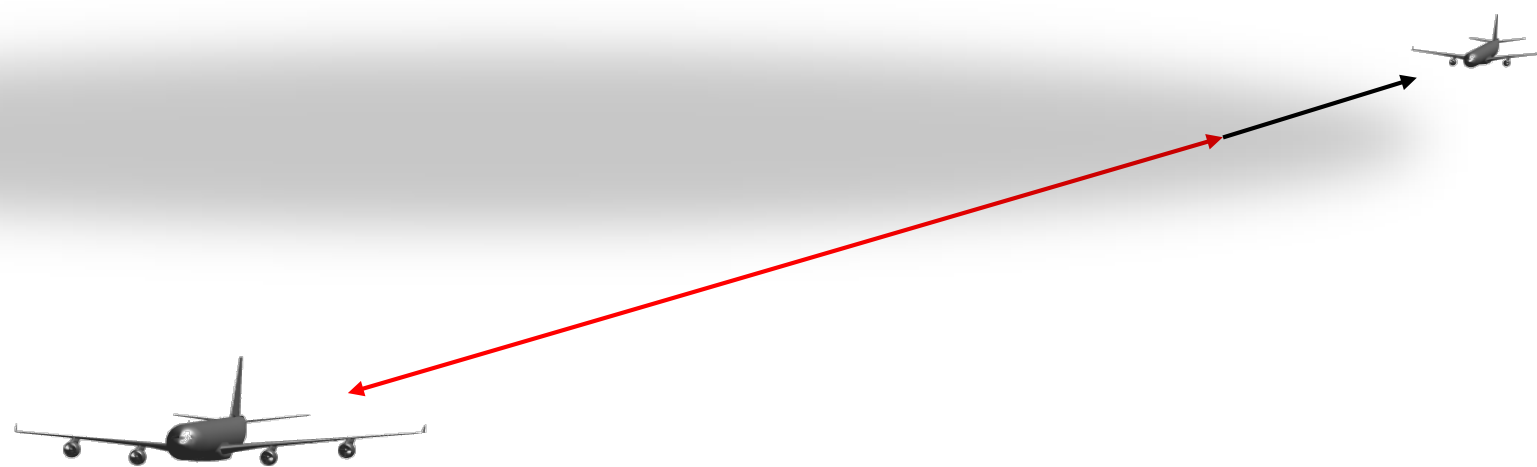
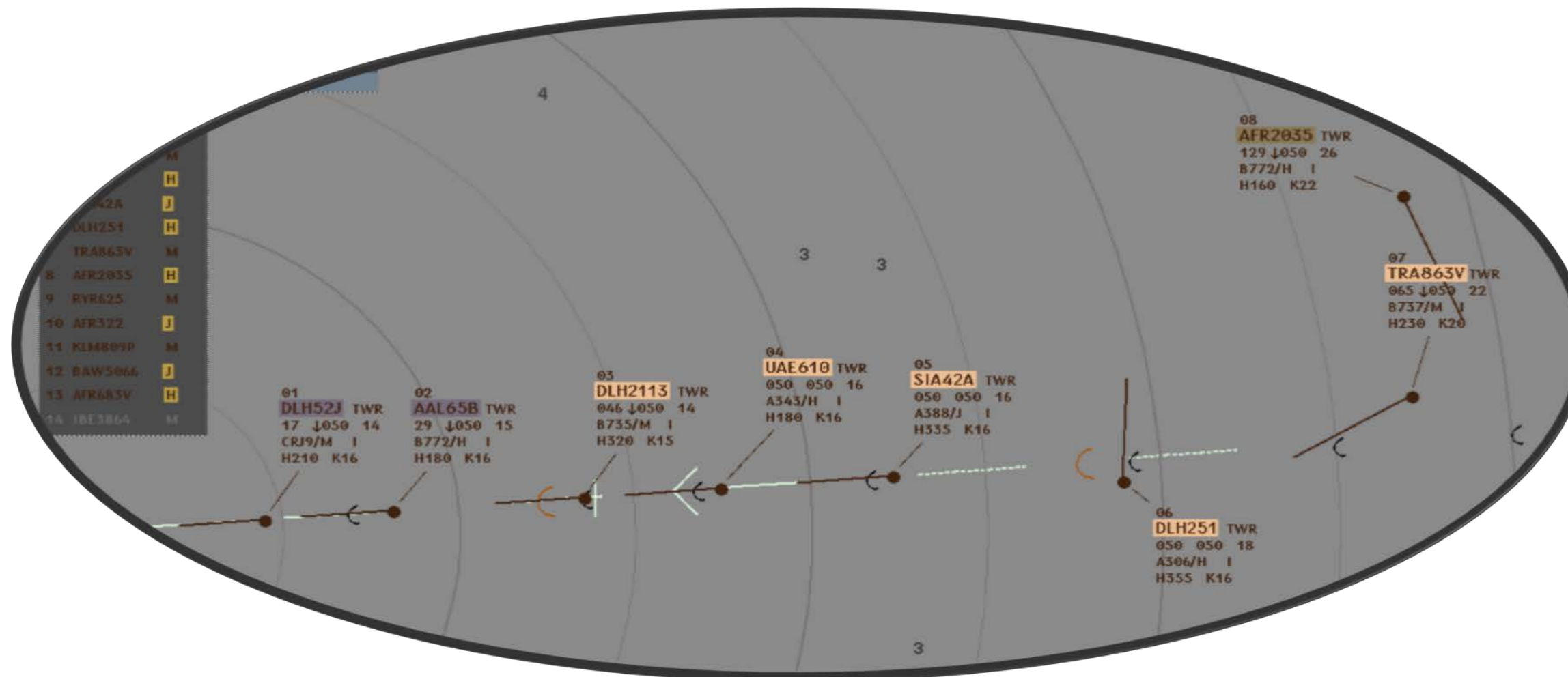
Runway
Occupancy Time



Pairwise
Separation

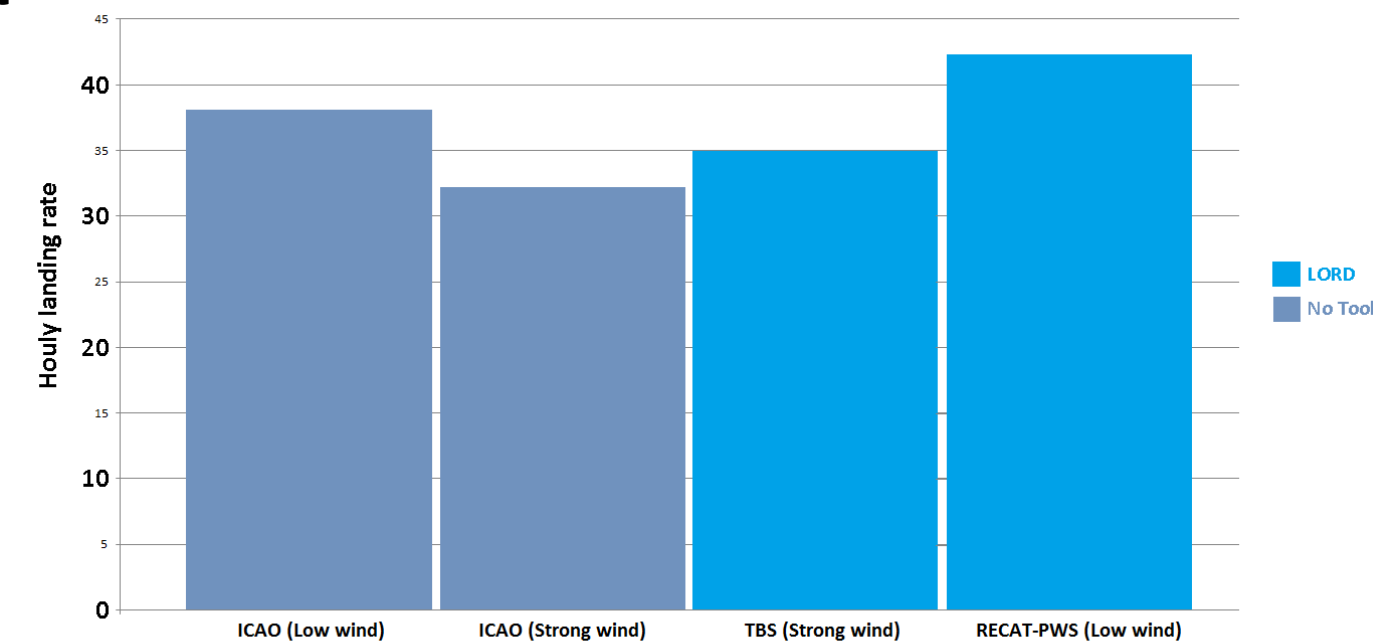
Weather
Dependant
Separation





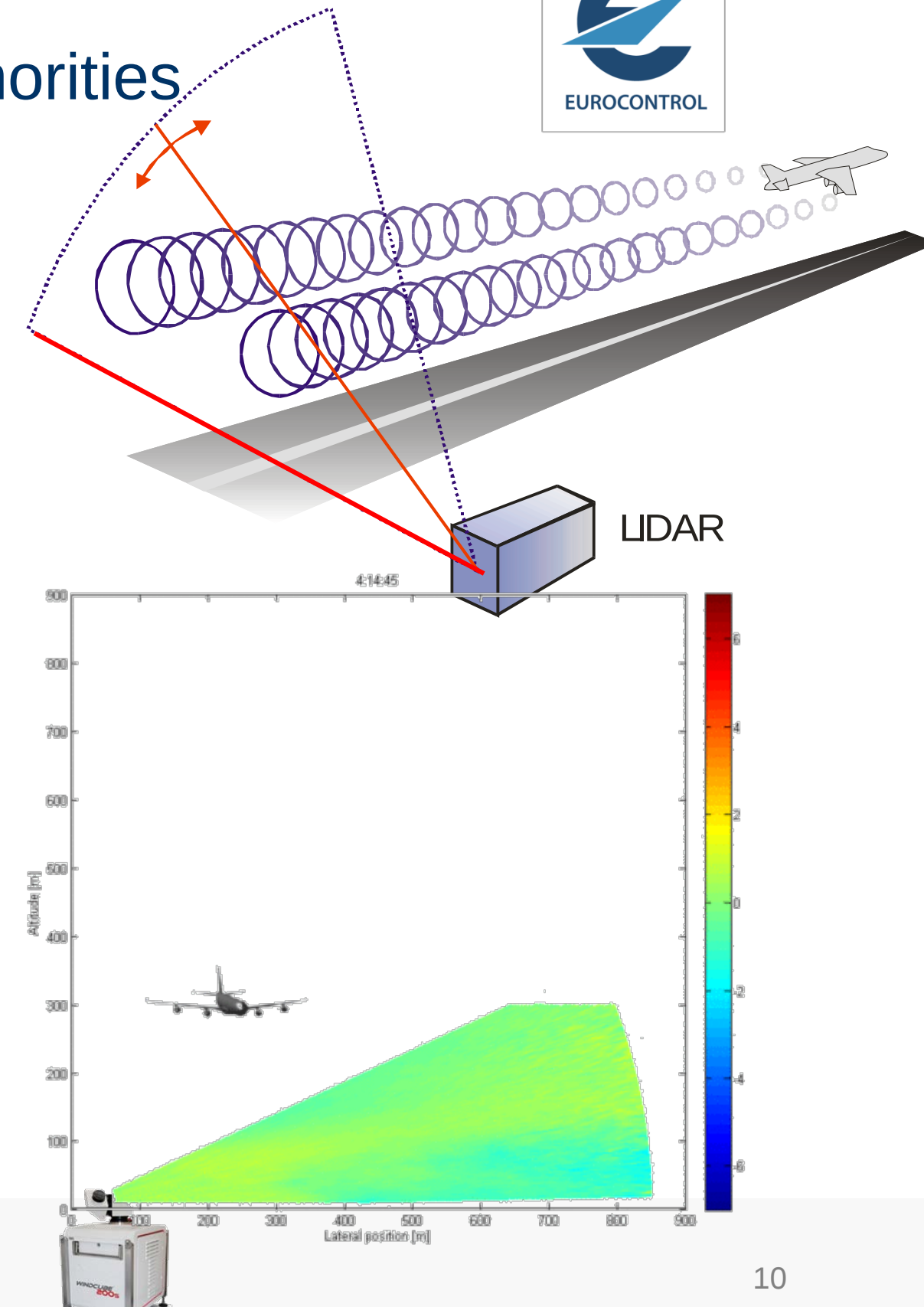
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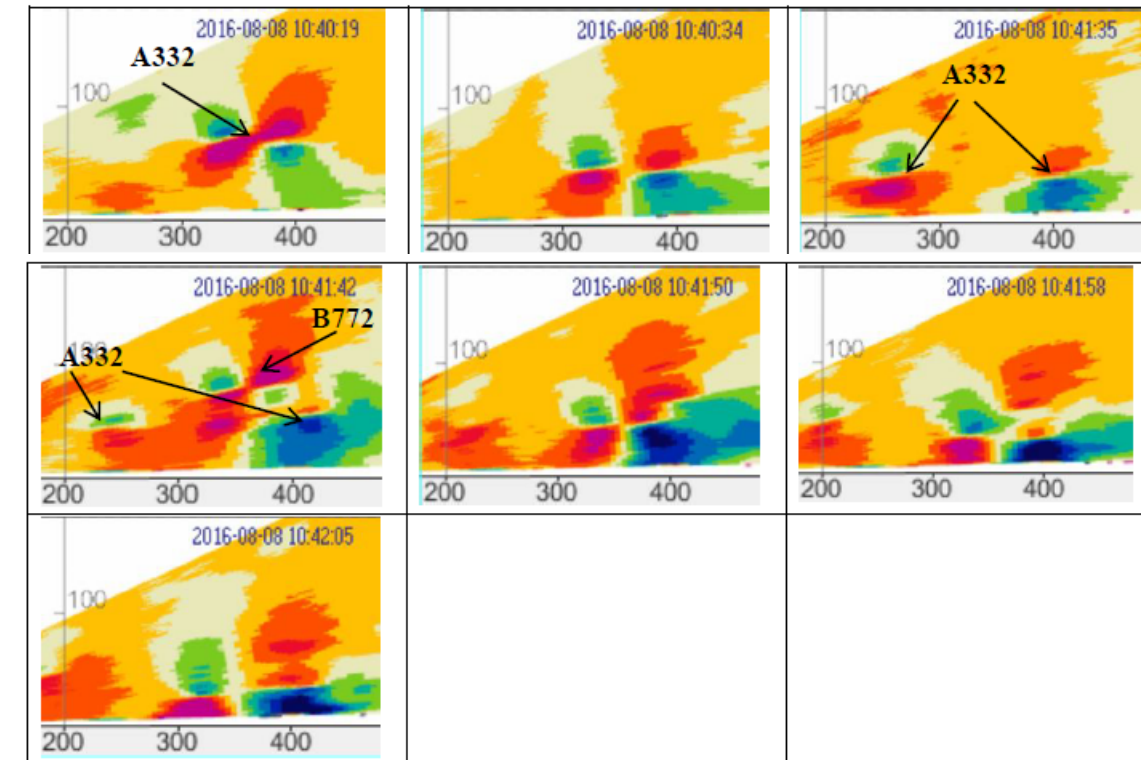
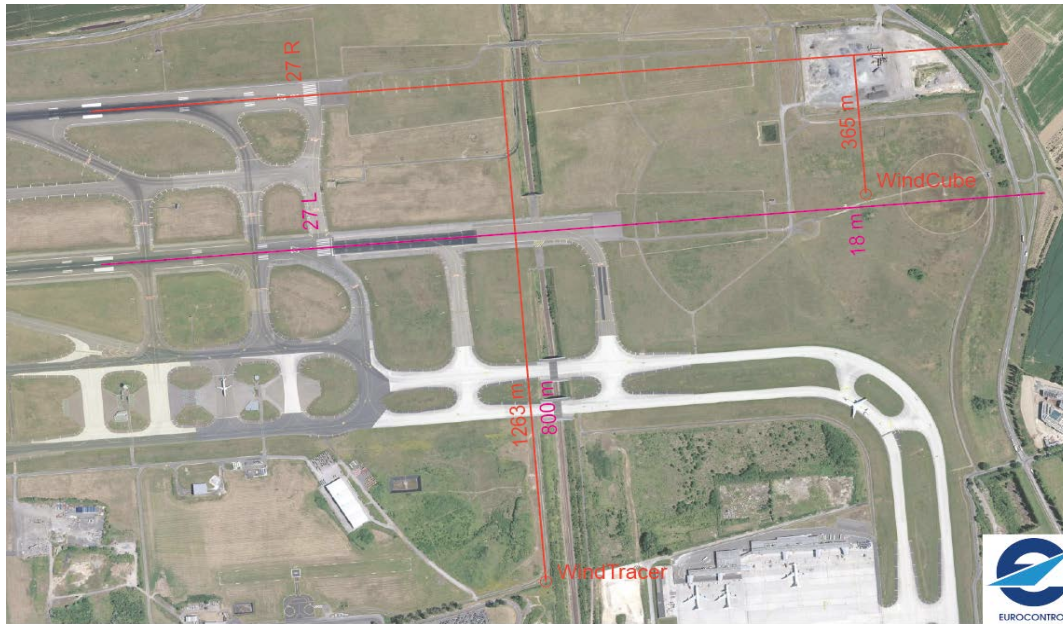


Support to Local Deployment

- TBS @ LOWW
 - Explanation of the Safety Case to Austrian regulation authorities
 - Elaboration of intermediate deployment step (Procedural: RedSep)
 - Support to MET office for definition of wind measurement requirements
 - Support to Time Based calibration (local definition of aircraft speed profile and associated buffer ensuring reliability of TBS computation)

- RECAT @ CDG
 - Explanation of the Safety Case to French Authorities
 - Demonstration session (RTS) to ATCO representatives and ATCO Team Leaders
 - Information to Pilot and Flight Simulation sessions
 - Post deployment risk monitoring

Support to Local Deployment



- Post deployment risk monitoring

EUROCONTROL automatic wake data collection and analysis platform freely available for supporting post deployment monitoring

Pre-deployment analysis

Refinement of the TBS concept as a function of local needs:

- Copenhagen – TBS + PBN
- Vienna – TBS in mix mode
- Zurich – TBS for better Runway Occupancy Time management
- CDG – Definition of step based TBS deployment roadmap

Organisation of Real Time Simulations for refining local requirements and making deployment decision

Important to define the content of ECTL support and to define transfer point between EUROCONTROL and industry

Building Consensus around European Standard and preparing ICAO ASBU

Non ECAC TBS concept presentation in:

- Dubai
- Hong Kong
- Tokyo
- Toronto
- China
- ICAO

Opening the doors for EUROPEAN industry:

- Leosphere / NATS in Hong Kong
- NLR in Dubai
- Airbus in Tokyo

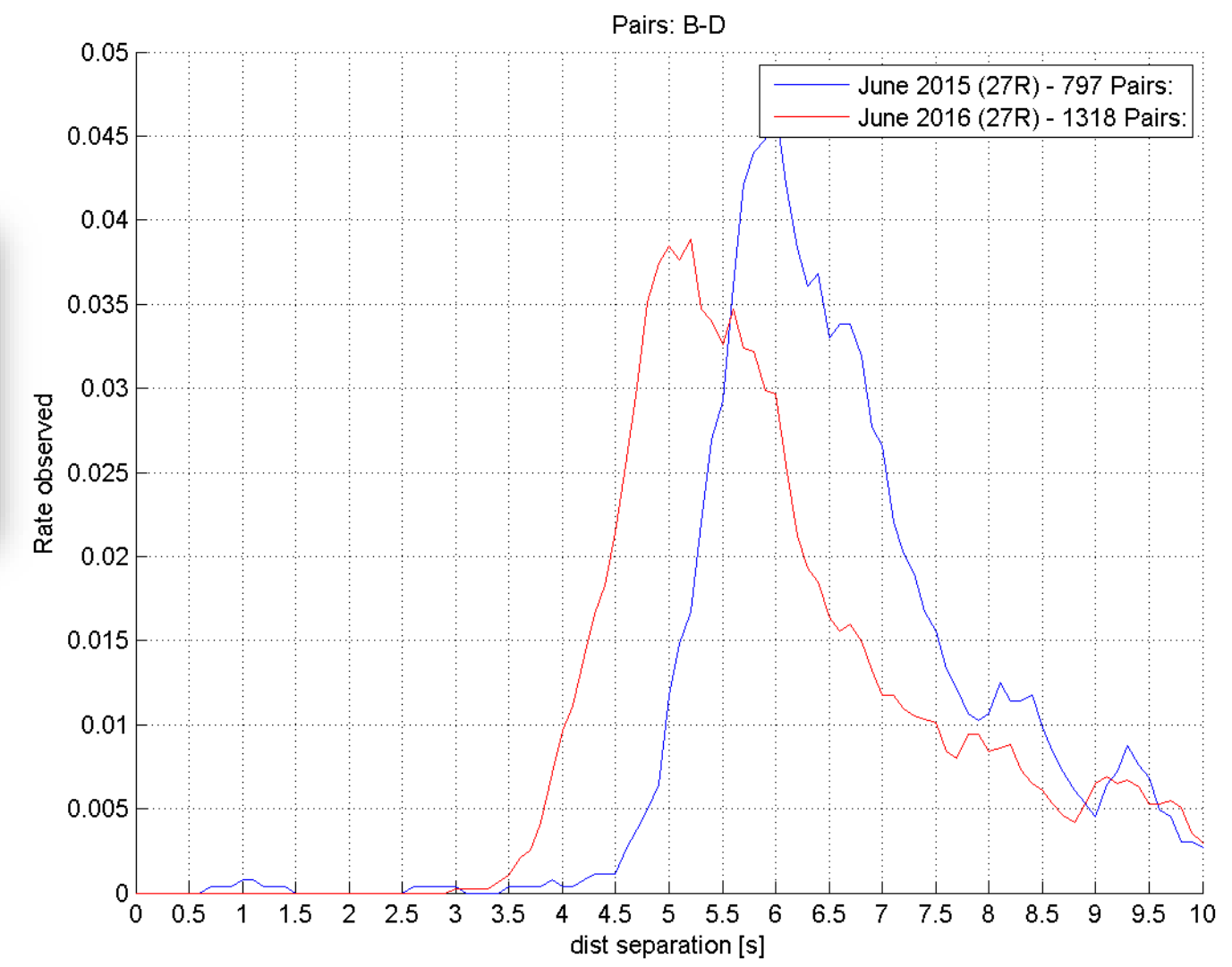


RECAT-EU operates in

- **Paris Charles de Gaulle**
(second larger airport in Europe)
since March 2016
 - **10%** runway throughput observed
 - 1 year monitoring didn't show increase of wake incidents
- **Leipzig/Halle Airport**
(second-busiest freighter hub in Germany after Frankfurt Airport)
since July 2017

Impact at CDG – New Separation Conformance

A332

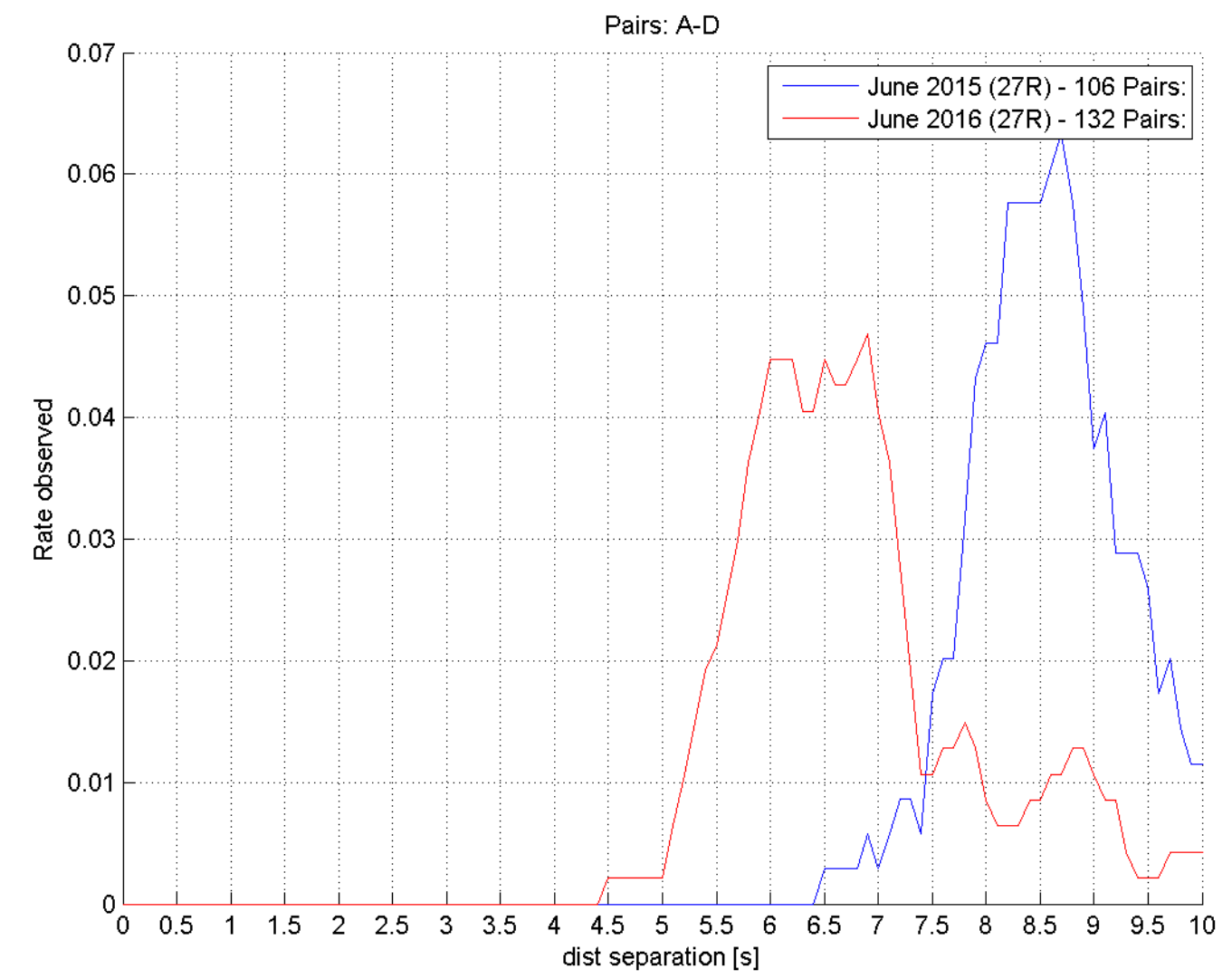


A320



Impact at CDG – New Separation Conformance

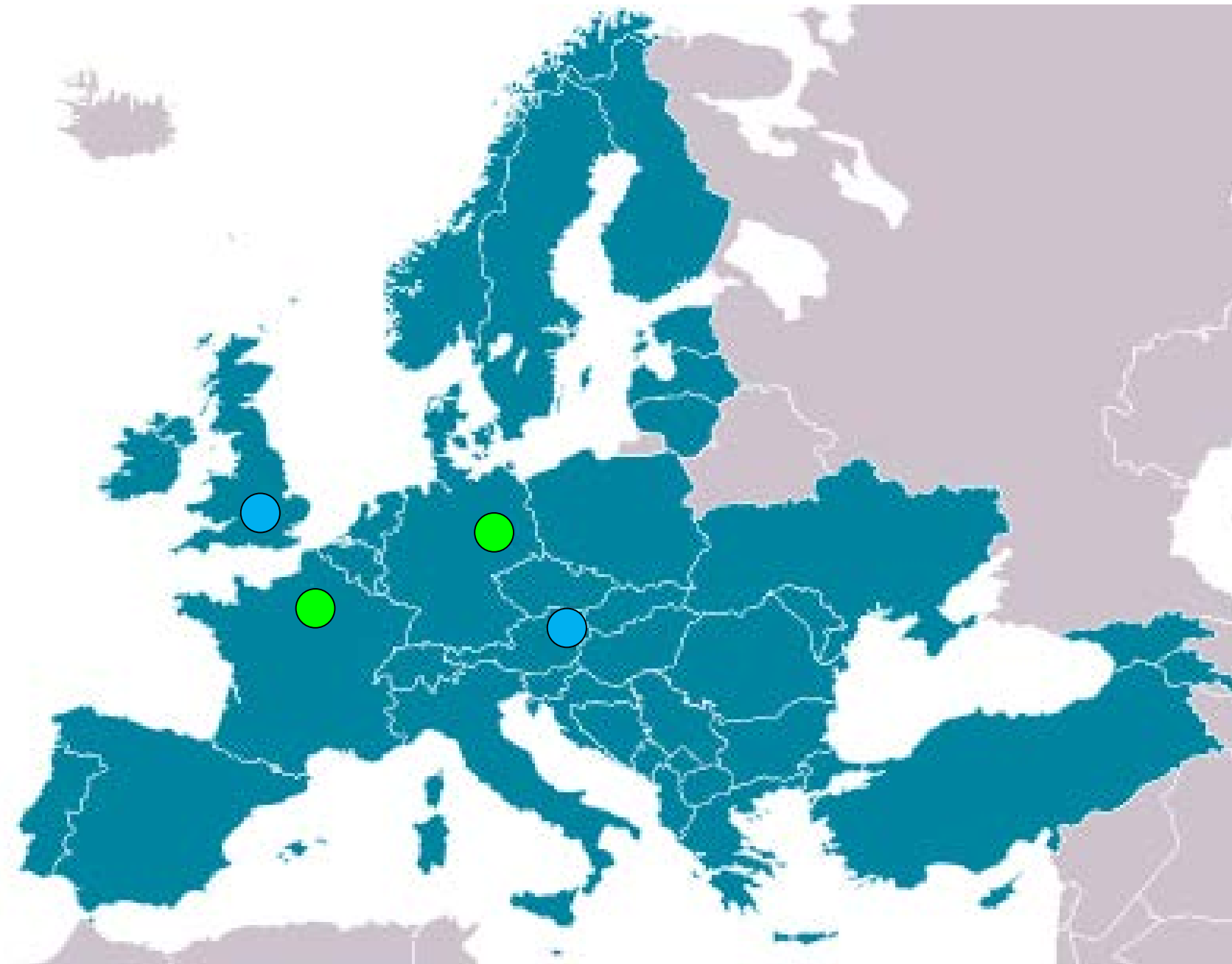
A380



A320



RECAT-EU



RECAT-EU will be operated in

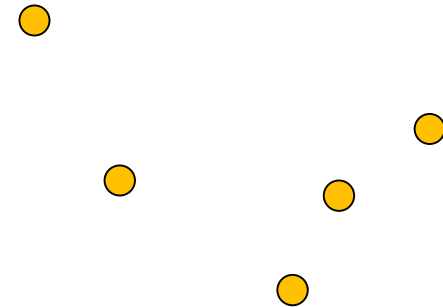
- **London Heathrow**
(first larger airport in Europe)
Spring 2018
- **Vienna**
(250,000 movement / year)
mid 2018



Preliminary analyses to deploy **RECAT-EU** in

- **Manchester**
- **Gatwick**
- **Barcelona**
- **Las Palmas**
- **Madrid**
- **Copenhagen**

Bi-lateral discussion and/or
Cooperation to deploy **RECAT-EU**
in



- **Tokyo**
- **Dubai**
(testing ongoing)
- **Singapore**
- **Hong Kong**
- **Moscow**

Time Based Separations (TBS)



Time based separation operates in

- **London Heathrow**
(first larger airport in Europe) since March 2015
 - **62%** Reduction in ATFM delay
 - **2.9** additional movements per hour in strong winds
 - **1.2** extra movements per hour

Time Based Separations (TBS)



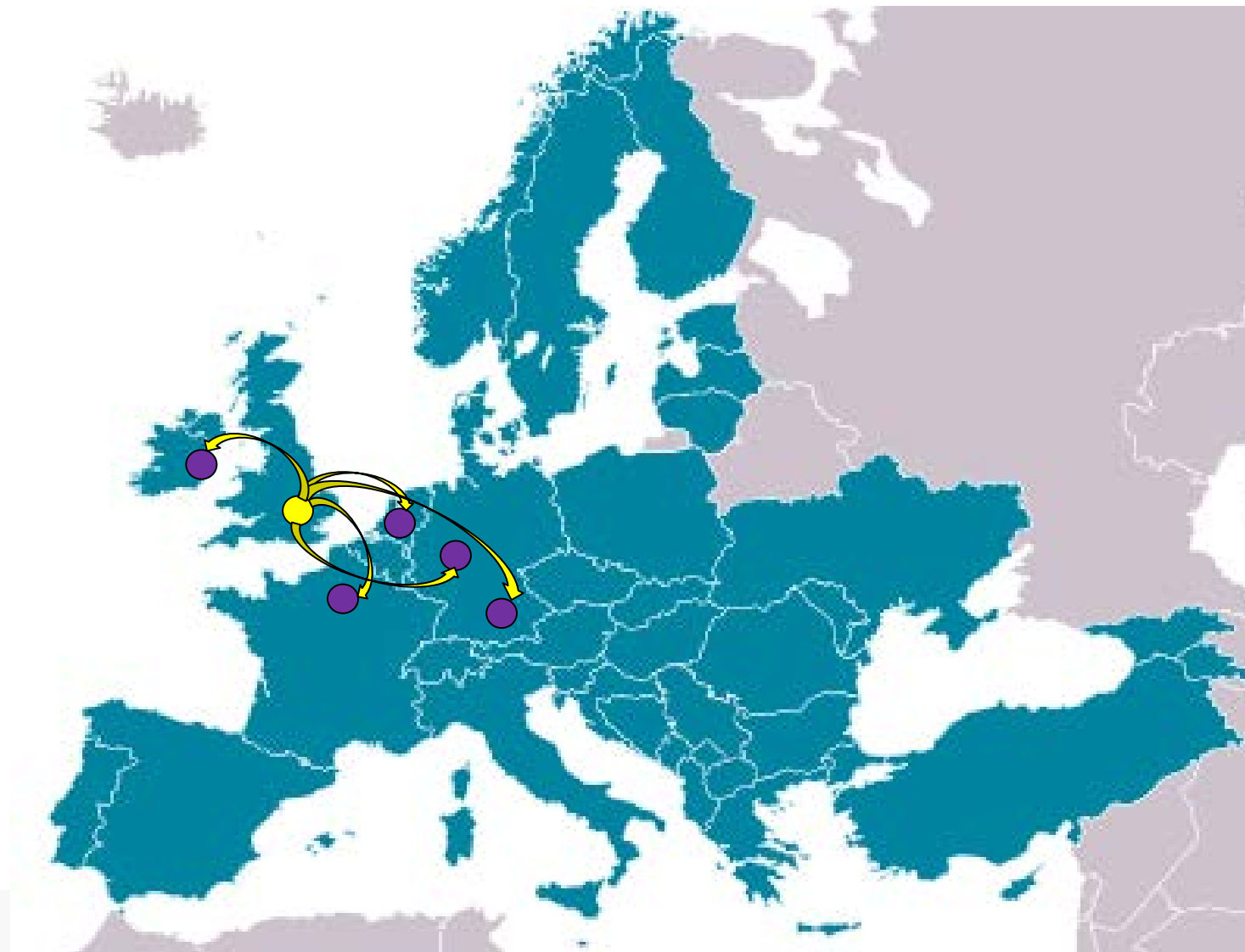
Support provided for **Time based separation** deployment to

- **Vienna**
(250,000 movement / year)
- **Zurich**
(270,000 movement / year)
- **Copenhagen**
(265,000 movement / year)

16 European airports committed to deploy Time Based Separation as from 1 January 2024)

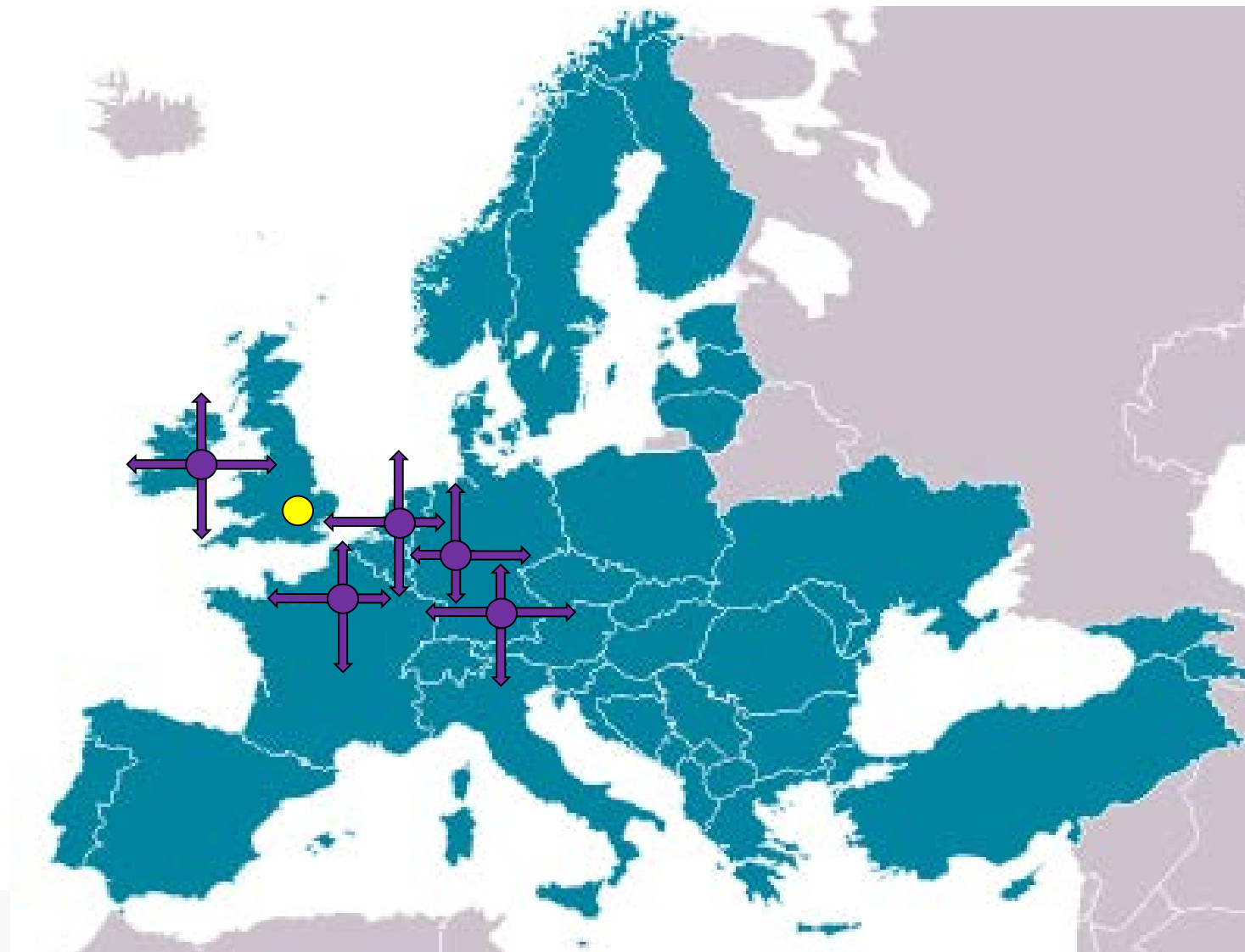
Network Impact Assessment

All departures out of EGLL to 1 of the to 5 most connected airport ((LFPG, EIDW, EDDF, EDDM, EHAM), then continue but doesn't go back to EGLL
(top 10 windy days before and after TBS deployment)



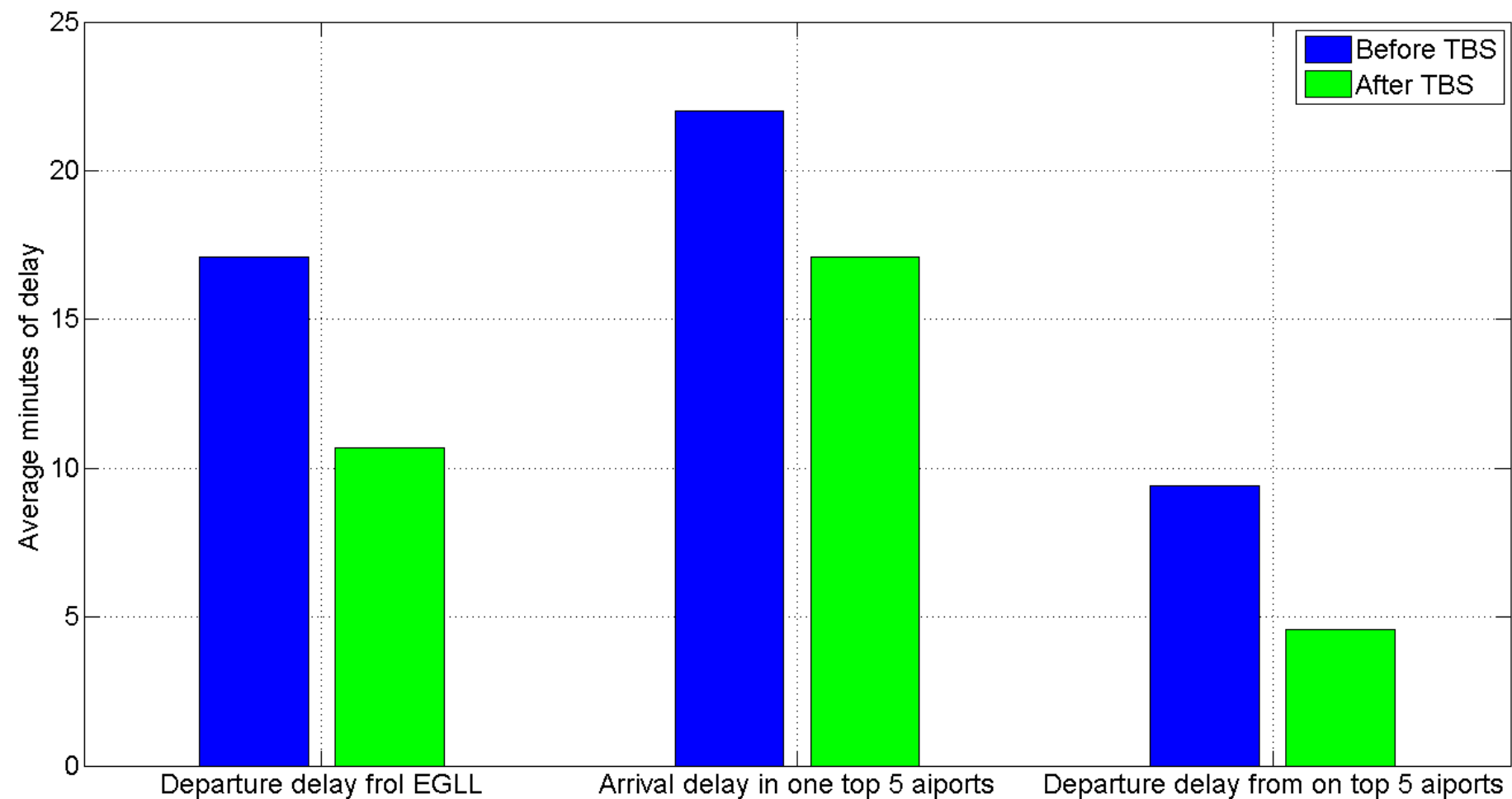
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Conclusion

- Runway throughput enhancement solutions are mature and ready for deployment
- EUROCONTROL Techniques, Tools and Know-How are available for supporting European and Non-European airports to make decision to deploy these solutions

EUROCONTROL Wake Knowledge Hub

<https://recat-project.eu/>

RECAT-EU

- <https://www.youtube.com/watch?v=UEWdexDIqfU>
- <https://www.youtube.com/watch?v=fJZf0LuwUJg>

Time Based Separations and next steps (Pair Wise Separations / LORD)

- <https://www.youtube.com/watch?v=8TjNF7dhdP0>
- <https://www.youtube.com/watch?v=ZUG5ywZvtnw&feature=youtu.be>
- https://www.youtube.com/watch?v=mn_WPikR4lg

Question?

