ADS-C CDP Climb/Descend Procedure

Implementation Project Update

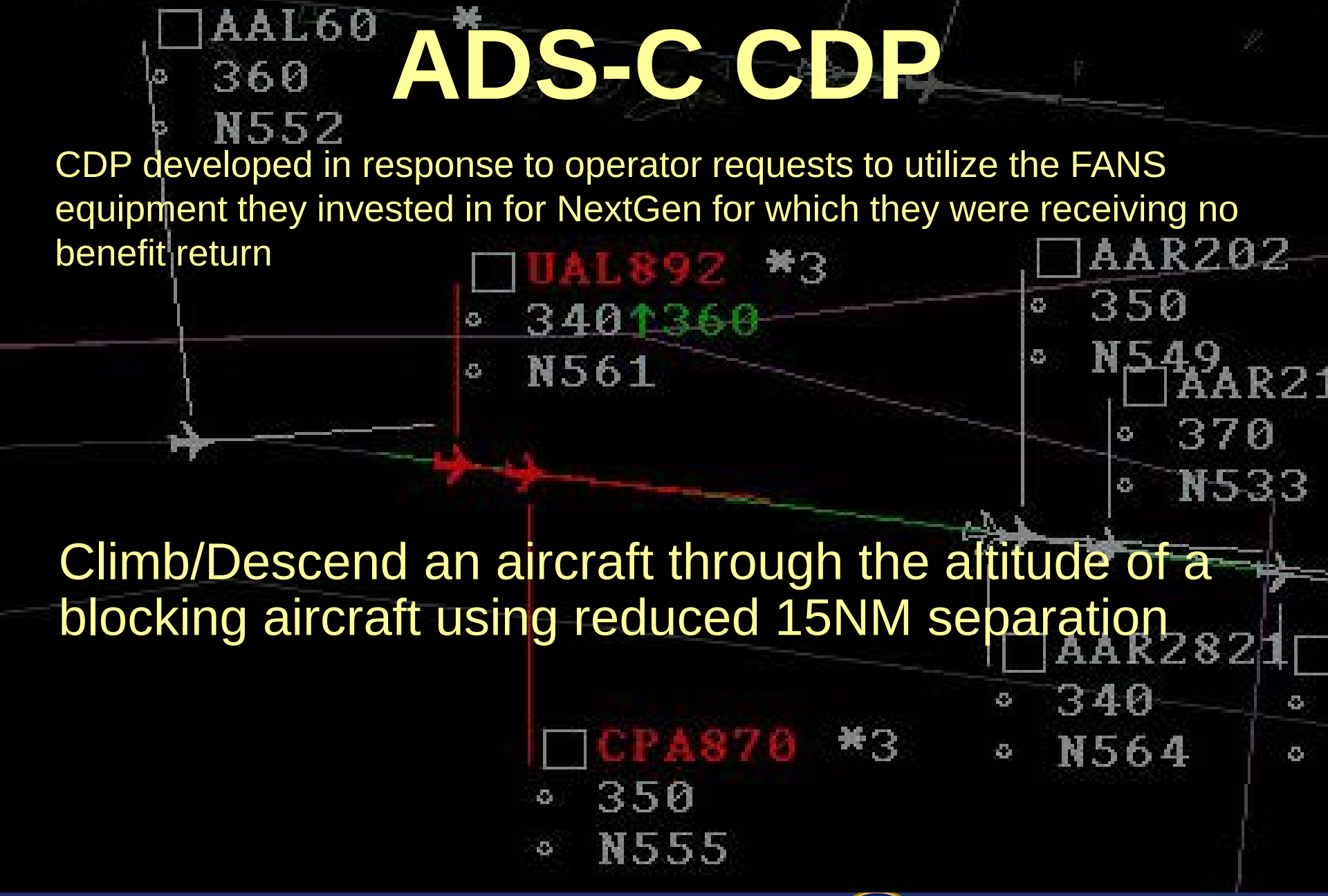
Presented to: ISPACG/28

By: Keith Dutch, FAA

Date: 03 – 07 March 2014

ADS-C CDP

CDP developed in response to operator requests to utilize the FANS equipment they invested in for NextGen for which they were receiving no benefit return



Climb/Descend an aircraft through the altitude of a blocking aircraft using reduced 15NM separation

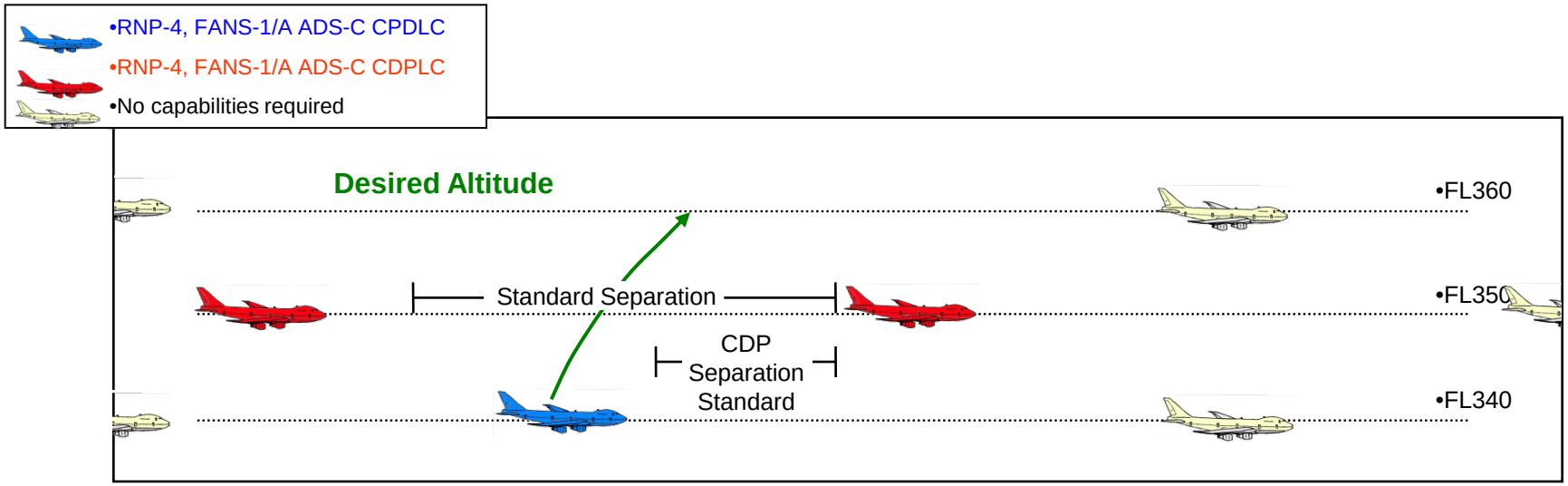
ADS-C CDP Operational Trials

- **ADS-C CDP was demonstrated in operational trials by manually applying ADS-C CDP without changes to FAA ATOP automation system**
  - Operational trials began on 15 Feb 2011 in the Oakland Oceanic CTA and ended 15 Feb 2013
  - During the two-year timeframe of the trials, the ADS-C CDP was successfully utilized eight times
- **There are no plans to extend the manual trial**
- **Fast-time simulations are currently being conducted at the FAA William J. Hughes Technical Center (WJHTC)**
  - These model the use of ADS-C CDP in a more densely populated environment
  - Increases opportunity for use and further validates the procedure

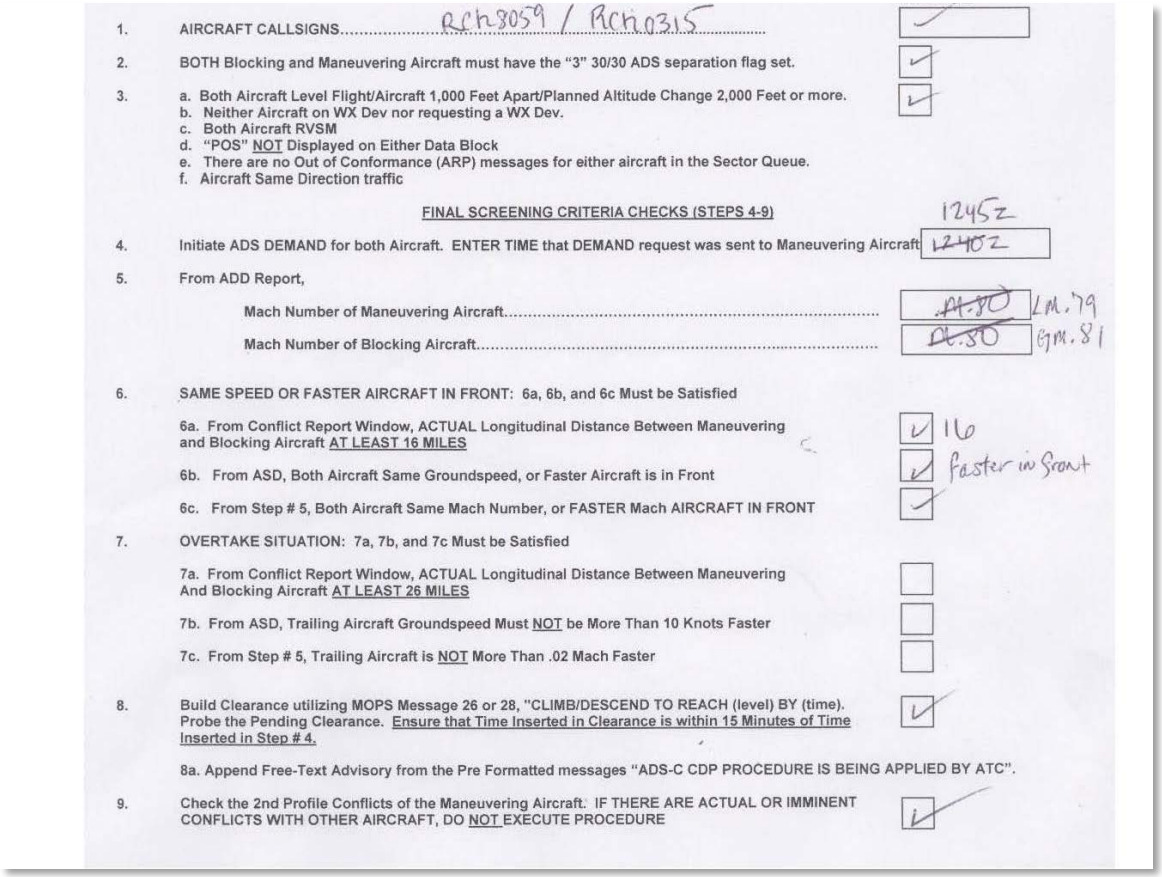
ADS-C Operational Requirements

- **CPDLC maintained**
- **Distance between aircraft determined from near simultaneous ADS-C demand reports which contain position accuracy of 0.25 NM or better (Figure of Merit 6 or higher)**
- **Distance between aircraft is not less than**
  - 15NM when same speed/faster aircraft in front
  - 25NM when faster aircraft in back (not more than M0.02)
- **Altitude difference between aircraft not more than 2000 ft**
- **Clearance assures vertical separation within 15 minutes from first ADS-C report request**

Automated ADS-C CDP



- **Automation requirements**
  - ATOP conflict probe decision support tool determines when CDP can be applied for climbing/descending aircraft by determining eligibility
  - ATOP will account for maneuvering aircraft, blocking aircraft, and all other traffic
  - ATOP will be able to handle multiple maneuvers in one or multiple sectors
  - Controller either issues the clearance for the climb/descend or UNABLE



1. AIRCRAFT CALLSIGNS..... RCH3059 / RCH0315 ✓
2. BOTH Blocking and Maneuvering Aircraft must have the "3" 30/30 ADS separation flag set. ✓
3. a. Both Aircraft Level Flight/Aircraft 1,000 Feet Apart/Planned Altitude Change 2,000 Feet or more.
   b. Neither Aircraft on WX Dev nor requesting a WX Dev.
   c. Both Aircraft RVSM
   d. "POS" NOT Displayed on Either Data Block
   e. There are no Out of Conformance (ARP) messages for either aircraft in the Sector Queue.
   f. Aircraft Same Direction traffic ✓

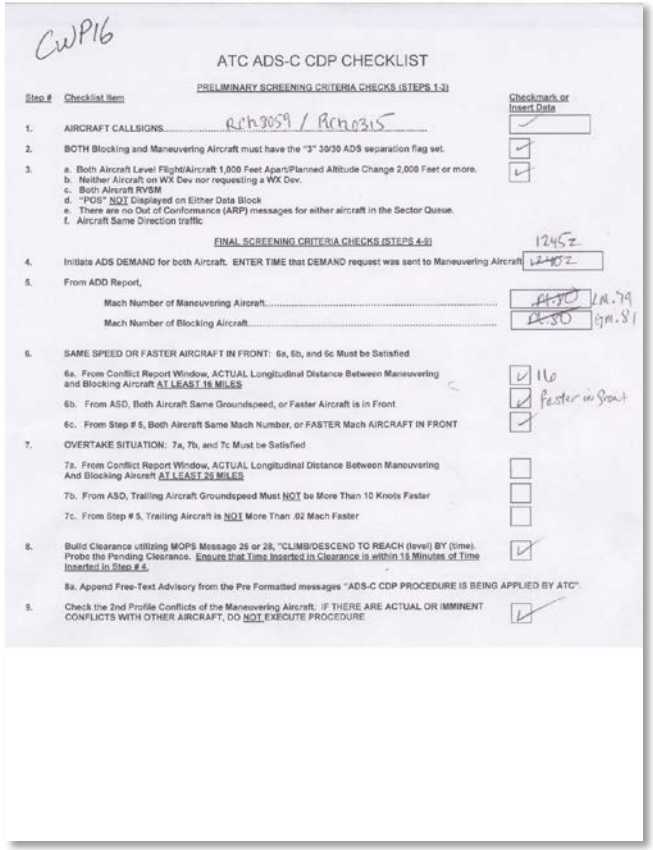
FINAL SCREENING CRITERIA CHECKS (STEPS 4-9) 1245z

4. Initiate ADS DEMAND for both Aircraft. ENTER TIME that DEMAND request was sent to Maneuvering Aircraft 1240z
5. From ADD Report,
   Mach Number of Maneuvering Aircraft..... ~~.81~~ LM.79
   Mach Number of Blocking Aircraft..... ~~.81~~ BM.81
6. SAME SPEED OR FASTER AIRCRAFT IN FRONT: 6a, 6b, and 6c Must be Satisfied
   6a. From Conflict Report Window, ACTUAL Longitudinal Distance Between Maneuvering and Blocking Aircraft AT LEAST 16 MILES ✓ 16
   6b. From ASD, Both Aircraft Same Groundspeed, or Faster Aircraft is in Front ✓ Faster in Front
   6c. From Step # 5, Both Aircraft Same Mach Number, or FASTER Mach AIRCRAFT IN FRONT ✓
7. OVERTAKE SITUATION: 7a, 7b, and 7c Must be Satisfied
   7a. From Conflict Report Window, ACTUAL Longitudinal Distance Between Maneuvering And Blocking Aircraft AT LEAST 26 MILES
   7b. From ASD, Trailing Aircraft Groundspeed Must NOT be More Than 10 Knots Faster
   7c. From Step # 5, Trailing Aircraft is NOT More Than .02 Mach Faster
8. Build Clearance utilizing MOPS Message 26 or 28, "CLIMB/DESCEND TO REACH (level) BY (time). Probe the Pending Clearance. Ensure that Time Inserted in Clearance is within 15 Minutes of Time Inserted in Step # 4. ✓
   8a. Append Free-Text Advisory from the Pre Formatted messages "ADS-C CDP PROCEDURE IS BEING APPLIED BY ATC".
9. Check the 2nd Profile Conflicts of the Maneuvering Aircraft. IF THERE ARE ACTUAL OR IMMINENT CONFLICTS WITH OTHER AIRCRAFT, DO NOT EXECUTE PROCEDURE ✓

Manual Controller Actions

From a systems efficiency perspective, ADS-C CDP system will allow for increased efficiency and improved flow for properly equipped aircraft.

Automated Procedure



CWP16

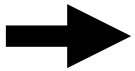
ATC ADS-C CDP CHECKLIST

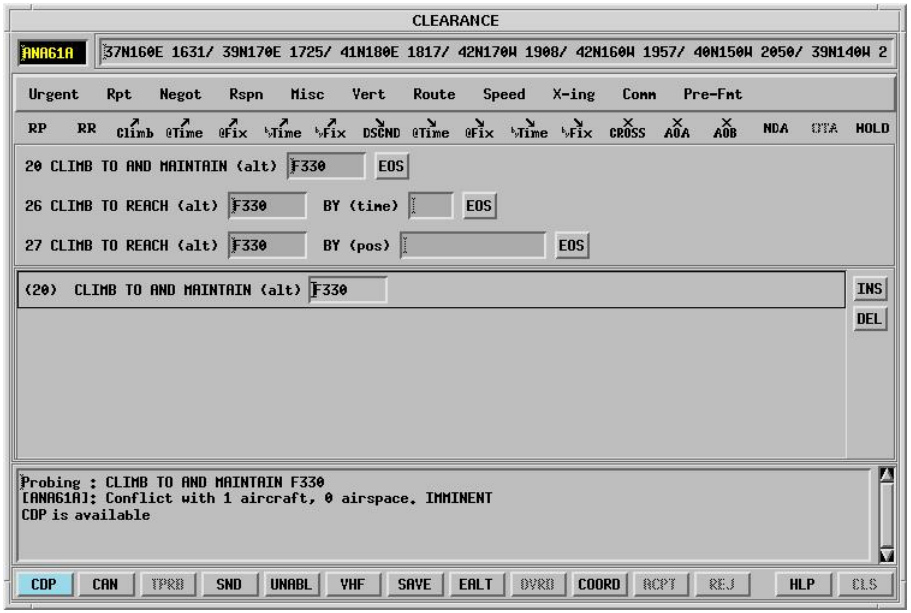
PRELIMINARY SCREENING CRITERIA CHECKS (STEPS 1-3)

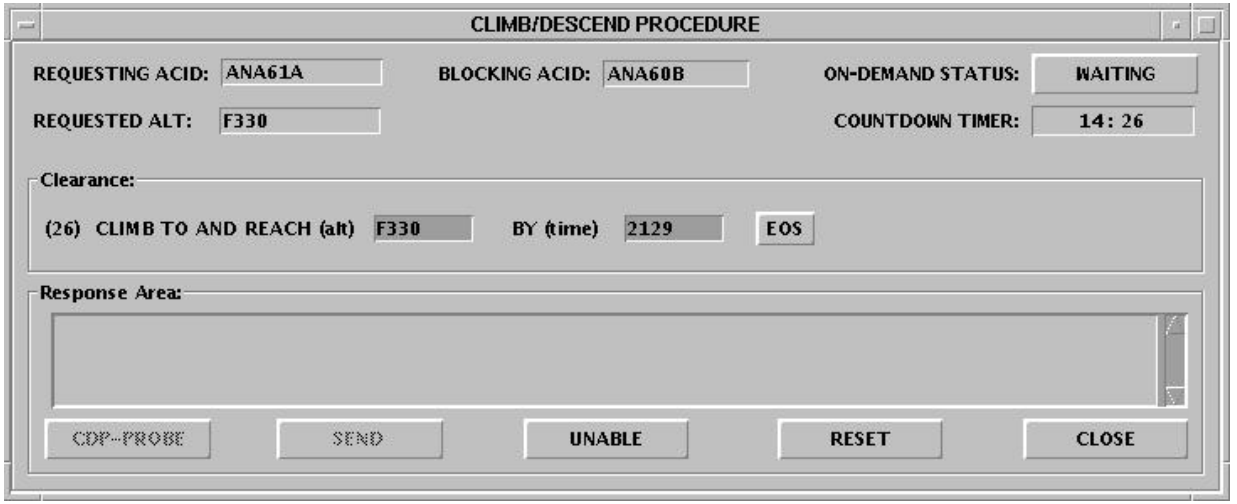
Step #	Checklist Item	Checkmark or Insert Data
1.	AIRCRAFT CALLSIGNS..... ACH3059 / ACH0315	✓
2.	BOTH Blocking and Maneuvering Aircraft must have the "3" 30/30 ADS separation flag set.	✓
3.	a. Both Aircraft Level Flight/Aircraft 1,000 Feet Apart/Planned Altitude Change 2,000 Feet or more. b. Neither Aircraft on WX Dev nor requesting a WX Dev. c. Both Aircraft RVSM d. "POS" NOT Displayed on Either Data Block e. There are no Out of Conformance (ARP) messages for either aircraft in the Sector Queue. f. Aircraft Same Direction traffic	✓

FINAL SCREENING CRITERIA CHECKS (STEPS 4-9)

4.	Initiate ADS DEMAND for both Aircraft. ENTER TIME that DEMAND request was sent to Maneuvering Aircraft	1245z / 1245z
5.	From ADD Report,	
	Mach Number of Maneuvering Aircraft.....	~~.830~~ .79
	Mach Number of Blocking Aircraft.....	~~.830~~ .81
6.	SAME SPEED OR FASTER AIRCRAFT IN FRONT: 6a, 6b, and 6c Must be Satisfied	
	6a. From Conflict Report Window, ACTUAL Longitudinal Distance Between Maneuvering and Blocking Aircraft AT LEAST 16 MILES	✓ 16
	6b. From ASD, Both Aircraft Same Groundspeed, or Faster Aircraft is in Front	✓ Faster in Front
	6c. From Step # 5, Both Aircraft Same Mach Number, or FASTER Mach AIRCRAFT IN FRONT	✓
7.	OVERTAKE SITUATION: 7a, 7b, and 7c Must be Satisfied	
	7a. From Conflict Report Window, ACTUAL Longitudinal Distance Between Maneuvering And Blocking Aircraft AT LEAST 26 MILES	
	7b. From ASD, Trailing Aircraft Groundspeed Must NOT be More Than 10 Knots Faster	
	7c. From Step # 5, Trailing Aircraft is NOT More Than .02 Mach Faster	
8.	Build Clearance utilizing MOPS Message 26 or 28, "CLIMB/DESCEND TO REACH (level) BY (time). Probe the Pending Clearance. Ensure that Time Inserted in Clearance is within 15 Minutes of Time Inserted in Step # 4.	✓
	8a. Append Free-Text Advisory from the Pre Formatted messages "ADS-C CDP PROCEDURE IS BEING APPLIED BY ATC".	
9.	Check the 2nd Profile Conflicts of the Maneuvering Aircraft. IF THERE ARE ACTUAL OR IMMINENT CONFLICTS WITH OTHER AIRCRAFT, DO NOT EXECUTE PROCEDURE	✓







ADS-C CDP Master Schedules - 7/9/13	
Milestones & Tasks	**Working Schedule**
ICAO Procedure Change	**12/31/2014**
Repurpose analytical model with changes recommended by the Panel	-
Develop simulation model to explore the interactions between principal random variables whose effects are confounded within sampled data	-
Conduct data collections to describe variable distributions and parameter estimates	-
Report analytical results to the Panel	-
Obtain Panel concurrence or critical comments	-
Describe operational limits for the application of the procedure	-
Propose draft ICAO document or circular material to the Panel for its recommendation	-
Initial Brief to ANC w/timeline	6/20/2013
Hazard Panel	9/15/2013
Draft Circular	10/15/2013
SASP November 2013 Meeting - Report	10/31/2013
ICAO Proposal for Amendment (PFA)	
Develop ICAO Proposal for Amendment and Impact Statement	10/15/2013
ICAO Proposal for Amendment	3/31/2014
Develop ICAO Proposal for Amendment	3/31/2014
Deliver ICAO Proposal for Amendment	4/30/2014
Deliver ICAO Proposal for Amendment and Impact Statement	5/1/2014
SASP Work Backlog/schedule	
SASP May 2014 Meeting - Report/Final Approval	5/30/2014
ADS-C CDP Automation Collision Risk Model	6/30/2014
Conduct ADS-C CDP Automation Collision Risk Model Assessment	5/31/2014
Deliver ADS-C CDP Automation Collision Risk Model	6/30/2014
FAA Procedure Change	
Develop regional application material for the subject airspace	-
Suggest on-going monitoring requirements (if any) to support SMS	-
Prepare FAA implementation materials for application (SRMD and facility application limits)	-
SRMD	
Site Test, Run, Report	
FAA Handbook 7110.65 procedure change	6/30/2014
Develop documentation for the FAA Handbook procedure change	5/31/2014
Receive approval for the FAA Handbook procedure change	12/31/2014
Finalize Circular or other material	
Support the briefing of the procedure to the ANC	
Briefed to the ANC/ Procedure Approval	11/1/2016

Current Working Schedule

ADS-C CDP automation, when ready as an operational capability, will be installed and employed in Anchorage, Oakland and New York oceanic airspace.