GOLD
Advanced Data Link Operations

Presented to:

ICAO Seminar/Workshop on the Implementation of Ground-ground and Air-ground Data Links in the SAM Region

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Federal Aviation Administration

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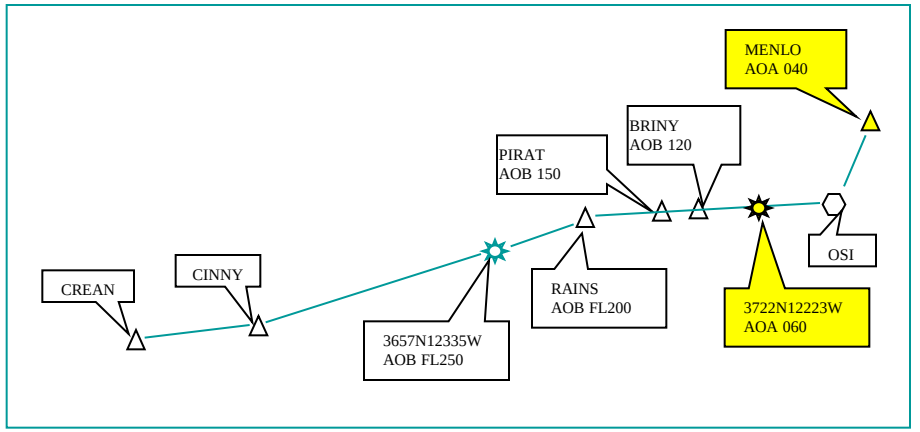
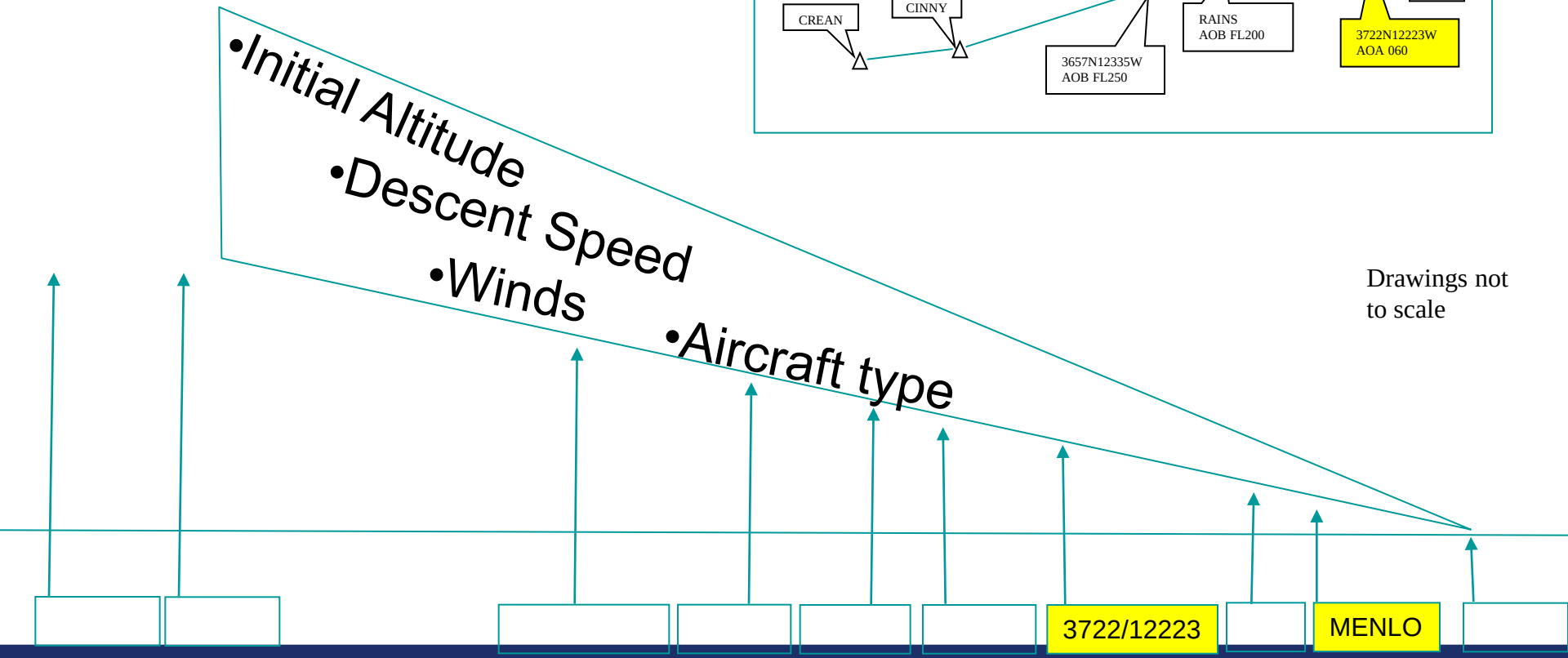
KSFO Tailored Arrival (TA) Trials

- **Initial TA Trials began in 2006**
  - Early Morning Traffic with little airport demand.
  - UAL aircraft only
- **Latest TA Trials began December 2007**
  - Expanded beyond early morning flights
  - Refined arrival routing and renamed the arrival
  - Added additional operators
  - Reduced coordination requirements for controllers

KSFO Tailored Arrival Profiles

- **Determining the TA profile**





Drawings not to scale

Profile Development Goals

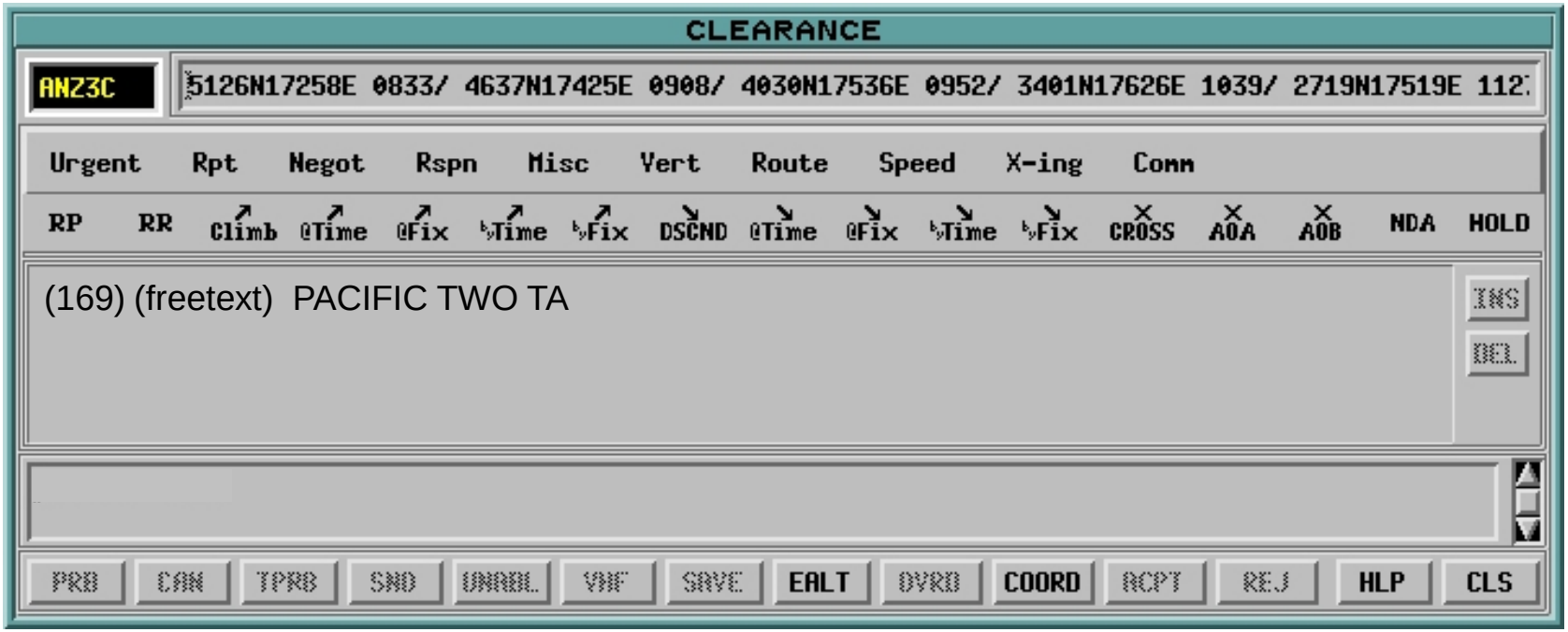
- **Meet ATC requirements**
  - Minimum IFR Altitudes
  - Noise Abatement
  - ATC Altitude Crossing Requirements
- **Continuous Descent**
- **Idle Power Descent**
- **Keep aircraft within the expected descent profile.**

TAILORED ARRIVAL UPLINK

A COMPLEX 4D TRAJECTORY PROFILE CLEARANCE IS UPLINKED TO THE AIRCRAFT FMS

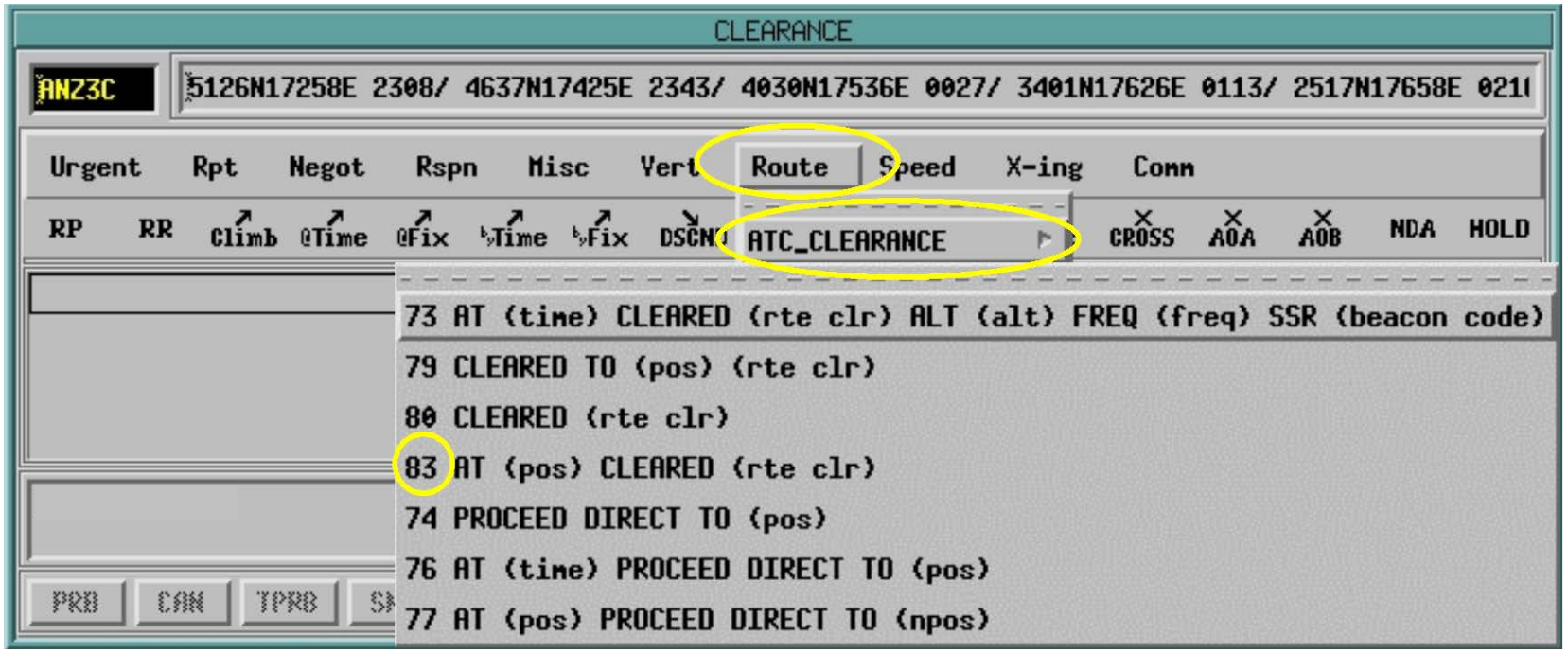
Tailored Arrival Route Clearance

- **Element One: Clearance Name**

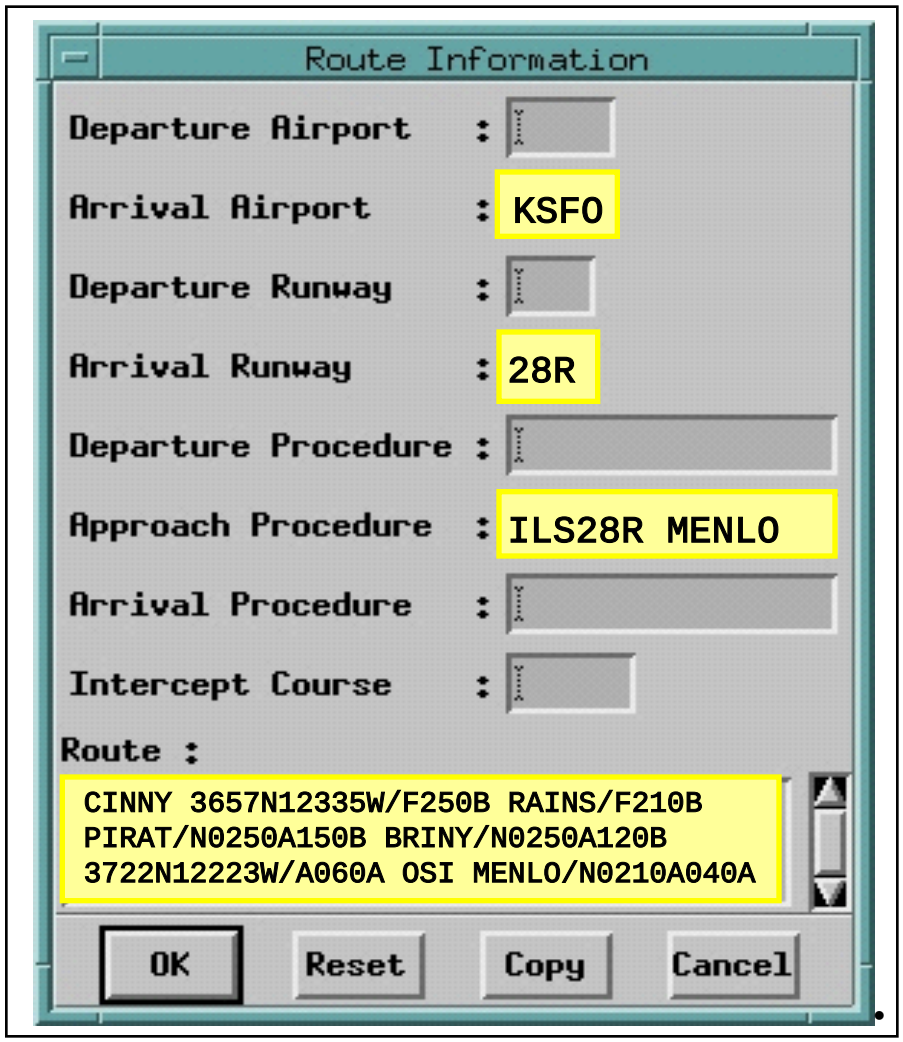


Tailored Arrival Clearance

- **Controller constructs the TA clearance using MOPS Element 83 Route Clearance**

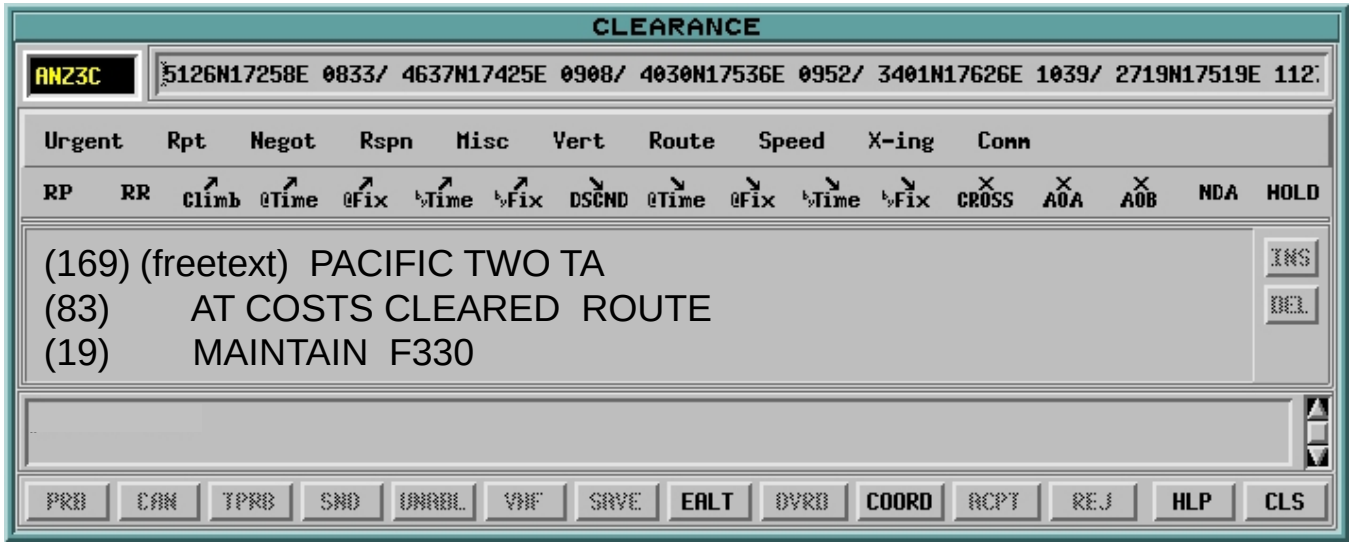


Tailored Arrival Clearance



Tailored Arrival Route Clearance

- **The clearance is constructed to clear the flight via the TA route and to maintain current altitude.**
- **The clearance is probed for conflicts and then sent to the aircraft.**



TAILORED ARRIVAL UPLINK

- **Tailored Arrivals enable VNAV path to the Localizer.**
- **FMS determines most efficient aircraft descent profile**

TA Radar Vectoring/Routing

- **The goal of the controller is to let the aircraft fly the TA without intervention, however at times it may be necessary to change an aircraft's flight path. To do this, the controller must:**
  - Issue a radar vector for traffic.
  - When the vector is complete or to shortcut an aircraft, the following instructions are issued:
    - "Call Sign, cleared direct (waypoint on the TA) the remainder of the Pacific Two TA. Comply with Restrictions."

Termination of Tailored Arrival

- **At any time the Tailored Arrival may be terminated by the aircraft or ATC.**
- **If the flight crew replies “UNABLE” to any TA clearance, or requests cancellation of the TA, the TA is terminated for that flight.**
- **If the Tailored Arrival is terminated.**
  - Advise the aircraft “Tailored Arrival is terminated”. Issue a new Route and Altitude clearance to the aircraft.
- **Notify the downstream controller of OTA cancellation.**

Fuel Savings from Top of Descent Cruise to Landing

	777-200/GE90-85B	747-400/PW4056
Full TA	1,303 lbs	2,291 lbs
Partial TA	379 lbs	1,100 lbs

- **Fuel consumption was calculated using the Boeing Climbout Program (BCOP) for low speed performance below 10,000 ft altitude.**
- **Fuel consumption above 10,000 ft altitude was calculated using the Boeing INFLT tool for cruise and descent.**
- **The vertical profile generated from BCOP and INFLT was matched to the mean descent paths of the collective ANOMS8 radar data.**

GOLD

Dynamic Airborne Reroute Procedure (DARP)

Federal Aviation Administration

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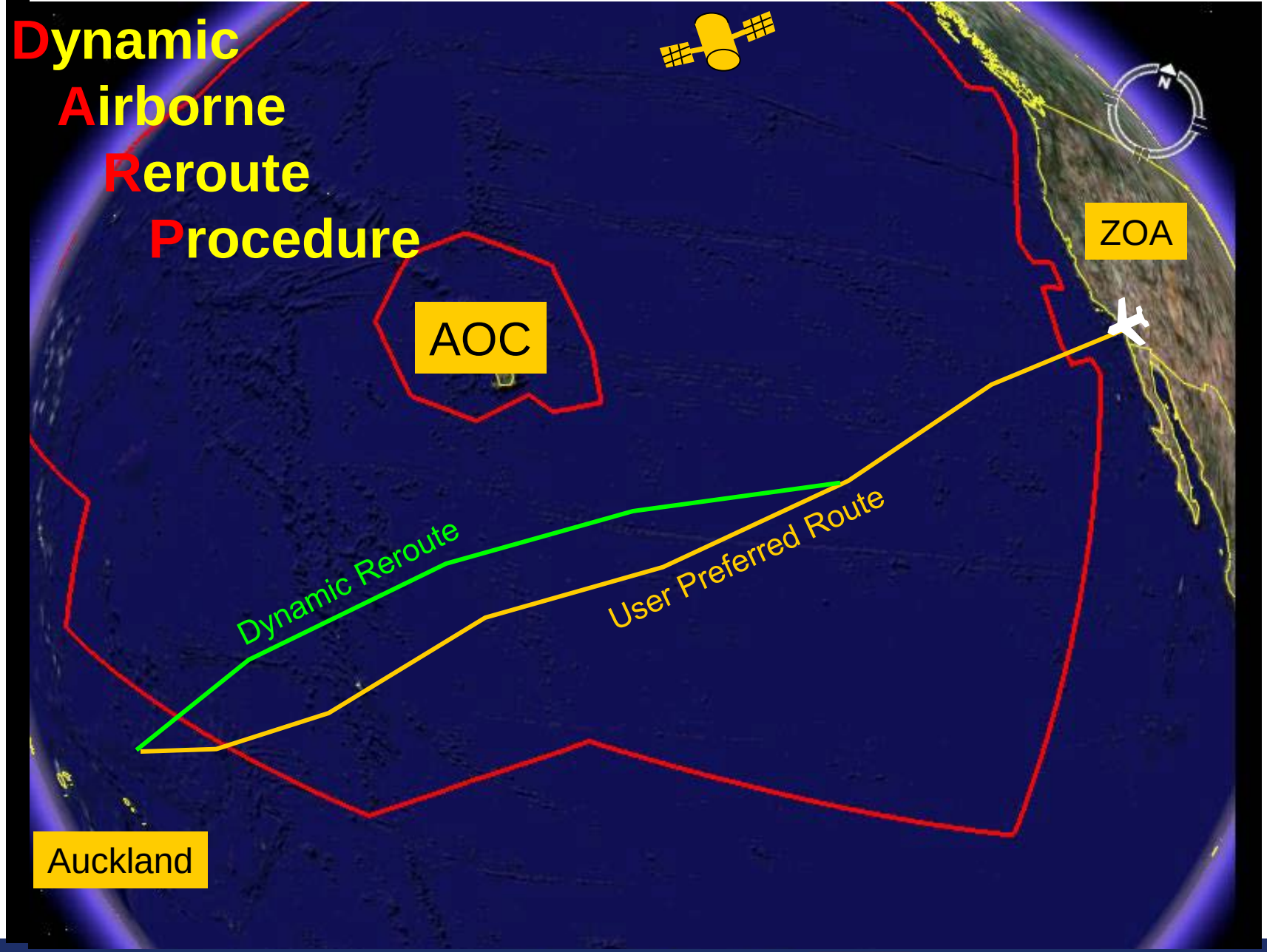
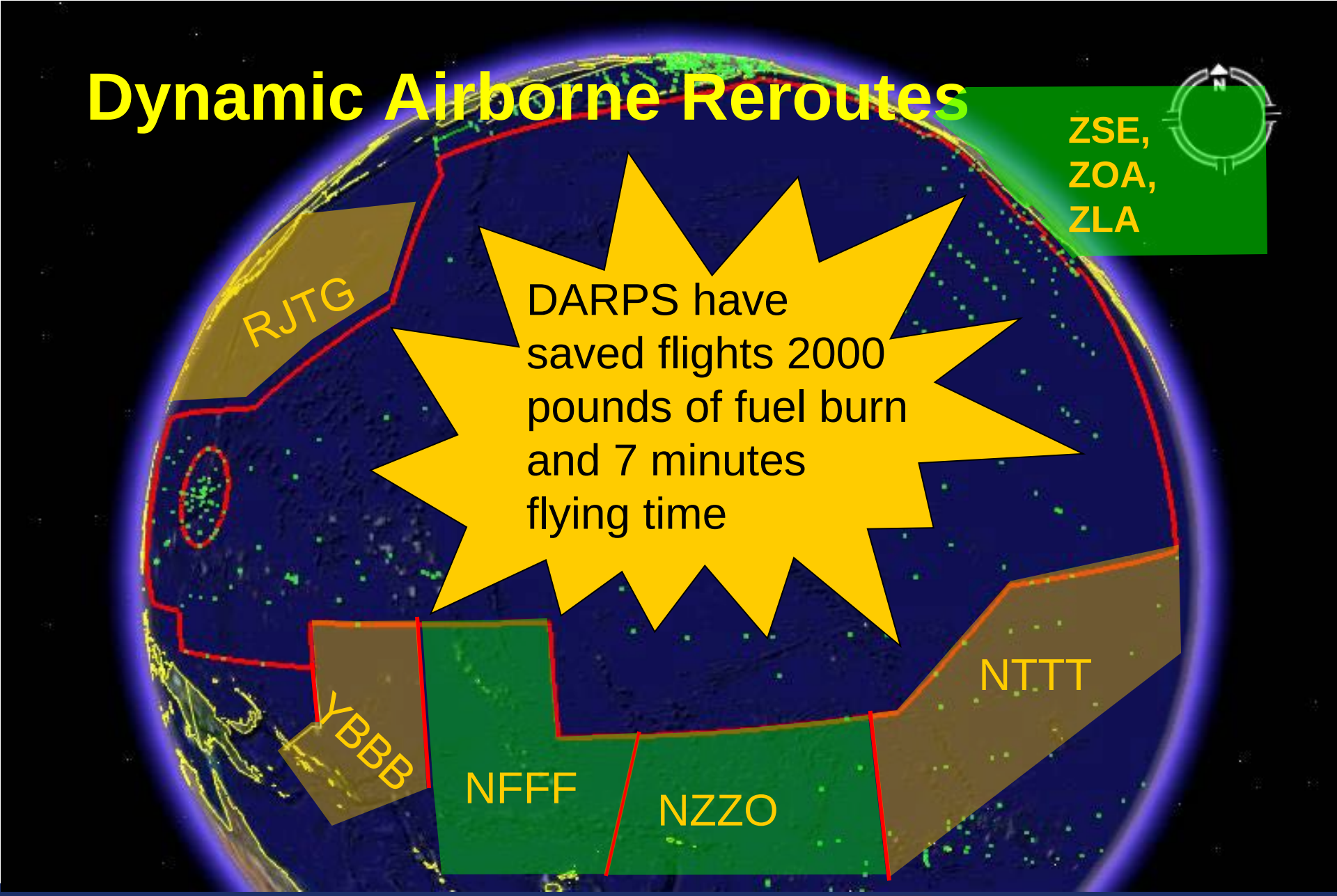
Dynamic Airborne Reroutes

- **Allows Airborne Rerouting of Aircraft When Winds Indicate a More Fuel Efficient Route is Available**
- **Reduce Operating Costs by Taking Advantage of Updated Winds**
- **FANS and Air Traffic Services Inter-facility Data Communications (AIDC) Required**
- **Ongoing Trials in the South Pacific**

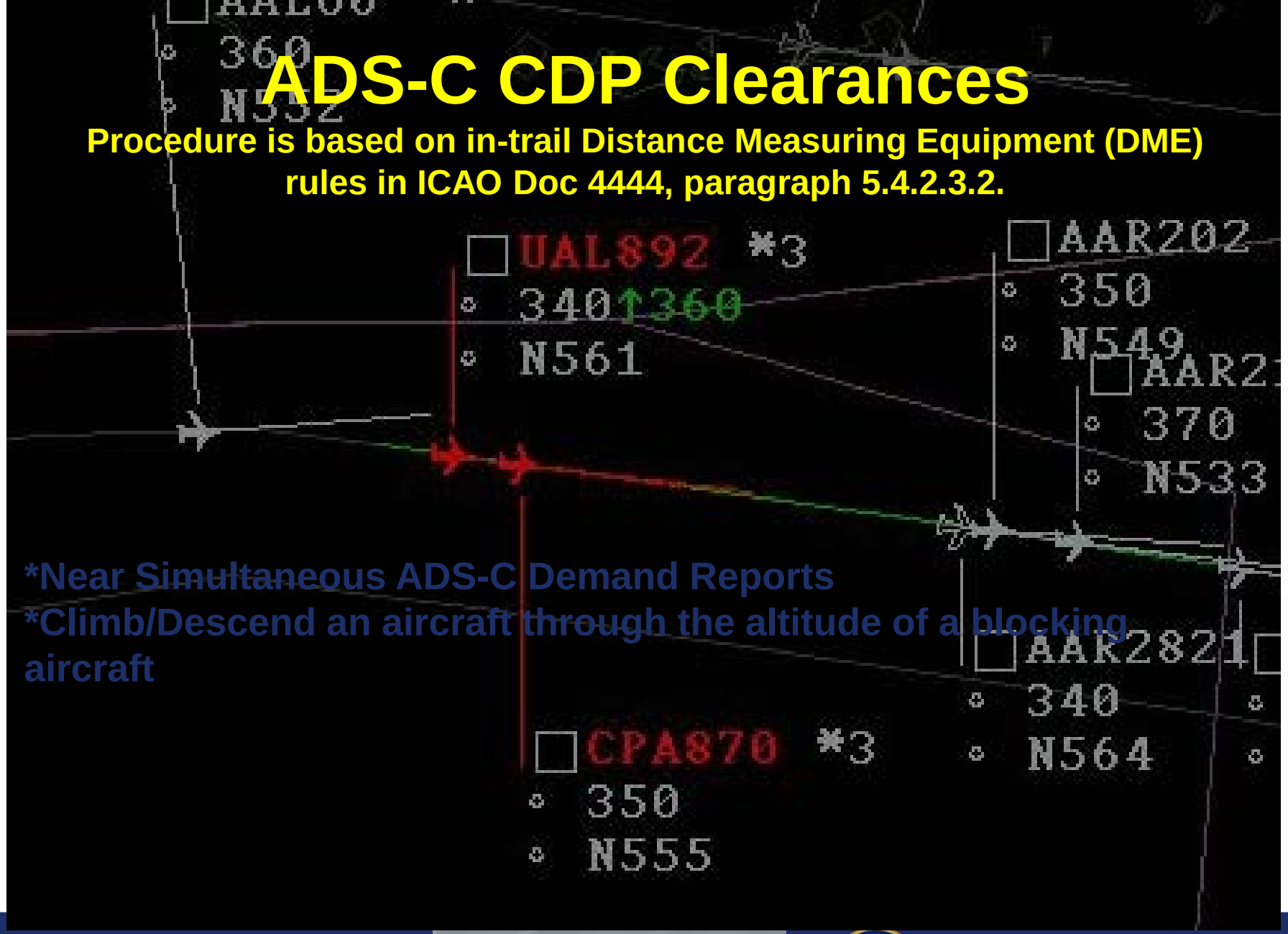

Dynamic
Airborne
Reroute
Procedure
AOC
ZOA
Dynamic Reroute
User Preferred Route
Auckland

Dynamic Airborne Reroutes



ADS-C CDP Clearances

Procedure is based on in-trail Distance Measuring Equipment (DME) rules in ICAO Doc 4444, paragraph 5.4.2.3.2.



***Near Simultaneous ADS-C Demand Reports**
***Climb/Descend an aircraft through the altitude of a blocking aircraft**