

RTCA SC-186 Working Group 6

ATTSA MASPS Development

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**Proposed Rewrite of Section 2.2.1.1.6
to remove the Non-Concur Comments**

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2.2.1.1.6 Delegated Separation

Delegated separation applications support operational concepts in which separation assurance responsibility is transferred from air traffic controllers to flight crews for specific tasks. The delegation of responsibility may not be for all dimensions. For example, ATC may only delegate responsibility for cross-track separation from a particular aircraft to the flight crew while the controller retains responsibility for separation of the performing aircraft from all other traffic even if the controller finds it necessary to cancel the delegated separation clearance in order to satisfy all separation requirements. Per Table 2-1, participating aircraft will be specially equipped with high accuracy and high integrity navigation capabilities and high reliability ADS-B capability for these increased criticality flight operations. The delegated separation assurance function includes separation monitoring and provision of guidance for performance of the delegated task including assuring the related separation minima are respected. Research is in progress supporting full development of operational concepts and requirements for delegated separation.

See Table 2-2 for the information exchange needs and Table 2-4 for operational performance requirements to support aircraft needs while performing delegated separation operations. Note that, to support delegated separation, aircraft must be able to acquire both state vector and intent information for a designated target aircraft at the required operational range.

Environment

An aircraft performing a delegated separation task will have a traffic display for traffic situational awareness and for performance of the task; other guidance information will be provided as part of the cockpit display of traffic information function. Avionics in delegated separation aircraft provide

separation assurance only from target(s) included in the delegation clearance. The pilot has available aircraft position, velocity vector information, and intended flight path information concerning the designated target(s). Standards will be developed defining limitations on maneuvers that will allow accomplishment of the delegated tasks; such standardization will provide controllers with situational awareness allowing them to provide separation assurance from all other traffic. There is a minimal level of interaction between potentially conflicting aircraft. Each aircraft in delegated separation applications airspace broadcasts the ADS-B state vector; higher capability aircraft equipped with flight management systems may also provide intended flight path information. Once the performing aircraft has been cleared for delegated separation, the controller will monitor the encounter but is not required to intervene.

Delegated separation operations will be defined for use in all operational domains including high density terminal airspace containing both airborne and airport surface traffic.

2.2.1.1.6.1 Aircraft Needs for Delegated Separation Assurance and Sequencing [FIM-DS, FIM-DSWRM] [j1]

In the case of Flight Deck Interval Management Delegated Separation (FIM-DS and FIM-DSWRM) operations, flight crew responsibility is limited to assurance of separation from one or two other aircraft; the controller retains responsibility for separation of the performing aircraft from all other traffic. The target and performing aircraft may be flying on the same path, longitudinally separated, or may be on separate paths that will lead to dependency (e.g. joining separate dependent, closely spaced, parallel approaches with a staggered separation requirement). All participating aircraft will fly cleared routes and procedures. Avionics in the performing aircraft provide the flight crew with speed guidance within the capabilities of the aircraft. Conformance to the speed guidance will result in the defined spacing's being achieved at the required position, maintenance of that spacing once achieved if required, and protection of the separation minimum throughout the procedure. The delegation clearance acknowledges that the flight crew will change speed without further clearance to the controller. Knowledge of the target aircraft intended flight path in the performing aircraft's avionics will be required. Wake risk management may require additional data to be defined. Alerting for rapid closure and separation infringement may be required.

The operations are intended to provide operational benefits through precise interval management in all phases of flight. Compared with the use of FIM-S described in 2.2.1.1.5, FIM-DS offers the opportunity for target spacing to be reduced to values as low as the separation minimum. By utilizing wake risk management techniques, FIM-DSWRM offers reductions in separation standards, and thus allows defined spacing to be reduced further.

Operational Scenario

Terminal spacing and delegated separation assurance starts in Center airspace and continues until the target aircraft lands. Two aircraft are arriving in a high density terminal environment and are under positive control. The controller issues a delegated separation instruction to the in-trail aircraft to maintain defined time-based spacing behind the target aircraft. The in-trail aircraft has avionics supporting the FIM-DS operation, the target aircraft's transmitted data are of sufficient quality for the FIM-DS

operation, and the flight crewmembers of the performing aircraft are qualified for the operation (e.g. OpSpecs, recency). The flight crew ensures that the initial speed guidance is within the aircraft's capabilities before accepting the clearance.

Since the defined spacing is time based, as groundspeed reduces with altitude and proximity to the airport, the distance between the target and performing aircraft reduces. Since distance-based separation standards are still in use, the separation minimum distance becomes a boundary for the delegated separation task, and speed guidance delivered to the flight crew for the FIM-DS task results in the separation minimum's being respected. If it appears that the performing aircraft will be unable to fly at speeds that will allow the separation minimum distance to be respected, the aircraft crew informs the controller who breaks the aircraft out of the arrival stream.

Associated scenarios include, but are not limited to:

1. Common route on arrival (where an aircraft is merged behind a target or between two other aircraft in an arrival stream)
2. Separate routes to a merge point during arrivals and departures
3. Separate routes to separate dependent runways
4. IM turn prior to merge (where path stretching or shortening is used to allow spacing to be achieved and separation minimum respected when speed changes alone would not be sufficient),
5. Arrivals supporting Optimized Profile Descents (OPD)
6. Crossing runways
7. Departure spacing
8. Dependent runway spacing