

*Update on Proposed Method for Broadcasting  
Short and Long-Term Intent*  
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## *Intent Subgroup of WG4*

- Intent subgroup of RTCA SC-186, WG4 is looking into ADS-B intent issues:
  - Information content.
  - Data format.
  - Information validity.
- Intent information can be categorized into:
  - Short-term intent - Mode Control Panel (MCP) selected heading/track, altitude, vertical rate, IAS/Mach.
  - Long-term intent - location and altitude of FMS-derived TCP's (waypoints, T/C, T/D, Mach/CAS, etc.)
- Knowledge of each type of intent is important in being able to reconstruct an aircraft's intended path.

## *Integration of Short and Long-term Intent*

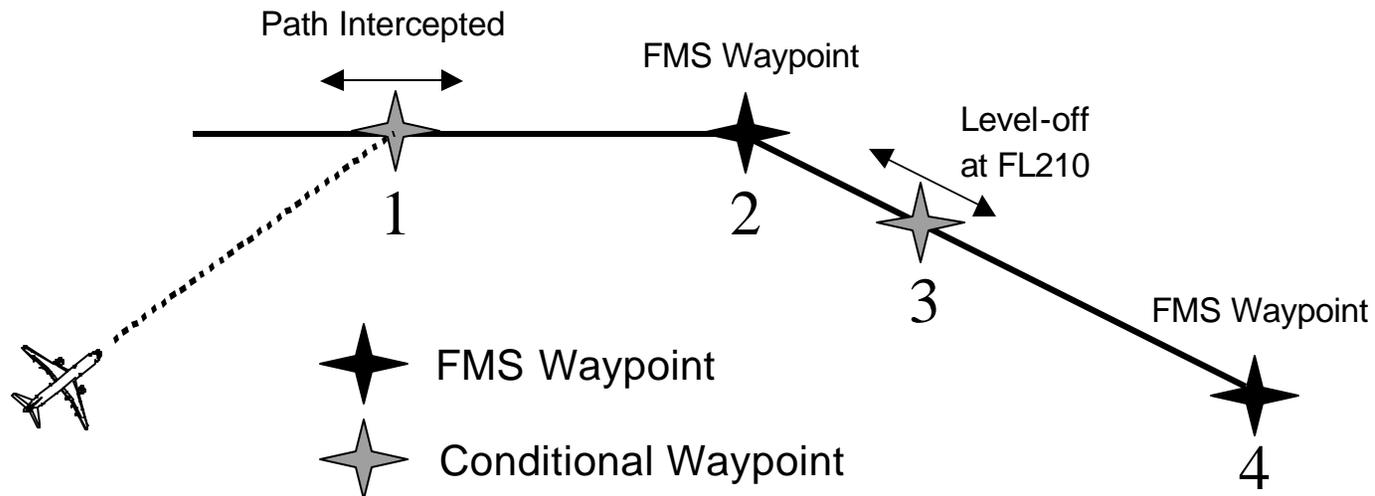
- Intent subgroup is focusing on ways to incorporate short and long-term intent into ADS-B message.
- 2 Methods of broadcasting short and long-term intent.
  - 1) Integrate short-term and long-term intent into TCP's.
    - Represents “command trajectory” (actual aircraft trajectory if pilot pushes no more buttons).
    - Method proposed by DO-242.
  - 2) Send MCP and FMS intent parameters separately, along with current flight mode, and let receiving aircraft reconstruct the path.

## *Intent Subgroup Proposes Method 2*

- Method 1 (suggested by MASPS) requires complex trajectory builder on transmitting aircraft, increasing the equipage burden. Logic must consider:
  - MCP selected parameters and FMS waypoints.
  - Current autoflight modes (autopilot and FMS).
  - Current aircraft state.
- Airbus has proposed an architecture to generate “target altitude”, but does not discuss lateral TCP.
- TCP’s due to mixed MCP and FMS modes not readily available in some aircraft.
  - Constant heading to intercept lateral (LNAV) FMS-path.
  - MCP Altitude intervention in vertical (VNAV) FMS-path.

# Multi-System Integration Required to Define TCP

- Scenario:
  - Constant heading to intercept lateral (LNAV) path.
  - Climb at constant vertical speed to FL210.
- TCP's 2 and 4 available in FMS flight plan.
- TCP's 1 and 3 depend on MCP states, aircraft performance, and wind (TCP location may not be available to FMS).



## *Planned B-777 Simulator Validation*

- Proposed approach relies on flight mode indicators to enable receiving aircraft to determine target states.
- Simulator study will examine flight mode indicators for a variety of operational scenarios.
  - MCP state modes, FMS waypoint constraints, mixed autopilot/FMS modes.
  - Record raw information (aircraft state data, MCP and FMS targets, active autopilot/FMS flight modes).
- Observer records time and type of mode transitions.
- Post-simulation analysis compares derived FMI's with recorded events to ensure FMI's adequately describe mode transitions and targets.
- Validation study also planned for A-320, details TBD.

## *Proposed Capabilities for A2 and A3*

- MCP target states.
  - Selected heading/track.
  - Selected altitude.
- FMS-derived TCP's (waypoints, T/C, T/D, etc.)
- Flight mode indicators (Details TBV).
  - Horizontal.
    - Heading/track select or hold (non-LNAV).
    - LNAV inactive, armed, or active.
  - Vertical.
    - Altitude transition, capture, or hold (non-VNAV).
    - VNAV inactive, armed, or active.