ADS-C Climb/Descent Procedure (CDP)

Federal Aviation Administration

Presented to New York OWG

October 13, 2016

ATOP Air Traffic T24
Upgrade Briefing

ICAO Authorization for ADS-C CDP

June 23, 2016

Subject: Approval of Amendment 7 to the PANS-ATM

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, acting under delegated authority, on 1 March 2016, approved Amendment 7 (i.e. Amendments 7-A and 7-B) to the fifteenth edition of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), for applicability on 10 November 2016[2]. The amendments were approved on 6 June 2016 by the President of the Council on behalf of the Council in accordance with established procedure. Copies of the amendment are available as attachments to the electronic version of this State letter on the ICAO-NET (http://portal.icao.int) where you can access all other relevant documentation.

2. Amendment 7 (i.e. Amendments 7-A and 7-B) stems from proposals developed by the Separation and Airspace Safety Panel (SASP), the second meeting of the Operational Data Link Panel (OPLINKP/2), the third meeting of the Air Traffic Management Operation Panel (ATMOPSP/3), the first meeting of the Flight Operations Panel (FLTOPSP/1), the sixteenth meeting of the Operations Panel Working Group of the Whole (OPSP/WG/WHL/16), the third meeting of the Aerodromes Panel (AP/3) and the Meteorology (MET) Divisional Meeting (2014). The amendment is related to:

a) performance-based longitudinal and lateral separation minima and automatic dependent surveillance — contract (ADS-C) climb and descend procedure (CDP);

ADS-C Climb/Descent Procedure (CDP)

What is an ADS-C CDP?

- A procedural maneuver allowing an aircraft to climb or descend through the altitude of another based on near simultaneous ADS-C reports and DME rules in ICAO Document 4444
  - Maneuver ***does not require*** a specific request by the pilot
    - Pilot has no knowledge that this procedure is being used over any other separation standard
  - Procedure initiated by the controller
  - Initial criteria test available if proposed clearance generates a second-profile conflict
  - If controller opts to use CDP option, ATOP requests ADS-C demand reports and validates remaining conditions and criteria

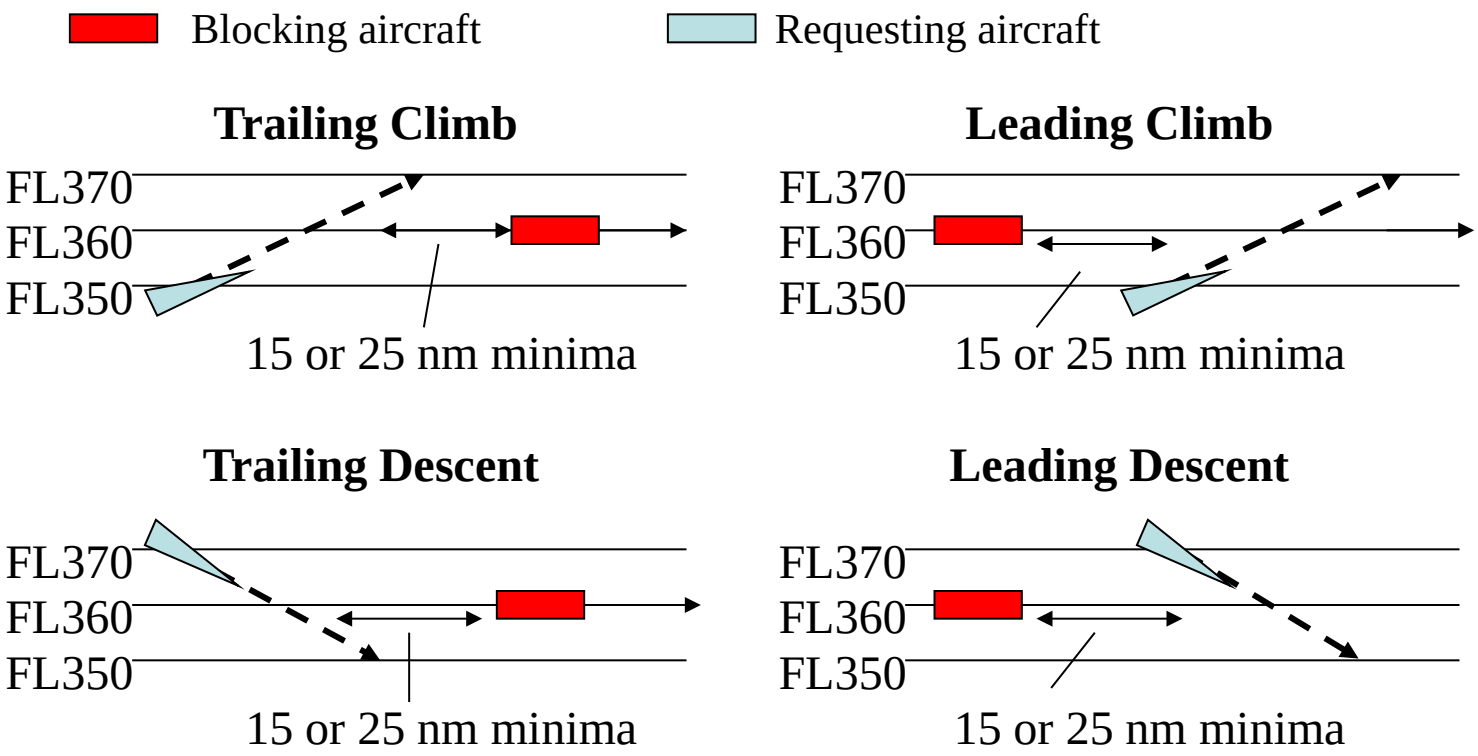
ADS-C Climb/Descent Procedure (CDP)

Applicable situations

- 15NM if the faster aircraft is the lead aircraft or it both aircraft are the same speed
- 25NM if the faster aircraft is the trailing aircraft

ADS-C Climb/Descent Procedure (CDP)

Applicable situations for the ADS-C CDP



ADS-C Climb/Descent Procedure (CDP)

The 15 NM Separation Standards

- Faster in Front separation – 15 NM
  - Leading aircraft has a ADS-C reported Mach speed greater than or equal to that of the trailing aircraft
  - Leading aircraft has a ADS-C reported ground speed greater than or equal to that of the trailing aircraft

The 25 NM Separation Standards

- Faster in Back separation – 25 NM
  - Trailing aircraft has a ADS-C reported Mach speed no more then .02* Mach faster than the trailing aircraft.
  - Trailing aircraft has a ADS-C reported ground speed no more then 10* knots faster than the leading aircraft.

ADS-C Climb/Descent Procedure (CDP)

In order for CDP to be used, certain eligibility conditions must be met:

- There is one, and only one, imminent or NOW aircraft-to-aircraft conflict
  - This conflict pair constitutes the Requesting and Blocking CDP pair
  - If multiple conflicts are detected for the Requesting aircraft, the CDP will be available only if conflicts other than the CDP pair are advisory*
  - If there are only advisory conflicts, CDP processing will not trigger (a regular separation rule applies)
- The Requesting and Blocking aircraft are vertically separated but not by more than 2000 feet.
- The clearance being probed is for a climb or descent of a maximum amount, not to exceed 4000 feet

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ADS-C Climb/Descent Procedure (CDP)

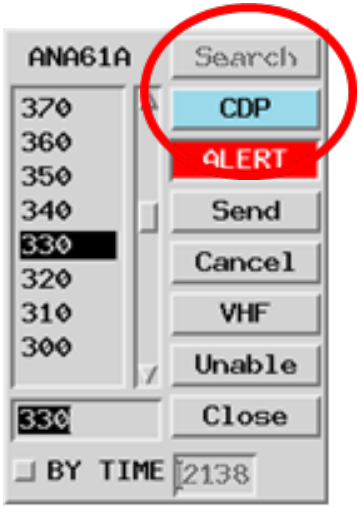
Eligibility conditions (continued):

- Both aircraft are filed as single flights, not as part of a formation
- The Requesting and Blocking aircraft are reporting via ADS-C

  - The flights must be reporting an accuracy Figure of Merit (FOM) value of 6 or greater, which equates to <.25NM
- Both Requesting and Blocking aircraft are CPDLC connected
- Both Requesting and Blocking aircraft are in level flight at a single assigned altitude
- Requesting and Blocking aircraft are same direction
- Neither the Requesting nor Blocking aircraft are on or have an open CPDLC request for a weather deviation
- Neither the Requesting nor Blocking aircraft are on an offset combined with a rejoin clearance

ADS-C Climb/Descent Procedure (CDP)

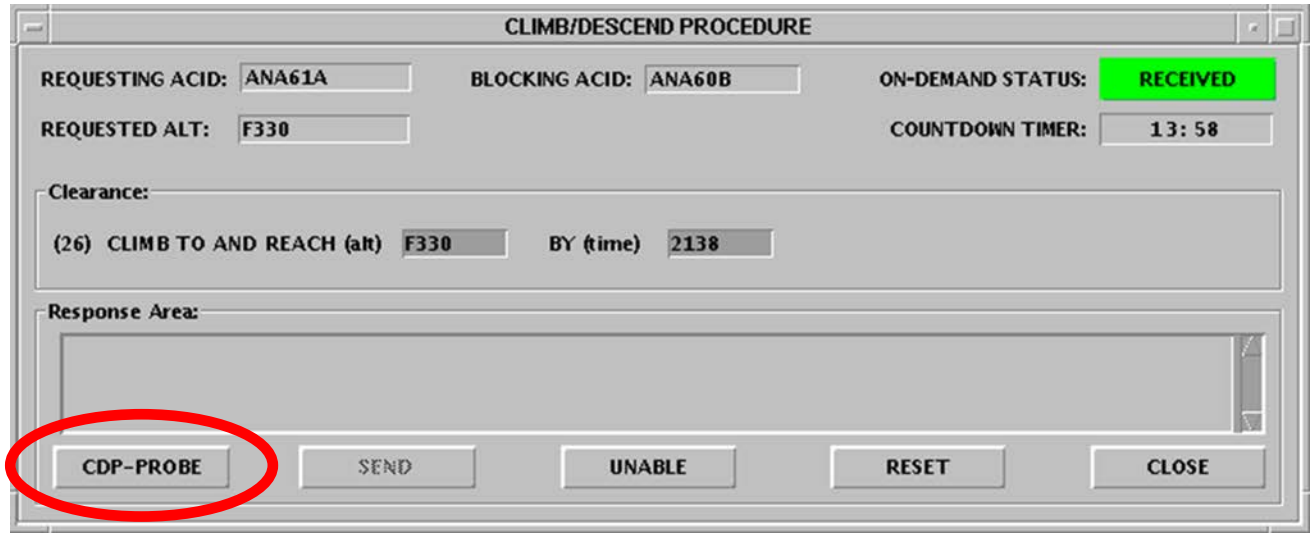
Probe responses will now provide feedback if aircraft are eligible for CDP



ADS-C Climb/Descent Procedure (CDP)

When the DEMAND reports are received and successfully applied to the aircraft profiles

- On-Demand Status changes to Received (green background)
- CDP-Probe button is available

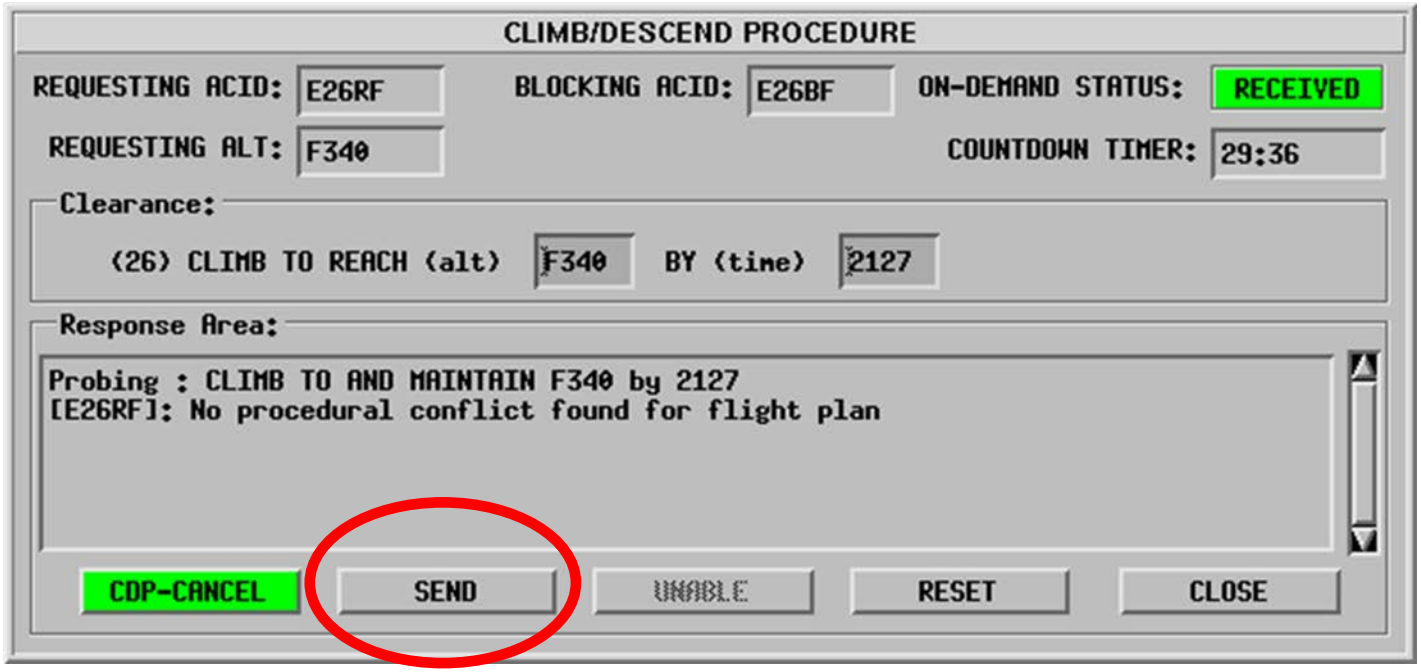


ADS-C Climb/Descent Procedure (CDP)

Selecting CDP-Probe continues the process

- ATOP performs a validation check on the clearance
  - Time
    - In the future, consistent with normal clearance processing
    - Not beyond the CDP limit
  - Altitude
    - Within the parameter limit of the CDP
    - Not in conflict (normal conflict indications will be shown)
    - Altitude is higher than current altitude for a climb, lower than current altitude for a descent
- If the validation check passes and there are no conditions or imminent conflicts to prevent the CDP
  - the Send button becomes selectable

ADS-C Climb/Descent Procedure (CDP)



Selecting SEND sends the CDP clearance shown to the aircraft

ADS-C Climb/Descent Procedure (CDP)

When a CDP clearance is sent, data blocks for both aircraft will display a “CDP” special condition code to show they are involved in an CDP maneuver.

ADS-C Climb/Descent Procedure (CDP)

Exceptions to arresting CDP application:

- Subsequent changes in position conformance (altitude, lateral, speed)
- Subsequent changes to the Figure of Merit (FOM) for either aircraft
  - Reduction in navigational performance
- Subsequent changes to the applicable vertical separation criteria for the conflict pair (RVSM status of either aircraft)
- Either aircraft loses its ADS-C and/or CPDLC connection

ADS-C Climb/Descent Procedure (CDP)

Notes on the CDP clearance

- **Pilot has no awareness this is a CDP**
  - The CDP clearance looks like any other Climb By Time clearance
- Prior to sending the clearance, the controller should ensure
  - There are no other open AGM messages for the aircraft (potential for HF weather deviations ATOP can not recognize)
  - Enough time exists to execute the maneuver
  - **If this is an unrequested climb, the pilot also needs time to calculate whether the aircraft can climb to the cleared altitude**
- If issuing a clearance to an altitude other than what was requested
  - Close the downlink with an UNABLE
  - Then send a new clearance with the revised altitude
    - Adding “Unable Requested Altitude” to the new clearance (after sending an UNABLE) should make the altitude clear to the pilot

Questions?