ATC02.9 — Short Term Conflict Alert (STCA) for TMAs

STCA (Short Term Conflict Alert) is a ground system designed and deployed to act as safety net against the risk of having collisions between aircraft during airborne phases of flight. STCA can be used in both en-route and TMA surveillance environments.

The difficulty of STCA development lies in the need to avoid having a high nuisance alert rate, while still making sure that real conflicts always trigger an appropriate and timely warning. Specific tuning is necessary for STCA to be effective in the TMA, in order to account for lower separation minima, as well as increased frequency of turns, climbs and descents.

It is therefore recognised that STCA may not be operationally usable in some dense TMA operations, because the nuisance alert rate generated by a linear STCA algorithm is evaluated to be too high.

The aim of this Objective twofold:
• To address the implementation of STCA functionality in TMAs
• For the TMA where, due to their complexity, the linear STCA algorithms are not fit for purpose, to address the improvement of the STCA functionality. This could be achieved by using multi-hypothesis algorithms, or other technical solutions ensuring earlier warning and lower nuisance alert rates related to steady and manoeuvring aircraft, in comparison to linear STCA algorithms.

NOTE 1: the scope of this Objective is limited to the deployment of the STCA functionality in TMAs. The (former) objective ATC02.2 which was addressing both en-route and TMA environments had its scope reduced to en-route allowing to consider it as achieved.

NOTE 2: SLoA ATC2.9-ASP02 does not have an associated FOC date and should be considered for specific local needs (refer to the description of SLoA below).

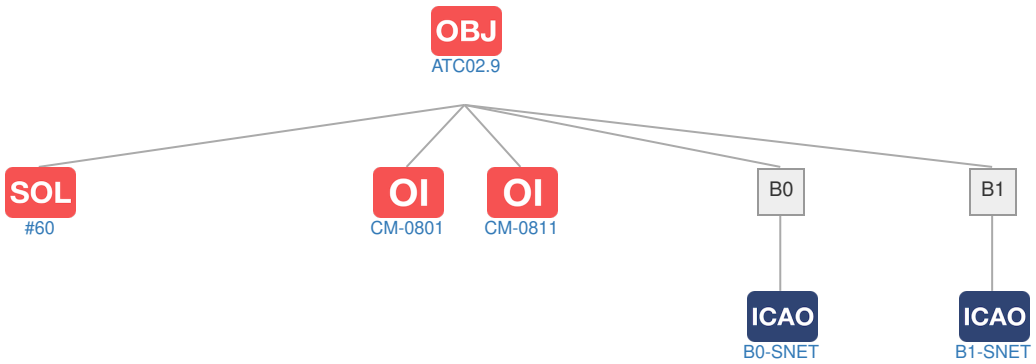
NOTE 3: : In certain more complex environments specific tuning is necessary for STCA to be effective especially in the terminal airspace in order to account for lower separation minima, as well as increased frequency of turns, climbs and descents. In these situations, the STCA may need to be improved with e.g. the use of multi-hypothesis algorithms, aiming to reduce the number of false and nuisance alerts compared to existing technologies, while maintaining the detection of genuine alerts (SLoA STCA02.9-ASP02). The improved STCA algorithms lead to more precise warnings and fewer false and nuisance alerts when compared against existing STCA technology.

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.

Edition	2022
Stakeholders	Air Navigation Service Provider
Type	SESAR
Scope	ECAC+
Status	Achieved

Context

Related Elements



Applicability Area(s) and Timescales

Applicability Area: All ECAC States except: Albania, Bosnia and Herzegovina, Cyprus, Maastricht UAC. Plus: Israel, Morocco
(Note: TMAs, according to local business needs)

Timescales	From	By	Applicable to
Initial operational capability	01-01-2018	-	Applicability Area
Full operational capability	-	31-12-2020	Applicability Area

Links to ATM Master Plan Level 2

OI Operational Improvment Steps

Code	Title	IOC	FOC	Related Elements
CM-0801	Ground Based Safety Nets (TMA, En-Route)	31-12-2006	31-12-2010	EN OBJ ICAO
CM-0811	Enhanced STCA for TMA specific operations	31-12-2017	31-12-2027	SOL EN OBJ DS ICAO

SOL Links to SESAR Solutions

Code	Title	Program	Related Elements
#60	Enhanced Short Term Conflict Alert (STCA) for Terminal Manoeuvring Areas (TMAs)	SESAR1	OI OBJ DS EOC ICAO

PCP Links to PCP ATM Sub-Functionalities

Code	Title	Related Elements
No record found		

ICAO ICAO Block Modules

Designator		Title	Related Elements
B0			
	B0-SNET	Ground based safety nets	OI OBJ
B1			
	B1-SNET	Ground-based Safety Nets on Approach	SOL OI OBJ PCP

References

Applicable legislation
None
Applicable ICAO Annexes and other references
None
Deployment Programme 2022
-
Operating Environments
Terminal Airspace

Expected Performance Benefits

Safety	Identification of conflicts between flights in TMAs. STCA based multi-hypothesis algorithm will provide an improved STCA (improved rate of genuine alert while maintaining the rate of nuisance alerts at an operationally acceptable level), thereby enhancing safety in TMAs. For TMAs with high trajectory uncertainty where operation of a single-hypothesis STCA would currently unacceptable due to its low performance, the introduction of multi-hypothesis algorithms will make it possible to implement STCA.
Capacity	-
Operational efficiency	-
Cost efficiency	-
Environment	-
Security	-

Stakeholder Lines of Action

Code	Title	From	By	Related Enablers
ASP01	Implement the STCA function in TMA	01-01-2018	31-12-2020	EN
ASP02	Improve the STCA functionality			
ASP03	Develop and implement ATC procedures related to the use of STCA in TMA	01-01-2018	31-12-2020	EN
ASP04	Align ATCO training with the use of STCA in TMA	01-01-2018	31-12-2020	EN
ASP05	Develop a local safety assessment	01-01-2018	31-12-2020	

Supporting Material

Title	Related SLoAs
EUROCONTROL - Air Navigation Systems Safety Assessment Methodology (SAM) - Version 2.1 / 11/2006 https://www.eurocontrol.int/tool/safety-assessment-methodology	ASP05
EUROCONTROL - SPEC-108 - EUROCONTROL Specification for Short Term Conflict Alert - Edition 1.0 / 11/2007 https://www.eurocontrol.int/publication/eurocontrol-specifications-short-term-conflict-alert-stca	ASP01, ASP02, ASP03, ASP04, ASP05
EUROCONTROL - Safety Nets - A guide for ensuring effectiveness - August 2017 https://www.eurocontrol.int/sites/default/files/publication/files/safety-nets-guide-august-2017.pdf	ASP01, ASP02, ASP03, ASP04, ASP05
SJU - SESAR Solution 60: Data Pack for enhanced STCA for TMA https://www.sesarju.eu/sesar-solutions/enhanced-short-term-conflict-alert-stca-terminal-manoeuvring-area-tma-specific	ASP02, ASP03, ASP04, ASP05

Consultation & Approval

Working Arrangement in charge	Safety Team (SAFT)
Outline description approved in	-
Latest objective review at expert level	03/2019
Commitment Decision Body	Provisional Council (PC)
Objective approved/endorsed in	05/2019
Latest change to objective approved/endorsed in	-