EUROCONTROL Guidelines for Short Term Conflict Alert - Part I

Concept and Requirements

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EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL Guidelines for Short Term Conflict Alert

Part I - Concept and Requirements

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Abstract

These Guidelines specify the minimum requirements and provide comprehensive guidance for the definition, implementation, optimisation and operation of Short Term Conflict Alert (STCA).

Part I, **this document**, describes the STCA concept of operations as well as the specific requirements on STCA.

Part II contains overall guidance for the complete lifecycle of STCA.

Part III specifies a generic example of an STCA implementation as well as detailed technical guidance for optimisation of STCA.

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EXECUTIVE SUMMARY

These Guidelines specify the minimum requirements and provide comprehensive guidance for the definition, implementation, optimisation and operation of Short Term Conflict Alert (STCA).

Ground-based safety nets are functionalities within the ATM system with the sole purpose of monitoring the environment of operations in order to provide timely alerts of an increased risk to flight safety.

STCA is a ground-based safety net that assists the controller in preventing collision between aircraft by generating, in a timely manner, an alert of a potential or actual infringement of separation minima.

The main objective of these Guidelines is to support ANSPs in the definition, implementation, optimisation and operation of STCA by means of:

- Part I, **this document**, describing the STCA concept of operations as well as the specific requirements on STCA
- Part II containing overall guidance for the complete lifecycle of STCA
- Part III specifying a generic example of an STCA implementation and providing detailed guidance for optimisation and testing of STCA

Together with similar Guidelines for Minimum Safe Altitude Warning (MSAW), Approach Path Monitor (APM) and Area Proximity Warning (APW) these Guidelines provide “Level 3” documentation for evolutionary improvement of ground-based safety nets, i.e.:

- “Level 1” – documented in the EUROCONTROL Operational Requirement Document for EATCHIP Phase III ATM Added Functions (Volume 2), published in 1998 with emphasis on automation
- “Level 2” – documented in EUROCONTROL Specifications and Guidance Material for STCA, MSAW, APM and APW, published in 2007-2008 providing a broader context than automation alone, e.g. pointing out the importance of policy, organisational clarity and training
- “Level 3” – documented in EUROCONTROL Guidelines for STCA, MSAW, APM and APW, published in 2017 incorporating the results of SESAR I as well as lessons learned

1. Introduction

1.1 Objective of the document

These Guidelines are aimed at all Air Navigation Service Providers (ANSPs) in the EUROCONTROL Member States (41) and Comprehensive Agreement States (2). Part I (this document) specifies the minimum requirements for the development, configuration and use of Short Term Conflict Alert (STCA). STCA is a ground-based safety net intended to assist the controller in preventing collision between aircraft by generating, in a timely manner, an alert of a potential or actual infringement of separation minima.

The European Single Sky Implementation (ESSIP) contained an Objective (ATC02.2) for standardisation of STCA in accordance with the EUROCONTROL Guidelines for STCA (this document). This document specifies, in qualitative terms, the common performance characteristics of STCA as well as the prerequisites for achieving these performance characteristics.

Note 1: ESSIP Objective ATC02.2 referred to "Level 2" STCA whist this document refers to "Level 3" STCA (see Executive Summary for explanation). However, the minimum requirements specified in this document are identical to those specified in "Level 2" documentation. The traceability between "Level 2" and "Level 3" documentation is contained in Table 1.

Note 2: Whilst the implementation of ESSIP Objective ATC02.2 has been completed, ANSPs are required to continue to operate and ensure the effectiveness of STCA in the context of an evolving operational environment. Hence, the "Level 3" documentation provides support for evolutionary improvement of STCA.

It should also be noted that Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation) contains, inter alia, the following essential requirements:

- *"Systems and operations of the EATMN shall achieve agreed high levels of safety. Agreed safety management and reporting methodologies shall be established to achieve this."*
- *"In respect of appropriate ground-based systems, or parts thereof, these high levels of safety shall be enhanced by safety nets which shall be subject to agreed common performance characteristics."*

These Guidelines facilitate harmonisation of the STCA elements of the ground based safety nets and sets up the prerequisites for the refinement, in quantitative terms, of the common performance characteristics which might be developed in a further step in response to the requirements of the SES interoperability Regulation.

This document is targeted at stakeholders identified in ESSIP ATC02.2, and the requirements are placed on ANSPs.

1.2 EUROCONTROL Guidelines

EUROCONTROL guidelines, as defined in EUROCONTROL Regulatory and Advisory Framework (ERAF), are advisory materials and contain:

"Any information or provisions for physical characteristic, configuration, material, performance, personnel or procedure, the use of which is recognised as contributing to the establishment and operation of safe and efficient systems and services related to ATM in the EUROCONTROL Member States."

Therefore, the application of EUROCONTROL guidelines document is not mandatory.

In addition, EUROCONTROL Regulatory and Advisory Framework specifies that:

"EUROCONTROL Guidelines may be used, inter alia, to support implementation and operation of ATM systems and services, and to:

- *complement EUROCONTROL Rules and Specifications;*
- *complement ICAO Recommended Practices and Procedures;*
- *complement EC legislation;*
- *indicate harmonisation targets for ATM Procedures;*
- *encourage the application of best practice;*
- *provide detailed procedural information."*

1.3 Structure of the document

Part I is structured as follows:

- Chapter 1 describes the purpose, scope and structure of the document.
- Chapter 2 describes the STCA concept of operations. It provides the contextual information for interpretation of the requirements contained in Chapter 3.
- Chapter 3 specifies the minimum qualitative requirements that are regarded as necessary for effective STCA. It does not prescribe implementation aspects. Only the *minimum* requirements that are considered essential for ensuring the effectiveness of STCA in the area of EUROCONTROL Member States (41) and Comprehensive Agreement States (2) are specified. These requirements are necessarily of a qualitative nature considering the implications of local factors that need to be considered.
- Chapter 4 lists reference documents, explains terms and contains a list of abbreviations

1.4 Use of this document

This document is intended to be read and used by all Air Navigation Service Providers (ANSPs) in the EUROCONTROL Member States (41) and Comprehensive Agreement States (2).

EUROCONTROL makes no warranty for the information contained in this document, nor does it assume any liability for its completeness or usefulness. Any decision taken on the basis of the information is at the sole responsibility of the user.

1.5 Conventions

The requirements in this chapter are normative in the sense that:

- ***"Shall"*** – requirements are mandatory to claim compliance with the Guidelines. Mandatory requirements are explicitly numbered with the prefix "STCA-"
- ***"Should"*** - indicates a recommendation or best practice, which may or may not be applied
- ***"May"*** indicates an optional element
- ***"Will"*** denotes a statement of intent

Use of the word "shall" is avoided in Chapter 2 of Part I as well as in Part II and Part III of these Guidelines in order to emphasise the introductory and explanatory rather than normative nature of the information provided.

Some of the terms in section 4.2 and the requirements on procedures in section 3.2 are derived from paragraph 15.7.2 of ICAO Doc 4444. Any differences in formulation are intended to remove ambiguity and not to imply deviation from ICAO provisions.

2. STCA concept of operations

2.1 Purpose of STCA

As illustrated in Figure 1, today's ATS system is human centred; based on processing of a continuous stream of information, the controller issues clearances and instructions to prevent or resolve conflicts.

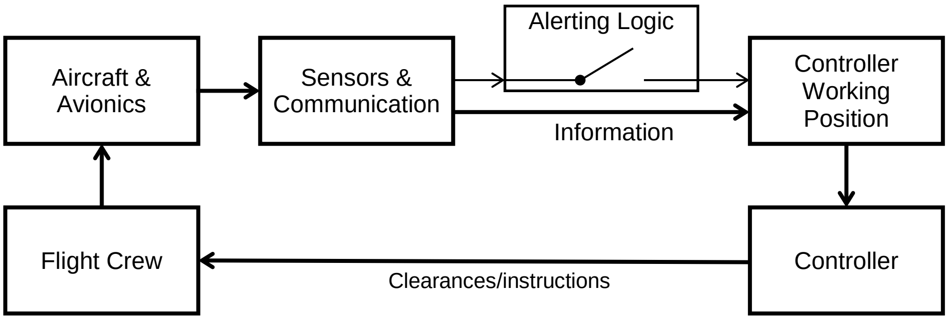

Figure 1: Simplified ATC control loop

However, the drive for consistency in cognitive information processing tasks leads to selective perception/exposure, selective attention and selective interpretation. As a result, conflicts and deviations from clearances or instructions leading to aircraft proximity can remain unnoticed.

STCA adds independent alerting logic to the control loop by generating indications of existing or pending situations, related to the proximity of aircraft as well as their relative positions and speed, which require attention/action.

STCA is intended to function in the short term, if applicable providing warning times of up to 2 minutes.

2.2 Prerequisites for effective STCA

2.2.1 Mature safety management system

STCA is in widespread use during several decades. Effective implementation and operation of STCA requires a number of attributes that are inherent to organisations that have adopted a mature Safety Management System. These attributes include:

- Management commitment, demonstrated by a formal policy for the use of STCA and making available sufficient resources for a total life cycle approach
- Team effort, involving operational experts, technical experts, safety experts and air traffic controllers in ANSPs, working together with Industry and Regulators
- Sustained effort to optimise and improve STCA, exploiting new technological developments and adapting for an increasingly complex operational environment

2.2.2 Adequate surveillance infrastructure

Conventional Mode 3A/C SSR infrastructure may still be sufficient for effective STCA in less complex operational environments.

Mode S SSR infrastructure is an essential enabler for effective STCA in more complex operational environments.

Complementary Multi-lateration infrastructure could be needed to obtain effective STCA at lower altitudes with demanding terrain.

2.2.3 Sufficient transponder equipage

STCA can only generate alerts for aircraft that are equipped with pressure altitude-reporting transponders. STCA will be more effective for altitude-reporting in 25 ft increments rather than 100 ft increments, provided that the surveillance infrastructure can exploit the benefits of such reporting.

2.3 Operational context

When STCA was first introduced, ATS surveillance services were in most cases provided using mixed (raw radar data supplemented with computer-generated synthetic data) situation displays. In the meantime, the norm for provision of ATS surveillance services has become full-synthetic situation displays. Decision support tools are gradually being introduced to enable the controller to handle more traffic in order to cope with the ever increasing demand. At the same time, automated support systems have become more robust and trustworthy but also more complex and interdependent. These changes imply a different operational context for STCA.

Note: Ground-based safety nets and decision support tools are different. Ground-based safety nets are exclusively intended to increase safety and they do not change the way of working of the controller. Decision support tools are intended to increase the overall performance of the system (often by providing a combination of capacity, efficiency and safety benefits), and may change the way of working of the controller.

It is essential that individual ANSPs establish a clear STCA policy for their particular operational context to avoid ambiguity about the role and use of STCA using the following generic policy statements as a starting point:

STCA IS A GROUND-BASED SAFETY NET; ITS SOLE PURPOSE IS TO ENHANCE SAFETY AND ITS PRESENCE IS IGNORED WHEN CALCULATING SECTOR CAPACITY.

STCA IS DESIGNED, CONFIGURED AND USED TO MAKE A SIGNIFICANT POSITIVE CONTRIBUTION TO THE EFFECTIVENESS OF SEPARATION PROVISION AND COLLISION AVOIDANCE.

STCA is only effective if the number of nuisance alerts remains below an acceptable threshold according to local requirements and if it provides sufficient warning time to resolve hazardous situations, governed by the inherent characteristics of the human centred system.

Figure 2 illustrates the nominal sequence of events to resolve a particular situation as two loosely coupled loops. Being a human centred system, the Ground loop reflects the states of the controller and the Air loop reflects the states of the flight crew. For each state transition to occur certain preconditions have to be met and actions performed, complicated by many fixed or variable delays and anomalous cases.

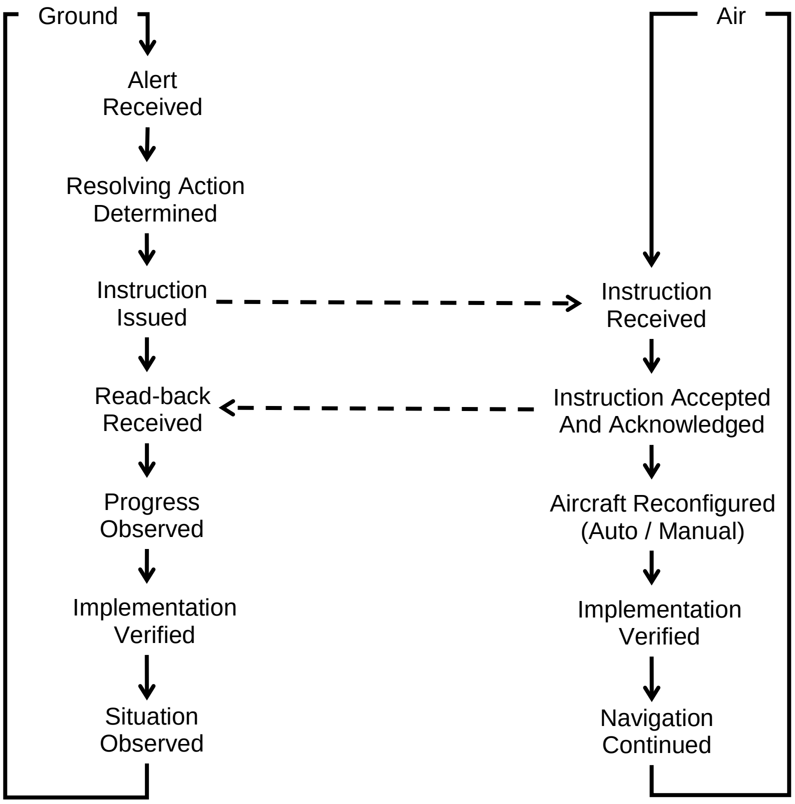

Figure 2: Expanded ATC control loop (triggered by STCA)

2.4 Operational concept

2.4.1 Human performance considerations

In order to be able to process all available information, the controller must acquire situational awareness and build a mental model of the airspace and traffic pattern. To control the situation and make decisions, the controller has to establish strategies and tactics to handle the traffic flows and conflicts.

Furthermore, there is a natural tendency for the human being to search for information that supports already taken decisions and avoid information that would be critical of it (accept as true information that conforms to pre-existing knowledge; reject as false or irrelevant information that does not conform).

The use of STCA will depend on the controller’s trust. Trust is a result of many factors such as reliability and transparency. Neither mistrust nor complacency is desirable; training and experience is needed to develop trust at the appropriate level (see [EURO-HRS]).

For STCA to be effective, the controller must have a positive attitude towards STCA. This requires that the following aspects are addressed:

- **Appropriateness and timeliness**

  The rule set for generating alerts should be appropriate; dissonance with normal control practices (and/or decision support tools with a longer look-ahead time) should be avoided.

- **Effectiveness**

  The controller in charge may not notice or recognise the reason for an alert for the same reasons that left the potentially hazardous situation undetected. This should be addressed in HMI design.

- **Comprehensibility and performance monitoring**

  The increasing complexity of STCA and the environment in which it is used should be addressed through appropriate training and competency assessment. Practices and controller perception of the effectiveness of STCA should be evaluated periodically and following changes to STCA. Lessons from particular situations or incidents in which STCA was involved should be shared through appropriate mechanisms.

2.4.2 Design considerations

STCA should perform in concert with the airspace design and classification, variety of airspace users, Flexible Use of Airspace (FUA) and the applicable procedures for air navigation services.

Special consideration should be given to making all ground-based safety nets and controller tools perform in concert.

Depending on the diversity of these aspects, STCA should be capable of using different parameters for generation of alerts in different volumes of airspace at different moments in time. A large number of volumes of airspace may need to be defined so that parameters can be tuned according to the use of individual volumes of airspace, including which flights are eligible for the generation of alerts. Different parameters may be applied in the case of system degradation (e.g. unavailability of one or more radar stations).

Local instructions concerning the use of STCA should be established to ensure that STCA is used in a safe and effective manner. Pertinent data should be regularly analysed in order to monitor and optimise the performance of STCA.

2.4.3 Technical aspects

STCA is suitable for use in any airspace covered by adequate surveillance.

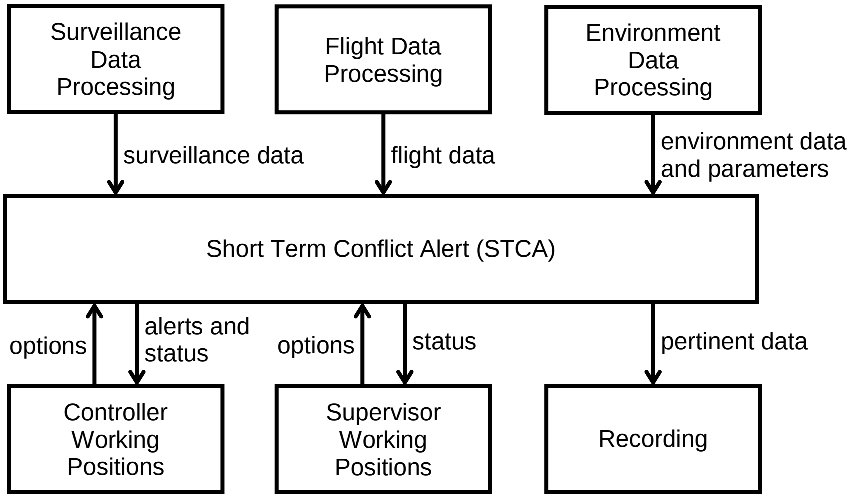
Surveillance Data Processing
Flight Data Processing
Environment Data Processing
surveillance data
flight data
environment data and parameters
Short Term Conflict Alert (STCA)
options
alerts and status
options
status
pertinent data
Controller Working Positions
Supervisor Working Positions
Recording

Figure 3: STCA context diagram

As illustrated in Figure 3, STCA should obtain information from Surveillance Data Processing, from Environment Data Processing and possibly from Flight Data Processing in order to generate alerts:

- Surveillance data

  - State vector and tracked pressure altitude information: to predict or detect hazardous situations
  - Selected Vertical Intent: to increase relevance of conflict prediction

    Note: Although Selected Vertical Intent downlinked from the aircraft will sometimes be QNH corrected it is commonly referred to as the Selected Flight Level (SFL), which is the term used in these Guidelines.

- Flight data should be used as follows:
  - Type/category of flight/flight rules: to determine the eligibility for alert generation and possibly also the parameters applied
  - RVSM status: to apply appropriate parameters in RVSM airspace
  - Concerned sector(s): to address alerts
  - Cleared/Block Flight Levels: to increase the relevance of alert generation
  - Number of aircraft: to apply appropriate parameters for formation flights
  - Manually entered Flight Levels: to compensate for missing pressure altitude information
- Environment data and parameters should include:
  - Airspace volumes
  - Alerting parameters

Alerts should be generated at least at a Controller Working Position of the control sector(s) working the aircraft. Status information regarding the technical availability of STCA is to be provided to all Working Positions. Selectable options of STCA related to eligibility, configuration and technical availability may be available at Controller and Supervisor Working Positions.

All pertinent STCA data should be recorded for offline analysis.

2.5 Safety aspects

It is assumed that EUROCONTROL Safety Regulatory Requirements are effectively implemented. It is recommended to put emphasis on [SRC-ESARR4] and its guidance material for the implementation of, and changes to, STCA applications.

2.6 Future directions and need for change

STCA will have to meet future demands imposed by, amongst other things, further traffic increase, changing traffic patterns, changing aircraft characteristics, further automation in the air and on the ground and, potentially, the introduction of new concepts.

STCA needs to be adapted to new separation modes (e.g. self-separation), in particular if lower separation minima are considered.

The compatibility of STCA and other ground-based and airborne safety nets, in particular ACAS, needs to be maximised.

This could, amongst others, lead to changes in the following aspects of STCA:

- Correlation of ATC constraints with aircraft intent in order to further reduce the number of nuisance alerts
- Increased look ahead time and multi-level or different types of alerts

- Correlation of alerts from multiple sources (on the ground and in the air) to generate combined alerts

3. Specific requirements

3.1 Policy, organisational clarity and training requirements

3.1.1 Policy

STCA-01 The ANSP ***shall*** have a formal policy on the use of STCA consistent with the operational concept and safety management system applied to avoid ambiguity about the role and purpose of STCA.

The policy ***should*** be consistent with the generic policy statements in section 2.3 of these Guidelines but ***may*** contain more detail or additional aspects called for by local factors.

The policy ***should*** be communicated to all relevant staff in order to ensure consistency of all design, configuration, operational use and monitoring activities in compliance with the intended use of STCA.

3.1.2 Responsibility for management of STCA

STCA-02 The ANSP ***shall*** assign to one or more staff, as appropriate, the responsibility for overall management of STCA.

It ***should*** be possible for other staff in the organisation to identify the assigned staff. The assigned staff ***should*** seek advice from the STCA manufacturer, as appropriate.

3.1.3 Training and competence

STCA-03 The ANSP ***shall*** ensure that all controllers concerned are given specific STCA training and are assessed as competent for the use of the relevant STCA system.

Note: The primary goal of the training is to develop and maintain an appropriate level of trust in STCA, i.e. to make controllers aware of the likely situations where STCA will be effective and, more importantly, situations in which STCA will not be so effective (e.g. sudden, unexpected manoeuvres).

3.2 Requirements on procedures

3.2.1 Local instructions

STCA-04 Local instructions concerning use of STCA ***shall*** specify, *inter alia*:

a) The types of flight (GAT/OAT, IFR/VFR, RVSM/NON-RVSM, etc.) which are eligible for generation of alerts

b) The volumes of airspace within which STCA is implemented

c) the method of displaying the STCA to the controller

d) In general terms, the parameters for generation of alerts as well as alert warning time

e) The volumes of airspace within which STCA can be selectively inhibited and the conditions under which this will be permitted

f) Conditions under which specific alerts may be inhibited for individual flights

g) Procedures applicable in respect of volumes of airspace or flights for which STCA or specific alerts have been inhibited

3.2.2 Controller actions

STCA-05 In the event an alert is generated in respect of a controlled flight, the controller ***shall*** without delay assess the situation and if necessary take action to ensure that the applicable separation minimum will not be infringed or will be restored.

Note: STCA does not exist in isolation; when a pilot reports a manoeuvre induced by an ACAS resolution advisory (RA), the controller is required not to attempt to modify the aircraft flight path (this is a "shall" provision in ICAO Doc 4444).

3.2.3 STCA performance analyses

STCA-06 STCA performance ***shall*** be analysed regularly to identify possible shortcomings related to STCA.

3.2.4 Statistical Analyses

The appropriate ATS authority ***should*** retain electronic records of all alerts generated. The data and circumstances pertaining to each alert ***should*** be analysed to determine whether an alert was justified or not. Non-justified alerts ***should*** be used to further optimise STCA in order to minimise the number of nuisance alerts. A statistical analysis ***should*** be made of justified alerts in order to identify possible shortcomings in airspace design and ATC procedures as well as to monitor overall safety levels.

3.3 Requirements on STCA capabilities

3.3.1 Alerting performance

STCA-07 STCA ***shall*** detect and alert operationally relevant conflicts involving at least one eligible aircraft.

STCA-08 STCA ***shall*** provide alerts for operationally relevant conflicts.

Note 1: Conflicts are operationally relevant when covered by the adopted rule set and optimisation strategy. The rule set and optimisation strategy should be determined taking into account the relevant local factors.

Note 2: Optimisation aims to maximise the number of operationally relevant situations which are alerted with adequate warning time and minimise the number of nuisance alerts. As a balance must be struck, STCA should not be expected to alert all operationally relevant situations with adequate warning time.

STCA-09 STCA alerts ***shall*** attract the controller’s attention and identify the aircraft involved in the conflict; STCA alerts ***shall*** be at least visual.

An audible element ***may*** be included to improve the system’s ability to draw the controller’s attention to the alert. If a continuous audible element is included, an acknowledgement mechanism ***may*** be provided to silence an alert.

STCA-10 The number of nuisance alerts produced by STCA ***shall*** be kept to an effective minimum.

Note: Human factors and local circumstances determine what constitutes an effective minimum.

STCA-11 The number of false alerts produced by STCA ***shall*** be kept to an effective minimum.

Note: Local circumstances determine what constitutes an effective minimum.

3.3.2 Warning time

STCA-12 When the geometry of the situation permits, the warning time ***shall*** be sufficient for all necessary steps to be taken from the controller recognising the alert to the concerned aircraft successfully executing an appropriate manoeuvre.

Note: Warning time may be insufficient in cases of sudden, unexpected manoeuvres.

STCA-13 STCA ***shall*** continue to provide alert(s) as long as the alert conditions exist.

3.3.3 Alert inhibition

STCA-14 STCA ***shall*** provide the possibility to inhibit alerts for predefined volumes of airspace and for individual flights.

Note: It may be necessary to inhibit alerts for predefined volumes of airspace (e.g. exercise areas) to suppress unnecessary alerts. It may be necessary to inhibit alerts for individual flights (e.g. formation flights) to suppress unnecessary alerts.

STCA-15 Alert inhibitions ***shall*** be made known to all controllers concerned.

3.3.4 Status information

STCA-16 Status information ***shall*** be presented to supervisor and controller working positions in case STCA is not available.

3.3.5 Adaptability

STCA ***should*** be adaptable for the procedures in use in all distinct volumes of airspace at any moment in time.

STCA ***may*** need to take into account the type of flight as well as the specific volume of airspace in which each aircraft is flying, in order to apply appropriate parameters or trajectory estimation. Different parameters ***may*** be applied in the case of system degradation (e.g. unavailability of one or more radar stations).

In RVSM airspace, STCA ***should*** be able to selectively assess the applicable vertical separation minimum of either 300 m (1 000 ft) or 600 m (2 000 ft), as determined by the current RVSM approved or non-approved (incl. unknown and exempt) status of the flight concerned.

3.3.6 Data recording

STCA-17 All pertinent STCA data shall be made available for off-line analysis.

Note: Off-line analysis may need access to other data sources as well (surveillance data and voice recordings) for complete analysis.

4. References, Definitions and Abbreviations

4.1 Reference documents

[EURO-HRS]	Guidelines for Trust in Future ATM Systems: Principles, HRS/HSP-005-GUI-03, Edition 1.0, May 2003
[SRC-ESARR4]	ESARR 4: Risk Assessment and Mitigation in ATM, Edition 1.0, 05-04-2001

4.2 Definitions

alert	Indication of an actual or potential hazardous situation that requires particular attention or action.
approach path monitor	A ground-based safety net intended to warn the controller about increased risk of controlled flight into terrain accidents by generating, in a timely manner, an alert of an unsafe aircraft flight path during final approach.
area proximity warning	A ground-based safety net intended to warn the controller about unauthorised penetration of an airspace volume by generating, in a timely manner, an alert of a potential or actual infringement of the required spacing to that airspace volume.
ATS surveillance service	Term used to indicate a service provided directly by means of an ATS surveillance system.
conflict	Converging of aircraft in space and time which constitutes a predicted violation of a given set of separation minima.
false alert	Alert which does not correspond to a situation requiring particular attention or action (e.g. caused by split tracks and radar reflections).
ground-based safety net	A ground-based safety net is functionality within the ATM system that is assigned by the ANSP with the sole purpose of monitoring the environment of operations in order to provide timely alerts of an increased risk to flight safety which may include resolution advice.
human performance	Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.
nuisance alert	Alert which is correctly generated according to the rule set but is considered operationally inappropriate.
minimum safe altitude warning	A ground-based safety net intended to warn the controller about increased risk of controlled flight into terrain accidents by generating, in a timely manner, an alert of aircraft proximity to terrain or obstacles.
separation	Spacing between aircraft, levels or tracks.
short term conflict alert	A ground-based safety net intended to assist the controller in preventing collision between aircraft by generating, in a timely manner, an alert of a potential or actual infringement of separation minima.

warning time	The amount of time between the first indication of an alert to the controller and the predicted hazardous situation. Note 1: The achieved warning time depends on the geometry of the situation. Note 2: The maximum warning time may be constrained in order to keep the number of nuisance alerts below an acceptable threshold.

4.3 Abbreviations and acronyms

ACAS	Airborne Collision Avoidance System
ADS	Automatic Dependent Surveillance
AGDL	Air-Ground Data Link
ANSP	Air Navigation Service Provider
APM	Approach Path Monitor
APW	Area Proximity Warning
ASM	Airspace Management
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATM	Air Traffic Management
ATS	Air Traffic Service
EATCHIP	European ATC Harmonisation and Integration Programme
EATMN	European Air Traffic Management Network
EC	European Commission
ESARR	EUROCONTROL Safety Regulatory Requirement
ESSIP	European Single Sky Implementation
FUA	Flexible Use of Airspace
GAT	General Air Traffic
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
MSAW	Minimum Safe Altitude Warning
OAT	Operational Air Traffic
RVSM	Reduced Vertical Separation Minima
SES	Single European Sky
SESAR	Single European Sky ATM Research
SFL	Selected Flight Level
SRC	Safety Regulation Commission
STCA	Short Time Conflict Alert
VFR	Visual Flight Rules

ANNEX A

Table 1: Traceability between “Level 2” and “Level 3” documentation for STCA

“Level 2” documentation	**“Level 3” documentation**
EUROCONTROL Specification for STCA, i.e. the STCA concept of operation as well as the specific requirements on STCA	EUROCONTROL Guidelines for STCA Part I: Concept and Requirements, i.e. as “Level 2” with the following evolutions: • New section 2.2 identifying the prerequisites for effective STCA. • Note added explaining the difference between ground-based safety nets and decision support tools (section 2.3). • Guidance for use of SFL added (section 2.4.3).
EUROCONTROL Guidance Material for STCA, i.e. a general description of the full STCA lifecycle, aimed at staff with responsibility for overall management of STCA	EUROCONTROL Guidelines for STCA Part II: Lifecycle Description, i.e. as “Level 2” with the same evolutions as in Part I.
Appendix A: Reference STCA System, i.e. a detailed technical explanation of typical implementation details of STCA with emphasis on parameterisation and performance optimisation; optimisation concepts are also covered in detail.	EUROCONTROL Guidelines for STCA Part III: Implementation and Optimisation Examples, i.e. as “Level 2” with the same evolutions as in Part I.
Appendix B: Safety Assurance, i.e. a set of three documents that can be used as starting point for STCA safety assurance work in a particular local context.	As “Level 3” STCA is an evolution of “Level 2” STCA, the “Level 2” safety assurance work should be reusable. If required, the “Level 2” guidance remains a valid starting point for safety assurance work and consequently no “Level 3” equivalent has been developed.
Appendix B-1: Initial Safety Argument for STCA System, i.e. ANSPs may find it convenient to present the safety argument as a stand-alone document initially, as is the case with this document. However, the argument will ultimately become part of the safety case document and the stand-alone version will then become defunct.	
Appendix B-2: Generic Safety Plan for STCA Implementation, i.e. a description of what safety assurance activities should be considered at each lifecycle phase, who should do them, and what the criteria for success are.	

Appendix B-3: Outline Safety Case for STCA System, i.e. addressing in detail the assurance and evidence from the System Definition stage and outlining the likely assurance and evidence for the later stages.	
Appendix C: Cost Framework for the Standardisation of STCA, i.e. assistance in identifying potential financial implications of standardisation of STCA in compliance with the EUROCONTROL Specification for STCA.	As “Level 3” STCA is an evolution of “Level 2” STCA, the “Level 2” financial planning work should be reusable. If required, the “Level 2” guidance remains a valid starting point for financial planning work and consequently no “Level 3” equivalent has been developed.
Appendix D: Case Study, i.e. a description of the (partial) application of the guidance material in a demanding environment.	As “Level 3” STCA is an evolution of “Level 2” STCA, no “Level 3” equivalent has been developed.
Appendix D-1: Optimisation of STCA for ATCC Semmerzake, i.e. identification of potential solutions for handling military formation flights and a large number of primary tracks in STCA whilst keeping the number of nuisance alerts to an effective minimum.	
Appendix D-2: Functional Hazard Assessment of STCA for ATCC Semmerzake, i.e. a description of the Functional Hazard Assessment of the identified potential solutions for optimisation of STCA, performed as initial step of safety assurance activities.	

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