



Integrated Equivalent Visual Operations

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FAA MOIE

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Problem



- **Air traffic operations at United States airports depend heavily on visual operations**
 - **Pilots or controllers acquire traffic visually and provide visual separation**
- **Operations in the national airspace system degrade enormously when visual operations cannot be supported**
 - **Significant delays throughout the system**

Background

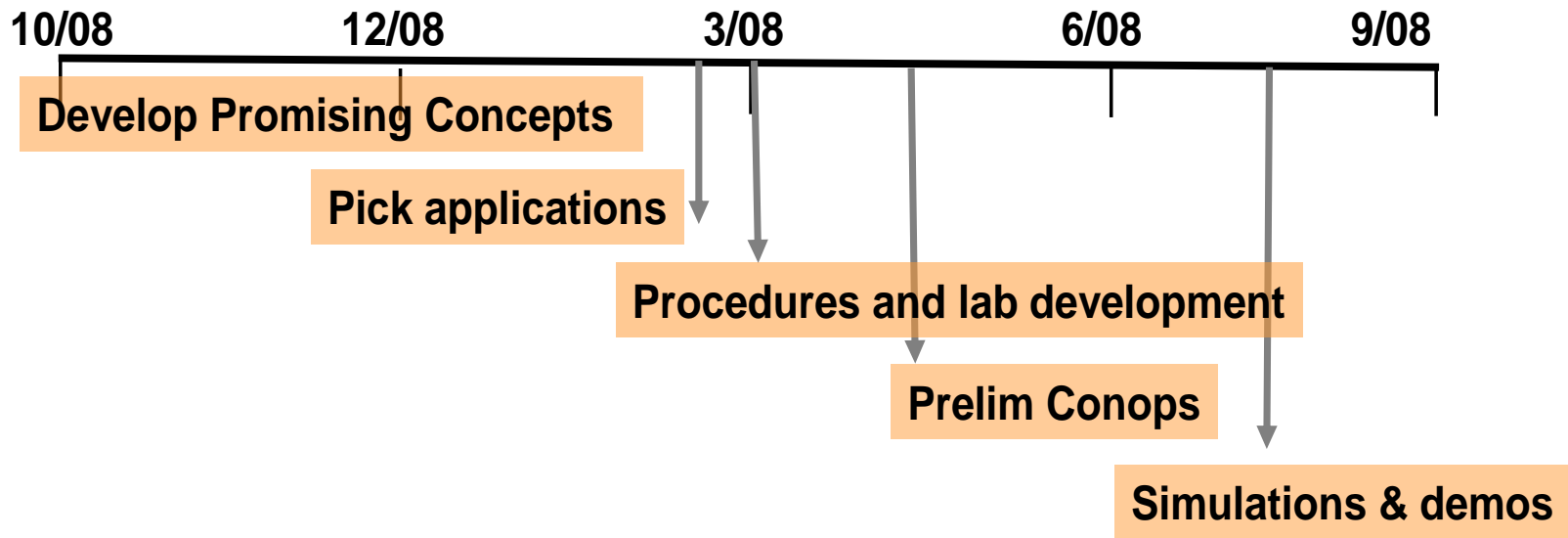
- **Air traffic control rules during visual separation differ from non-visual separation rules**
 - **Simultaneous visual operations allowed to closely spaced parallel runways separated by 700 ft.; radar-based operations require runway separations of at least 2,500 ft**
 - **Single runway separations over threshold during visual operations are nearly a mile better than radar-based separations**
 - **Departures from single runways are more efficient during visual conditions than instrument conditions**
- **Efforts to close the gap have resisted approaching visual capacities**
 - **Simultaneous Offset Instrument Approaches (SOIA) is not available in instrument meteorological conditions**

Objective



- **Develop concepts to emulate or enhance visual operations**
 - **Use existing and emerging technologies**
 - **Automatic Dependent Surveillance- Broadcast (ADS-B)**
 - **Area Navigation (RNAV) and Required Navigation Performance (RNP)**
 - **Wake vortex transport prognosis**
 - **Enhanced Vision Systems (EVS) (sensor based vision in low visibility)**
 - **Synthetic Vision Systems (SVS) (terrain and cultural data)**
- **Develop laboratory demos of selected concepts**

Activities

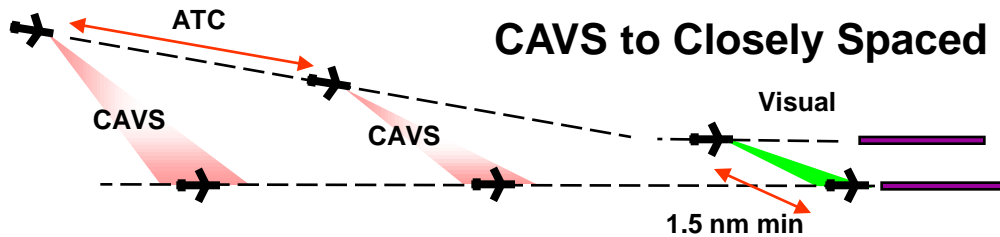


Cockpit Display Based Visual-like Separation

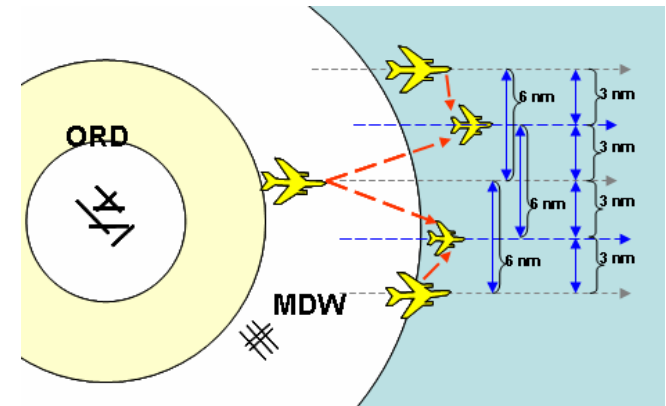
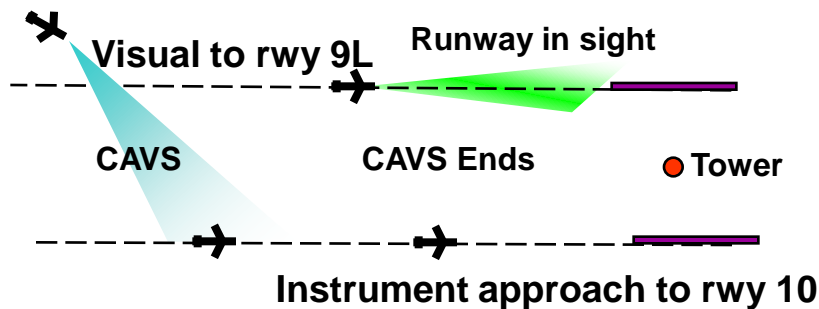
CAVS: Cockpit display of traffic information Assisted “Visual” Separation

Arrivals

CAVS to Closely Spaced Parallel Runways



Parallel Rwy CAVS

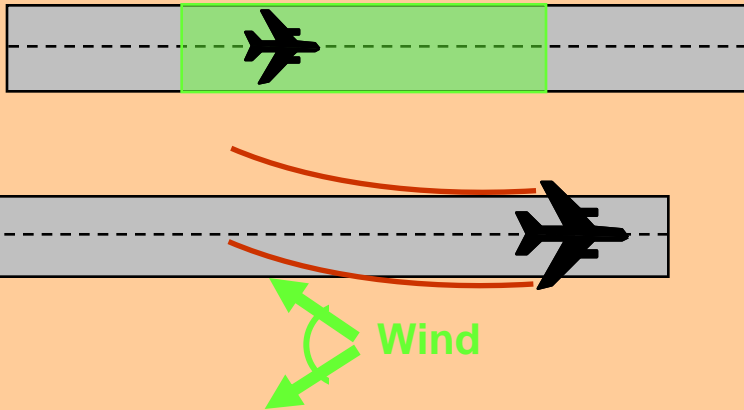


Transition CAVS

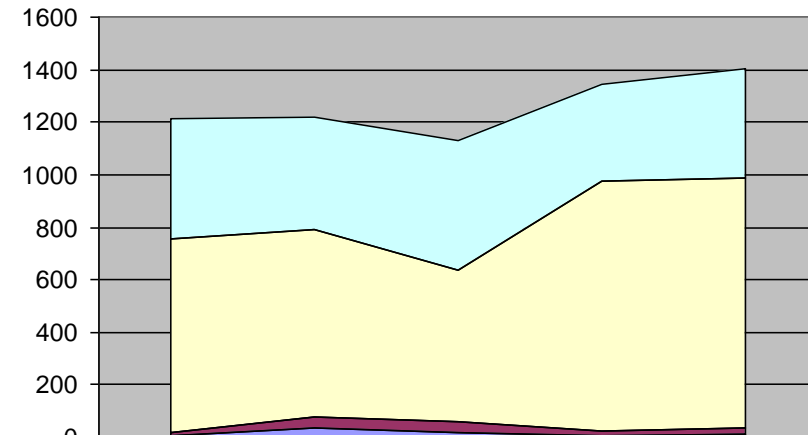
Parallel Departure Flow Monitoring

Highlight/Demonstration: Paired Departures

Paired Departure: Wake delay of 2-3 minutes avoided with short interval (window) between departures (available 50-70% of time)



Increments of Monthly Departures Enabled



	March	April	May	June	July
Paired Dept (10kt wind)	456	423	495	369	417
Paired Dept (2kt wind)	739	716	576	954	953
During Relaxed WTMD Green	15	43.5	42	17	19
During Original WTMD Green	4	34.5	16	5	14

- **Trailing aircraft starts takeoff roll prior to heavy departure rotation**
 - **Controller provides conditional takeoff clearance**
 - **ADS-B CDTI displays departure status and signals end of departure window**

Impacts



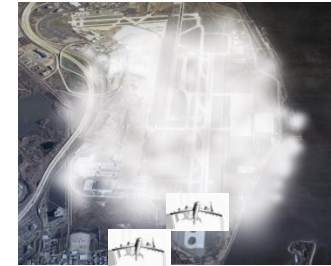
- **Increase NAS capacity and reduce delays**
- **Help meet Joint Program Development Office's NextGen objectives**
- **Provide return on investment to users for major technologies such as ADS-B and RNP**

Future Plans

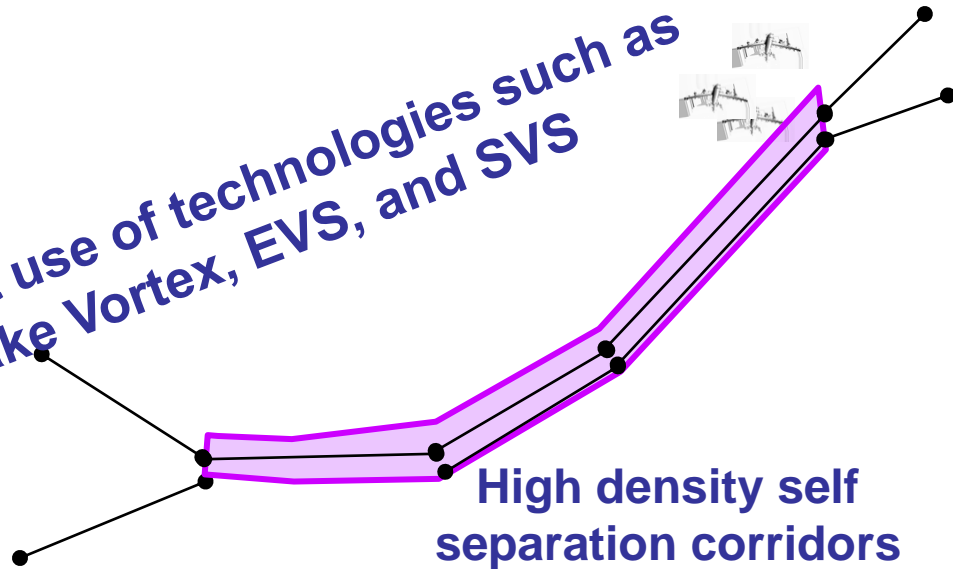
Controller and pilot
productivity
improvements



Visual-like
operations in all
weather
conditions



Integrated transparent use of technologies such as
ADS-B, RNP, Wake Vortex, EVS, and SVS



High density self
separation
corridors