

Airport Working Group Activity #16: Benefits of Closely-Spaced Parallel Runway Operations to Airports

Airport Capacity Workshop
JPDO Airport Working Group
February 19, 2009

What is a Closely-Spaced Parallel Runway Operation?

- Parallel runways with centerline separations of less than 4,300 feet
- More specifically, parallel runways that are affected by operational dependencies because of insufficient runway separations
- Dependencies are associated with wake turbulence and collision avoidance in reduced visibility conditions

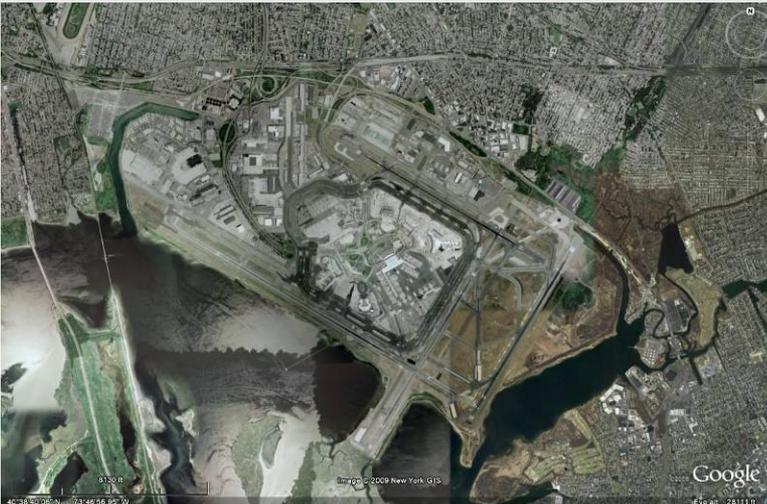
CSPO Examples



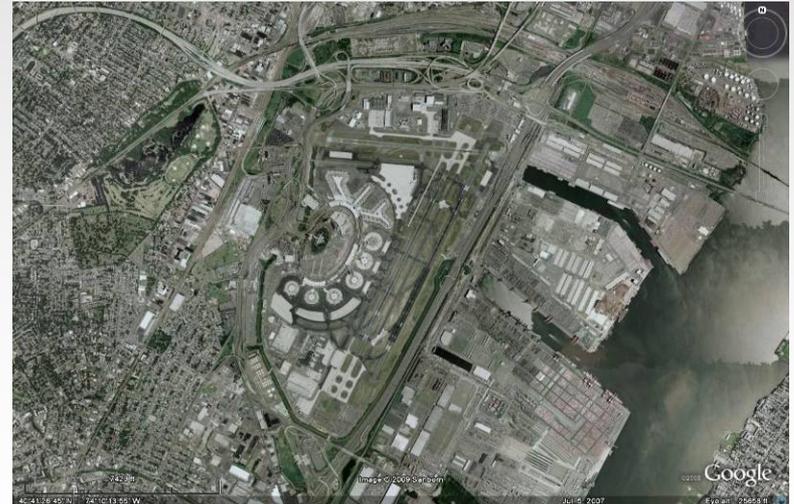
San Francisco International Airport



Seattle-Tacoma International Airport



John F. Kennedy International Airport



Newark-Liberty International Airport

Current Air Traffic Rules (a very simplified picture)

Parallel runway separation	Runway dependencies
4,300 ft and greater	None
3,000 ft – 4,300 ft	None, but only if a precision runway monitor (PRM) is installed and used
2,500 ft – 3,000 ft	Dependent (staggered instrument approaches allowed); departures are independent
1,200 ft – 2,500 ft	Wake turbulence dependencies introduced, runway typically treated as a single runway in instrument meteorological conditions (IMC)
700 ft – 1,200 ft	Dependencies related to aircraft geometry introduced

CLOSELY-SPACED PARALLEL OPERATIONS

NextGen/JPDO CSPO Initiatives

- Goal is to facilitate dependent or independent approaches and departures in **all weather** conditions on runways separated by as little as **700 feet**
- Enables capacity gains at airports with closely-spaced runways, particularly in IMC
- Also facilitates new runway development opportunities

CSPOs—The FACT(2)s

	ATL	BOS	BWI	CLE	CLT	CVG	DCA	DEN	DFW	DTW	EWB	FLL	HNL	IAD	IAH	JFK	LAS	LAX	LGA	MCO	MDW	MEM	MIA	MSP	ORD	PDX	PHL	PHX	PIT	SAN	SEA	SFO	SLC	STL	TPA	
Reduced Separation Standards -- use visual separation in MMC -- use 2/3/4/5 NM in IMC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x*	x	x	x	x	◇*	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Improved threshold delivery accuracy	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
1.5 NM Departure/Arrival separation (IMC) -- spacing < 2500 ft or same runway	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Independent parallel approaches (IMC) -- spacing 2500-4299 ft												x											▲		x									▲		
Triple indep. parallel approaches (IMC)	▲					▲		▲	▲	x				◇	▲						◇				◇										x	
"Mixed triple" independent/dependent parallel approaches (IMC)					x																															
Paired approaches, e.g. SOIA -- MMC (spacing 700-2499 ft)	x	◇		▲							◇						x	x					x		◇						◇	▲				
-- IMC (spacing 1200-2499 ft)		x																																		
Dependent Approaches -- MMC/IMC (700-2500 ft spacing) -- 1.5 NM diagonal behind Small, Large -- wake vortex sep behind B757/Heavy											x							x		x		x										x		◇	x	
LAHSO (all weather) if >7000 ft to intersection		▲											x				x					x														
Simultaneous Converging Approaches (IMC)																	x						x													
Standard Departure/Departure separations (no departure constraints)		x									x				◇	x									x					x		x	x			
Independent parallel departures (IMC) -- no wake vortex separation behind Small/Large (700-2500 ft spacing)											x						x			x		x										x		◇	x	
New/extended runways (since 2002)	▲	◇	x	▲	x	▲		▲	▲			◇		◇	▲					▲		▲	▲	◇		◇					◇			▲	x	

- ▲ Included in 2006 capacity
- ◇ 2015 capacity improvement
- x 2025 capacity improvement
- x* Visual separations applied in VMC and MMC (2025)
- ◇* Visual separations applied in VMC (2015)

Source: FAA, FACT 2 Report.

JPDO Airports Working Group

CSPO Task

- Develop an action plan / roadmap on CSPO benefits to airports
 - Synthesize existing FAA efforts that seek to enable independent aircraft operations to closely spaced parallel runways
 - Assess potential parallel runway separation standards that might be achieved by various candidate technologies
 - Identify airports which would benefit from reduced runway separation requirements
 - Evaluate approaches to integrate potential CSPO into long-term airport infrastructure planning efforts.
 - Provide preliminary guidance to airports regarding how they can prepare for NextGen/JPDO CSPO initiatives

Delay-prone airports will be the focus

Challenges

- Estimating benefits and needed enablers
 - Aircraft and airport equipage assumptions
 - Procedural assumptions
 - Airport-specific issues (weather, runway use, procedural minimums)
- Capturing “unintended consequences”
 - Taxiing/ground operations
 - Runway use configurations
 - Other facility impacts
 - Environmental issues
- Coordinating ongoing work efforts
 - FAA ATO and NextGen efforts
 - With other JPDO working groups

We Need A Few Good Industry Experts to Help Us

- Need a mix of backgrounds--airports, consultants, FAA, and manufacturers
- Experience with airfield planning, air traffic control, capacity/delay analysis, and benefit-cost analysis a plus



BACKUP SLIDES

(more to come)

CSPO Categorization

Parallel runway separation	Issues
2,500 ft - 4,300 ft	Navigational capabilities/collision avoidance
1,200 ft – 2,500 ft	Navigational capabilities/collision avoidance, wake turbulence, ground-based navaid siting, runway crossings
700 ft – 1,200 ft	Navigational capabilities/collision avoidance, wake turbulence, aircraft geometrics, taxiway and hold pad siting, ground-based navaid siting, runway crossings