SESAR	Active									APT
AOP10	Time-Based Separation									
REG	ASP	MIL	APO	USE	INT	IND	NM	MET	AIS	USP

Subject matter and scope

Time-based separation (TBS) consists in the separation of aircraft in sequence on the approach to a runway using time intervals instead of distances. It may be applied during final approach by allowing equivalent distance information to be displayed to the controller taking account of prevailing wind conditions. Radar separation minima and Wake Turbulence Separation parameters shall be integrated to provide guidance to the air traffic controller to enable time-based spacing of aircraft during final approach that considers the effect of headwind.

A TBS system that provides in real-time the separation to apply between two aircraft needs to be fed by:

- the aircraft sequence to anticipate aircraft specific speed management and to define the time separation required for a given wake category pair, and;
- the wind profile, approximately 10 minutes before landing, to define the separation on final approach.

These require respectively the development of an easily usable sequencing tool and a now casting technology based upon merging wind profile measurement and heuristic techniques.

NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each military authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the military authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to military authorities.

Applicability Area(s) & Timescale(s)

Applicability Area	See list of airports in MP Level 3 Implementation Plan - Annexes

Timescales:	**From:**	**By:**	**Applicable to:**
Initial operational capability	01/01/2015		Applicability Area
Full operational capability		31/12/2023	Applicability Area

References

European ATM Master Plan

OI step -	[AO-0303]-Time Based Separation for Final Approach - full concept								
	Enablers -	AERODROME -ATC-17	APP ATC 156	REG-0514	STD-065				

Legend:	WXYZ-001	Covered by SLoA(s) in this objective	WXYZ-002 zzz	Covered by SLoA(s) in another objective Objective covering the enabler	WXYZ-003	Not covered in the Implementation Plan

Applicable legislation

-none-

Essential Operational Changes

Airport and TMA performance

SESAR Solution

#64 - Time Based Separation

ICAO GANP - ASBUs

WAKE-B2/7	Time based wake separation minima for arrival based on leader/follower static pair-wise

Deployment Programme

- none -	

European Plan for Aviation Safety

- none -	

AOP10	Time-Based Separation

Operating Environments

Airport
Terminal Airspace

Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	By
AOP10-REG01	Publish TBS operations procedures in national aeronautical information publications	01/01/2015	01/01/2024
AOP10-ASP01	Ensure AMAN system is compatible with TBS support tool	01/01/2015	01/01/2024
AOP10-ASP02	Modify CWP to integrate TBS Support tool with safety nets	01/01/2015	01/01/2024
AOP10-ASP03	Local MET info with actual glide-slope wind conditions to be provided into TBS Support tool	01/01/2015	01/01/2024
AOP10-ASP04	TBS Support tool to provide automatic monitoring and alerting of non-conformant behaviours, infringements, wrong aircraft	01/01/2015	01/01/2024
AOP10-ASP05	Implement procedures for TBS operations	01/01/2015	01/01/2024
AOP10-ASP06	Train controllers (Tower and Approach) on TBS operations	01/01/2015	31/12/2024
AOP10-USE01	Train flight crews on TBS operations	01/01/2015	01/01/2024

Description of finalised and deleted SLoAs is available on the eATM Portal @ https://www.eatmportal.eu/working/depl/essip_objectives

Expected Performance Benefits

Safety:	More consistent separation delivery on final approach.
Capacity:	Improved aircraft landing rates leading to increased airport throughput. Reduction of holding times and stack entry to touchdown times leading to reduced delays.
Operational Efficiency:	-
Cost Efficiency:	-
Environment:	Reduced emissions due to reduced holding times and stack entry to touchdown times.
Security:	-

Detailed SLoA Descriptions

AOP10-REG01	**Publish TBS operations procedures in national aeronautical information publications**	From: 01/01/2015	By: 01/01/2024
Action by:	**National Supervisory Authorities (NSAs)**		
Description & purpose:	Publish TBS operations procedures in national aeronautical information publications		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - TBS operations procedures are published in national aeronautical information publications.		
AOP10-ASP01	**Ensure AMAN system is compatible with TBS support tool**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	Ensure that the flight data processing and AMAN systems are compatible with the TBS support tool for the visualisation of the final approach separation or spacing, and are able to switch between time and distance based wake turbulence radar separation rules. Switching from TBS to Distance Based Separation (DBS) is necessary to cover contingency and other locally-driven requirements. The TBS support tool and associated CWP shall also calculate headwind independent time based separation to be used by the Arrival manager between arriving aircraft and display it on controller displays to support reduced, time-based separation for aircraft on final approach.		

AOP10	Time-Based Separation

Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
ATM Master Plan relationship:	[AERODROME-ATC-17]-Airport ATC tool to Support Time-Based Separation in Final Approach [APP ATC 156]-ATC System to Support Time-Based Separation in Final Approach		
Finalisation criteria:	1 - FDPS and AMAN system are compatible with the TBS support tool 2 - CWP is modified to display headwind independent time based separation 3 - TBS support tool is able to calculate headwind independent time based separation		
AOP10-ASP02	**Modify CWP to integrate TBS Support tool with safety nets**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	Modify the controller working position (CWP) to integrate the new TBS support tool with safety nets to support the air traffic controller, in order to calculate TBS distance respecting minimum radar separation using actual glide-slope wind conditions.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - CWP is modified to integrate the new TBS support tool with safety nets.		
AOP10-ASP03	**Local MET info with actual glide-slope wind conditions to be provided into TBS Support tool**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	To feed local meteorological (MET) information providing actual glide slope wind conditions to the TBS support tool.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - Local meteorological information providing actual glide slope wind conditions is fed into the TBS support tool		
AOP10-ASP04	**TBS Support tool to provide automatic monitoring and alerting of non-conformant behaviours, infringements, wrong aircraft**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	To ensure that the TBS support tool provides automatic monitoring and alerting on non-conformant final approach airspeed behaviour, automatic monitoring and alerting of separation infringement, automatic monitoring and alerting for the wrong aircraft being turned on to a separation indicator.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - TBS support tool provides automatic monitoring and alerting		

AOP10	Time-Based Separation

AOP10-ASP05	**Implement procedures for TBS operations**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	Implement procedures and practices to be used by the final approach controller for TBS operations.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - Procedures for TBS operations are implemented operationally		
AOP10-ASP06	**Train controllers (Tower and Approach) on TBS operations**	From: 01/01/2015	By: 31/12/2024
Action by:	**ANS Providers**		
Description & purpose:	Train Tower and Approach controllers on TBS operations. The final approach controller will be required to adopt procedures and practices to ensure that the variations in the distance spacing changes and time spacing changes on final approach are consistently managed.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation EUROCONTROL - SPEC-167 - EUROCONTROL Specification for Time Based Separation (TBS) support tool for Final Approach - Edition 1.0 / 02/2018 Url : https://www.eurocontrol.int/publication/eurocontrol-specification-time-based-separation-tbs-support-tool-final-approach EUROCONTROL - GUID-187 - EUROCONTROL Guidelines on Time-Based Separation (TBS) for Final Approach - Edition 1.0 / 05/2021 Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-time-based-separation-tbs-final-approach		
Finalisation criteria:	1 - Final approach controllers are trained for TBS procedures and practices.		
AOP10-USE01	**Train flight crews on TBS operations**	From: 01/01/2015	By: 01/01/2024
Action by:	**ANS Providers**		
Description & purpose:	Train flight crews on TBS operations The flight deck will be required to adopt procedures and practices to ensure that the variations in the distance spacing changes and time spacing changes on final approach are consistently managed.		
Supporting material(s):	SJU - SESAR Solution 64: Data Pack for Time Based Separation Url : https://www.sesarju.eu/sesar-solutions/time-based-separation		
Finalisation criteria:	1 - Flight crews are trained to TBS operations		