

Application descriptions (DO-317 & RFG)

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Summary

DO-317 was developed on the basis of the five applications defined in DO-289 (i.e. EVAcq, EVApp, ASSA, FAROA and CD).

The RFG has defined three applications (ATSA-AIRB, ATSA-SURF and ATSA-VSA) equivalent to some DO-289 applications (EVAcq, ASSA, FAROA, EVApp) and a new one (ATSA-ITP).

For DO-317A, the names and acronyms of the applications resulting from the **merge** of these two sets of applications were agreed during the Amsterdam meeting. Besides, it was agreed that CD will be removed from the scope of DO-317A.

This paper provides proposed modifications to the sections of DO-317A describing the applications addressed by the document.

1- Introduction

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2- Text modifications

1.3 Operational Application(s)

1.3.1 ~~Included~~ Applications

The standards defined in this version of the ASAS MOPS have been scoped to support the ~~five~~four applications. ~~Three of them result from the merge of~~ equivalent applications defined in DO-289 and by the RFG, and the fourth one has been defined by the RFG. They, ~~which~~ are as follows:

- ~~Enhanced Visual Acquisition (EVAcq)~~ Basic Airborne application (AIRB).
- ~~Conflict Detection (CD)~~.
- ~~Airport Surface Situational Awareness (ASSA)~~ Basic Surface application (SURF).
- ~~Final Approach and Runway Occupancy Awareness (FAROA)~~.
- ~~Enhanced Visual Approach (EVApp)~~ Visual Separation on Approach (VSA).
- In Trail Procedure (ITP).

~~EVAcq~~AIRB defines the basic use of ASAS for enhanced traffic situational awareness, and support for this application is the minimum requirement for all ASAS implementations. The remaining ~~four~~three applications (~~CD~~, ~~ASSA~~, ~~FAROA~~ and ~~EVApp~~ SURF, VSA and ITP) are optional.

A description of each of the supported applications follows:

~~Enhanced Visual Acquisition~~: CDTI provides traffic information to assist the flight crew in visually acquiring traffic out the window. ~~The CDTI can be used to initially acquire traffic (that the pilot might not have known about otherwise) or as a supplement to an Air Traffic Control (ATC) traffic advisory. This application is expected to improve both safety and efficiency by providing the flight crew enhanced traffic awareness.~~

Note: ~~While there is no defined application for general traffic situational awareness beyond the visual range, CDTI will display traffic to enable such awareness using the requirements for the EVAcq application.~~

Basic Airborne application: This application enhances the flight crew's traffic situational awareness through the provision of an on-board graphical display of surrounding traffic that transmits ADS-B data of a sufficient quality. It is expected that this enhanced traffic situational awareness will improve the safety

Comment [JD1]: These are not "Initial" applications anymore.

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Comment [JD2]: Where is this "merge" documented? The documentation of this is very important, particularly for the ONE application that MUST be included in any/all ASA systems (EVAcq/AIRB). If there is a "replacement" then we should not say "merge." However, replacing EVAcq with AIRB is not so simple. The applications are different. The primary difference is the operational domain(s) of the traffic and ownship. AIRB only considers airborne traffic AND Airborne ownship. EVAcq considers all flight operations (gate to gate) and includes taxi/takeoff/after landing ownship AND traffic, in addition to the AIRB operational domain. This permits a limited form of enhanced traffic situation awareness in the airport traffic area when an AMMD is not available for ASSA/FAROA (SURF) to run, or if those applications are not installed.

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Comment [JD3]: The documents should be listed, not the workgroup. The RFG is a WG of SC186. The sentence might be better if changed to "Three of them...applications defined by SC186 in DO289 and the joint SC186/WG51 RFG in DO3xx, 3xx, and 3xx. A fourth application developed by the RFG is also included."

Comment [JD4]: no mention of airborne ownship or airborne traffic. Is this AIRB (airborne ownship and traffic domain) or EVAcq (airborne or surface traffic and airborne or surface ownship) when without SURF application? Would "Basic Traffic" application make more sense? The application name should describe the application, not the domain of either ownship or traffic (or both). If the domain of the application is what is desired, then it should be accurate. The name here is accurate for the RFG's AIRB application, but it isn't accurate for a "merge" of AIRB and EVAcq.

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Comment [JD5]: relevance at deleted sentence (below) at this high level?

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and **efficiency of** flight operations. This application results from the **merge of the** EVAcq (DO-289) and ATSA-AIRB (DO-319/ED-164) applications.

Comment [JD6]: does **merge** mean the application domains as well as the requirements? From a pilots POV, the domain of the application is very important. Airborne has specific meaning (from "off to on!" [same issue as above])

Conflict Detection (CD): The CDTI is used to alert the flight crew of situations in which a loss of separation (LOS) or collision is predicted. The conflict and collision alerts may prompt the flight crew to exercise see and avoid procedures or to contact ATC. Conflict avoidance **maneuvers** are not provided by this application. This application is expected to improve safety by advising the flight crew of non TCAS equipped aircraft about potential conflicting traffic and by providing information that can augment current flight crew tasks of see and avoid per 14 CFR 91.113(b). The requirements included in this document for CD are based on the Conflict Detection application as described in DO-289. Additional development and field experience is necessary to validate and verify this application, and may result in different and additional requirements. If an applicant chooses to implement CD, the requirements in this document may be referenced; however the CD requirements in this MOPS version are not intended to be referenced by regulatory guidance.

Airport Surface Situational Awareness (ASSA), and Final Approach and Runway Occupancy Awareness (FAROA): In these applications, the CDTI is used to support the flight crew in making decisions about taxiing, takeoff and landing. These applications are expected to increase efficiency of operations on the airport surface and reduce the possibility of runway incursions and collisions.

Basic Surface application: This application enhances the flight crew's traffic **and positional** situational awareness during taxi, take-off, **final approach**, and landing operations. It is expected to reduce the **risk of** errors, runway and taxiway incursions, and collisions while **operating an aircraft on the airport surface**. This application results from the **merge** of the ASSA/FAROA (DO-289) and ATSA-SURF (DO-3XX/ED-165) applications.

Comment [JD7]: positional SA is also enhanced though availability of AMMD, which is part of the application.

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Enhanced Visual Approach (EVApp): The CDTI is used to assist the flight crew in acquiring and maintaining visual contact during visual approaches. The CDTI is also used in conjunction with visual, out the window contact to follow the lead aircraft during the approach (i.e., during conduct of the visual separation task). The application is expected to improve both the safety and the performance of visual approaches. It could allow for the continuation of visual approaches when they otherwise would have to be suspended due to the difficulty of visually acquiring and tracking the other aircraft.

Comment [JD8]: Isn't final approach a case wherein the flight crew and the application are operating while airborne? This conflicts with the first sentence. Again, from a pilots's viewpoint, the domain of ownership and the domain of traffic is very important. The AIWP name "Airport Traffic SA" was coined to explicitly resolve the application domain for the operator (pilot), as well as accurately describe what the application provides to the flight crew/pilot.

Visual Separation on Approach (VSA): This application enhances the flight crew's traffic situational awareness during **a sequential visual** approach to assist in **visual acquisition** and **the maintenance of** visual contact **with** the preceding aircraft. The information provided by the CDTI supplements out-the-window **visual traffic cues** and ATC information. The objective is to safely perform approach procedures using visual separation from the preceding aircraft more efficiently and possibly more regularly to enhance runway **efficiency and** capacity. This application results from the **merge** of the EVApp (DO-289) and ATSA-VSA (DO-314/ED-160) applications.

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In Trail Procedure (ITP): This application enables aircraft to perform a climb-through or descend-through maneuver past one or two Reference Aircraft in procedural airspace in compliance with a "longitudinal separation minima based on

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distance using ADS-B In-Trail Procedure” of 10 NM. The objective is to achieve these requested altitude changes in procedural airspace on a more frequent basis to improve flight efficiency. This application is defined in DO-312/ED-159.

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1.3.2 Future Applications

DO 289 included probing analyses for three future applications. Future applications may demand significantly more application specific processing, and provide spacing, separation and self-separation functionality in all weather conditions. Other applications are currently being developed for inclusion in future versions of DO-289, as well. As such, the ASAS designer may wish to consider providing system expansion capability to support additional future applications. It is also likely possible the some future applications will replace the some initial applications (e.g. by providing all-weather support). This MOPS includes some guidance for supporting future applications.

Comment [JD9]: I am not sure that this statement is justified now that ITP is in this set. Also, “Initial” doesn’t seem to apply as this is “rev A.”

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Future applications will likely make greater use of target coupling to specify spacing or separation tasks with specific traffic. They may also remove certain traffic from other application processing. For example, traffic may be chosen to be coupled for a parallel approach application which monitors for flight path conformance, and the processing of that application would subsume monitoring of that traffic by a more general conflict detection application. Several target aircraft may be coupled concurrently for these applications.

Comment [EV10]: What guidance is included in DO-317? Is there anything more than this section and the note in 2.3.1?

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Controls and displays may also be affected by the addition of future applications, as applications may be used for only specific tasks in certain airspaces. It is likely that future applications will not rely solely on using the traffic display, but on alerts and guidance, as well.

ASA Capability Level (ACL) has not been addressed within this document. The ACL concept was included in DO-289 due to concerns about the number of possible combinations of applications, and human factors issues relating to the use of these applications. These issues do not apply to the four included applications, as there is no need for ground systems, or other users, to know the capabilities of an individual aircraft. Use of ACL may be required for future applications.

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Transmit Quality Level (TQL) has not been addressed within this document. The TQL concept was included in DO-289 to address transmit quality factors that have not been included in DO 242 and DO 242A compliant link MOPS. The additional quality information is not needed to support the applications addressed in this version of the ASAS MOPS.

Comment [JD11]: This paragraph is needed for MASPS compatibility. That is, it explains why the MOPS is not following the MASPS.

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Comment [JD12]: Same reason to keep this as ACL paragraph. It is in DO289. Agreed, that the new MASPS may take on this concept and delete it, but this ASA MOPS needs to be compliant with whatever is in the current ASA MASPS.

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2.3.1 General CDTI Requirements

The CDTI is defined as a graphical plan-view (top down) traffic display. The CDTI is required (in Section 2.3.4.1) to indicate ownship position and (in Section 2.3.1.2) to show the positions, relative to the ownship, of traffic.

The ~~basic (minimal) application~~ of the CDTI is enhanced traffic situational awareness. At a minimum, enhanced traffic situational awareness is provided by the ~~EVAeq Basic Airbone application (AIRB) within the visual range described for that application. The same requirements apply for enhanced traffic situational awareness beyond the EVAeq visual range.~~ CDTI shall (3000) support the ~~EVAeq AIRB~~ requirements.

Comment [JD13]: perhaps “The basic function of the CDTI is to enhance flight crew’s traffic SA.” There should be a difference between a basic function of a display and the basic application driving it.

Additionally, the CDTI supports these applications, if installed:

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1. ~~Airport Surface Situational Awareness/Final Approach and Runway Occupancy Awareness (ASSA/FAROA) Basic Surface application (SURF).~~
2. ~~Conflict Detection (CD) Visual Separation on Approach (VSA).~~
3. ~~Enhanced Visual Approach (EVApp) In Trail Procedure (ITP).~~

The minimum CDTI requirements specified in this version of the MOPS are based on these four operational applications that are described in ~~DO-289~~ DO-319/ED-164 (AIRB), DO-3xx/ED-165 (SURF), DO-314/ED-160 (VSA) and DO-312/ED-159 (ITP). For each application that is implemented, all of the application's requirements must be met.

Comment [JD14]: This goes back to the “what does “merge” mean?” problem. Does it mean “replace” or “combine?”

Note: Even though the requirements are based on the above applications, they may also support future applications. Designers are expected to carefully consider the use and expandability of the equipment for additional applications and make sufficient provisions for future changes and expansion. Applications in addition to the ones listed above may be implemented, but these MOPS do not provide requirements for them. They may be added in a future version.

CDTI may also support integration with TCAS. Requirements for TCAS support are only applicable in such installations.