Taking Flight – the Latest from the Aircraft Manufacturers

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ECCN: 9E991

Agenda

- 777X Update
  - Airports visited
  - 777-9X Aircraft Characteristics (Preliminary)
    - General Dimensions
    - Folding Wing Tip
    - Overall Length
    - Ramp Servicing
    - Turning
    - Pavement Loading (ACN vs. PCN)
  - Airport Compatibility Summary
  - 747-8 Update
- 737 MAX Update

Dimensions shown are preliminary and may change during configuration development

ECCN: 9E991 – June 2-4, 2014

85 airports and 25 CAAs visited

- 777X Airport Compatibility WTT

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Airports visited

- 777X Airport Compatibility WTT

DESTINATION AIRPORTS

ADD	Addis Ababa
AKL	Auckland
AUH	Abu Dhabi
BKK	Bangkok
BLR	Bengaluru
BNE	Brisbane
BOG	Bogotá
BOM	Mumbai
CDG	Paris
CGK	Jakarta
CPT	Capetown
DEL	Delhi
DFW	Dallas / Ft. Worth
DOH	Doha
DXB	Dubai
FRA	Frankfurt
GRU	São Paulo
HKG	Hong Kong
HND	Tokyo
IAD	Washington Dulles
IAH	Houston
IST	Istanbul
JED	Jeddah
JFK	New York
KIX	Osaka
LAX	Los Angeles
LHR	London
MAA	Chennai
MEL	Melbourne
MEX	Mexico City
MNL	Manila
MUC	Munich
MXP	Milan
NRT	Tokyo
ORD	Chicago
PEK	Beijing
PHL	Philadelphia
PVG	Shanghai
SEA	Seattle
SFO	San Francisco
SIN	Singapore
SYD	Sydney
TPE	Taipei
YUL	Montreal
YVR	Vancouver
ZRH	Zurich

ALTERNATE AIRPORTS

AFW	Dallas/Fort Worth
AMS	Amsterdam
BAH	Bahrain
BFI	Seattle
BIL	Billings
BOS	Boston
BRU	Brussels
BWI	Baltimore
CGN	Cologne / Bonn
CPH	Copenhagen
DEN	Denver
DME	Domodedovo
DTW	Detroit
EWR	Newark / New York
HAJ	Hannover
HEL	Helsinki
ICN	Seoul
IND	Indianapolis
KHV	Khabarovsk
KUL	Kuala Lumpur
LAS	Las Vegas
LED	St. Petersburg
LGW	London Gatwick
MFM	Macau
MKE	Milwaukee
MSP	Minneapolis / St. Paul
NGO	Nagoya
NUE	Nuremberg
OAK	Oakland
ONT	Ontario
ORY	Paris
PAE	Everett
PDX	Portland
PKC	Petropavlovsk
RFD	Chicago Rockford
SLC	Salt Lake City
SVO	Sheremetjevo (Moscow)
VKO	Vnukovo (Moscow)
YYZ	Toronto

REGULATORS

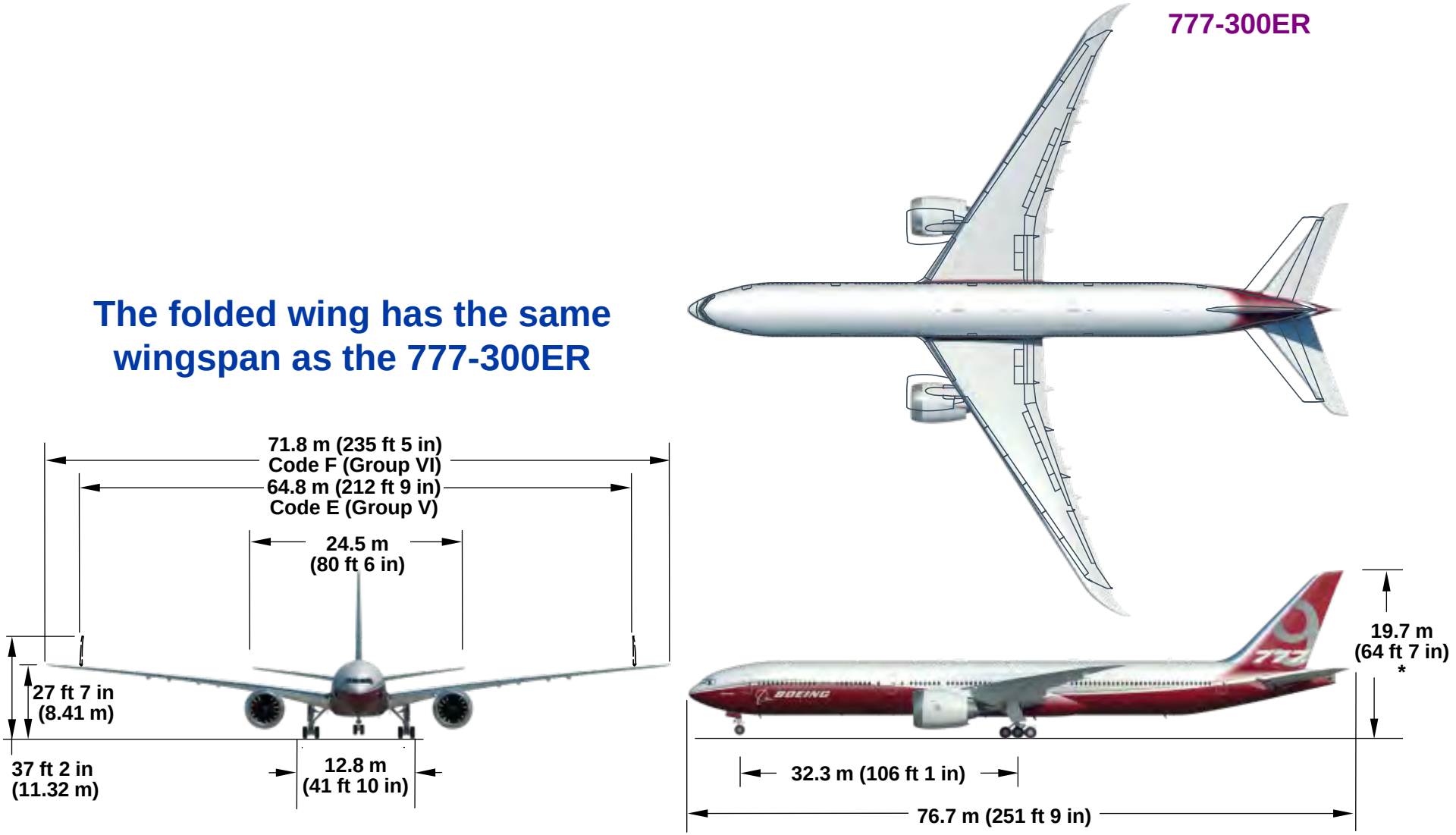
Airport Authority of India
Airports of Thailand
ANAC-Brazil
Bahrain
CAA - Hong Kong
CAA - Macau
CAA - Philippines
CAA - Singapore
CAA - Taiwan
CAA - UK
CAAC - China
CASA - Australia
DGAC - France
DGAC - Mexico
DGCA - India
DGCA - Indonesia
EASA
ENAC - Italy
Ethiopia
FAA
ICAO
JCAB
KOCA - Korea
Russia
TC - Canada

Dimensions shown are preliminary and may change during configuration development

As of September 10, 2015

777-9X Baseline General Arrangement

The folded wing has the same wingspan as the 777-300ER



*** Estimate maximum tail height under normal loading conditions**

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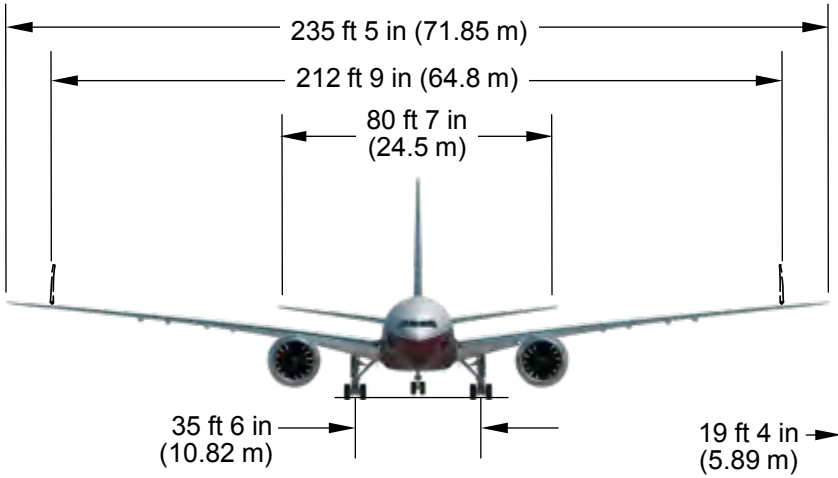
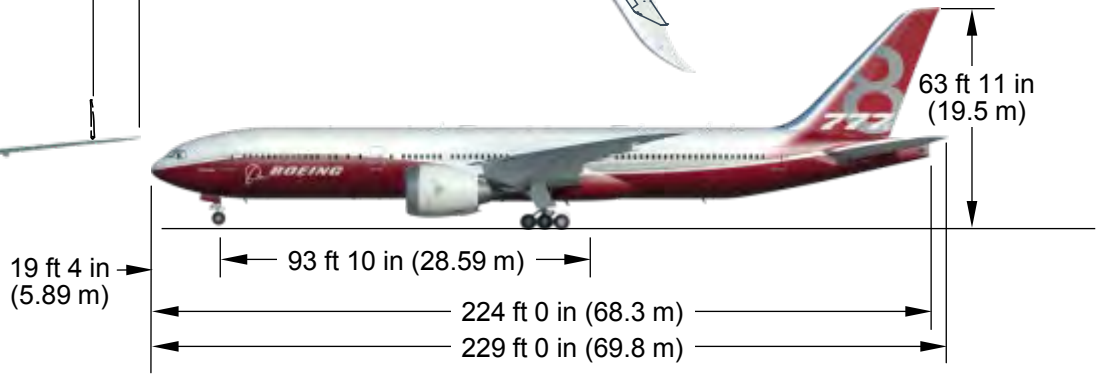
777-8X general arrangement

Compared to the 777-200LR, the 777-8X
- Fuselage is 17.5 ft (5.33 m) longer
- Wing span is 22.8 ft (6.96 m) longer
- Horizontal stabilizer is 10.0 ft (3.05 m) wider





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PDX-CO-0372 R1 1-7-15-CG

777-9X Compared to the 777-300ER

- Compared to the 777-300ER, the 777-9X
  - Overall length is 2.9 m (9.4 ft) longer
  - Folded wingspan same, unfolded wingspan is 7 m (22.8 ft) wider
  - Horizontal stabilizer is 3.0 m (9.9 ft) wider
  - Wheelbase is 1.1 m (3.6 ft) longer
  - Distance from the nose to the nose landing gear remains the same
  - Engine to fuselage centerline is 1.0 m (3.3 ft) further outboard
  - Vertical tail max. height is < 1.0 m (< 3.0 ft) higher
  - Main landing gear width is 0.2 m (6 in) narrower

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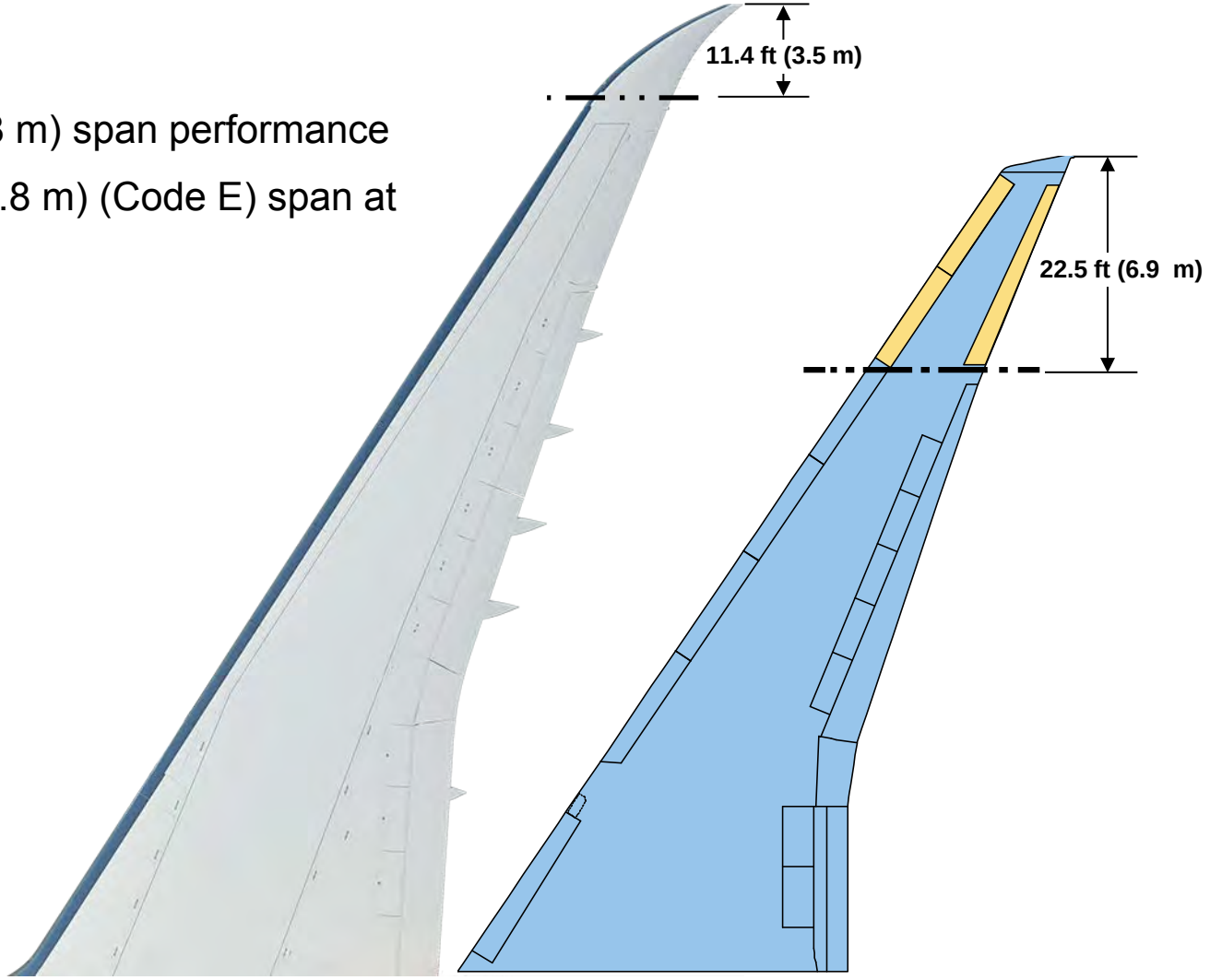
Folding Wing Tip Comparison to 777-200 “Folding Wing”

- 777X tip fold
  - Enables 235.4 ft (71.8 m) span performance
  - Maintains 212.8 ft (64.8 m) (Code E) span at taxiways and gates
  - Lighter weight
  - Fewer moving parts

- 777-200 folding wing
  - Larger, heavier
  - More complex
    - Ailerons, slats, hydraulics, electrical
  - Large external fairing



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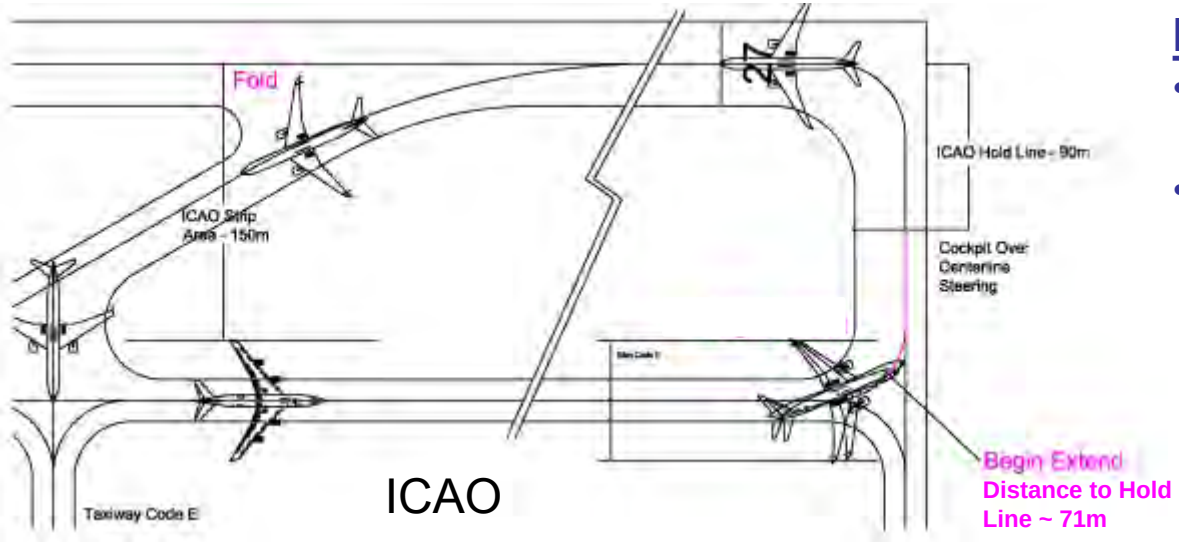
Determining where to extend – in work

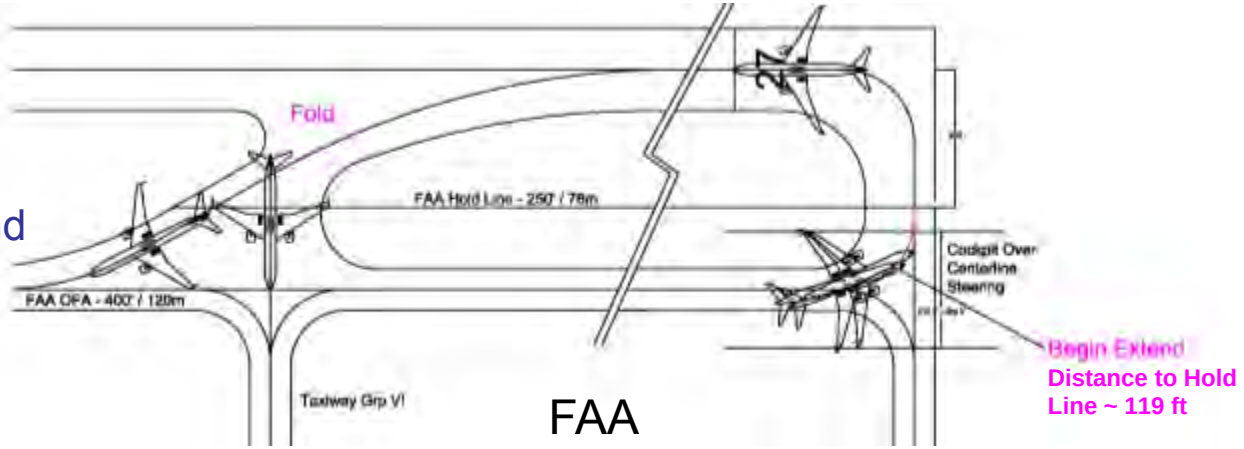


Requirements:

- Minimize the potential impacts to airport normal traffic flow
- Minimize impacts to parallel taxiways (Code E vs. Code F)

Next Step:

- Make a case to ICAO / FAA to initiate extend 1000 ft along parallel taxiway prior to RW end



- Fold/Extend command is linked to electronic checklist and alerting system
- Alerts prior to takeoff and after landing back up normal crew procedure

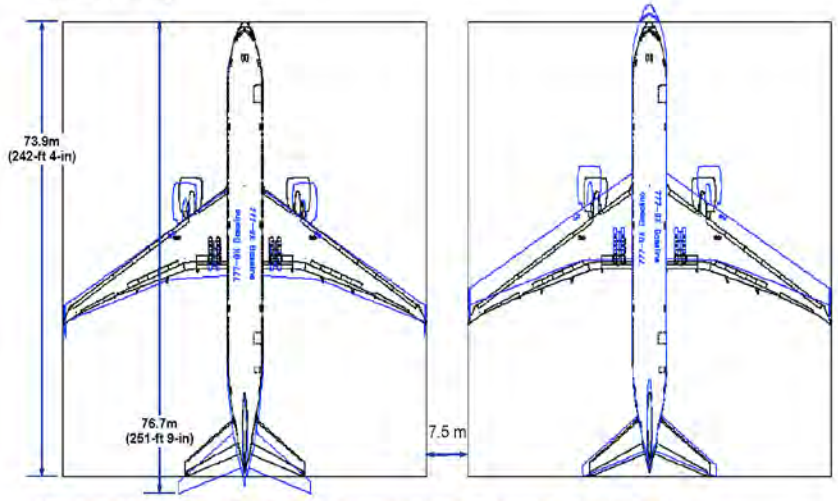
Dimensions shown are preliminary and may change during configuration development

777X overall length

Ways to accommodate 777-9X length at the gate

777-9 Parks at a 777-300ER Gate

- No requirement to down-size adjacent gate
- At many gates increased length of the 777X can be accommodated by moving aircraft forward towards the terminal (additional space available in the front of aircraft nose)

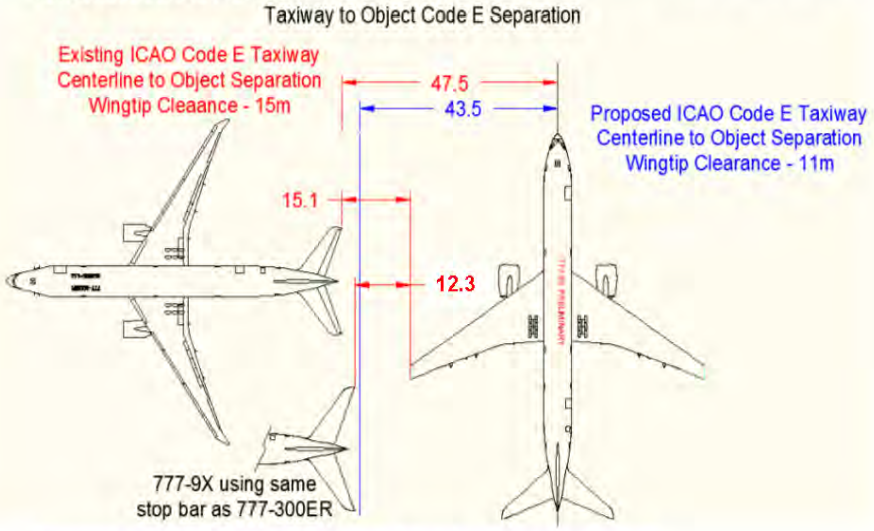


Dimensions shown are preliminary and may change during configuration development

Move nose stop bar forward

777-9 Parks at a 777-300ER Gate

- No requirement to down-size adjacent gate with FWT
- Expected ICAO wingtip separation standard change (in 2016) provides relief at gates that do not have service road aft of the parking limit line



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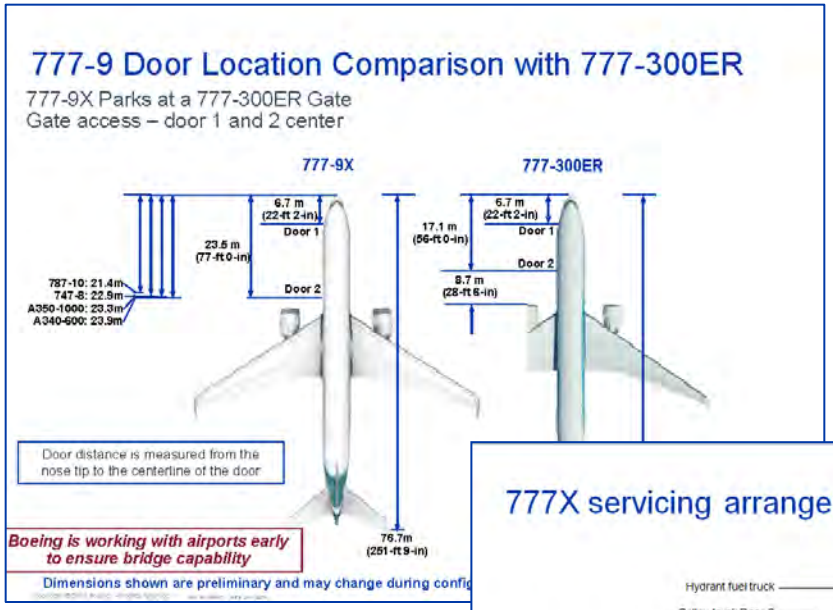
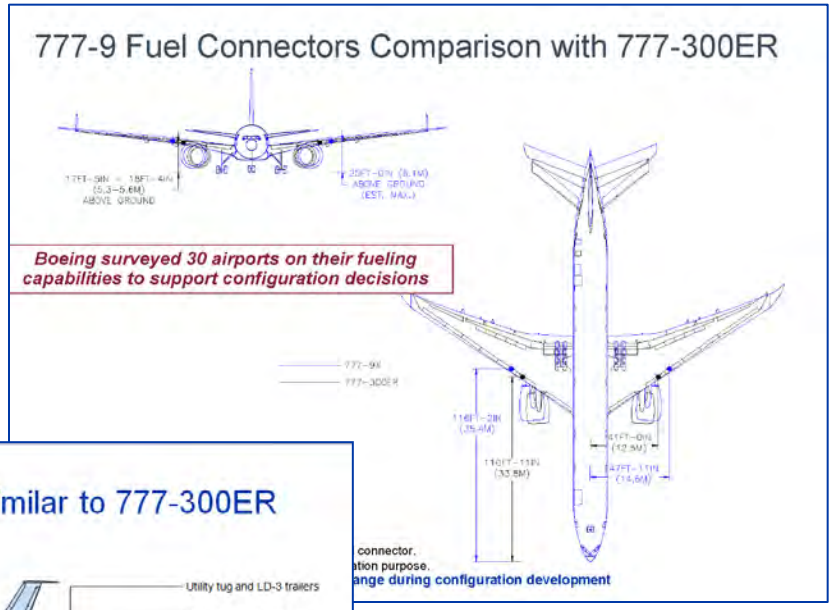
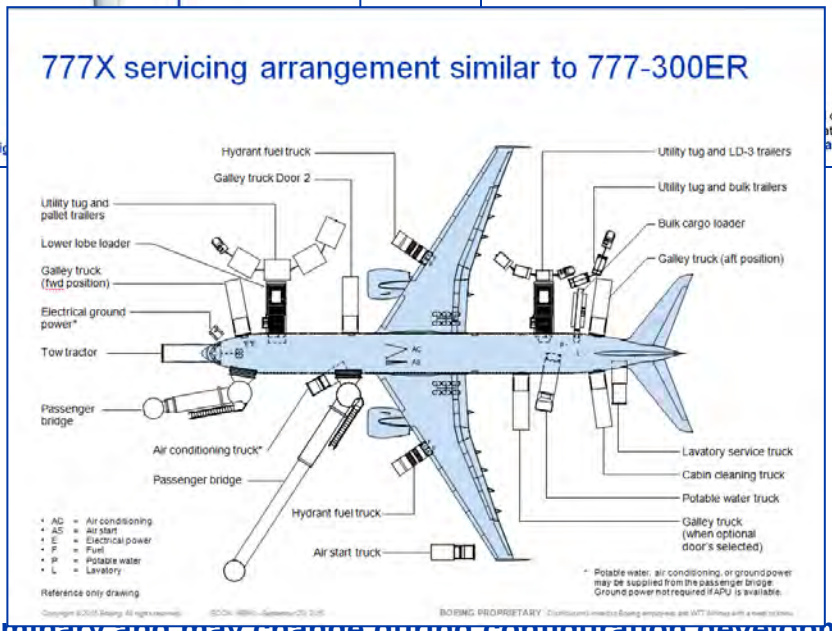
Reduced ICAO separations
“absorbs” additional length

Dimensions shown are preliminary and may change during configuration development

777X on the ramp







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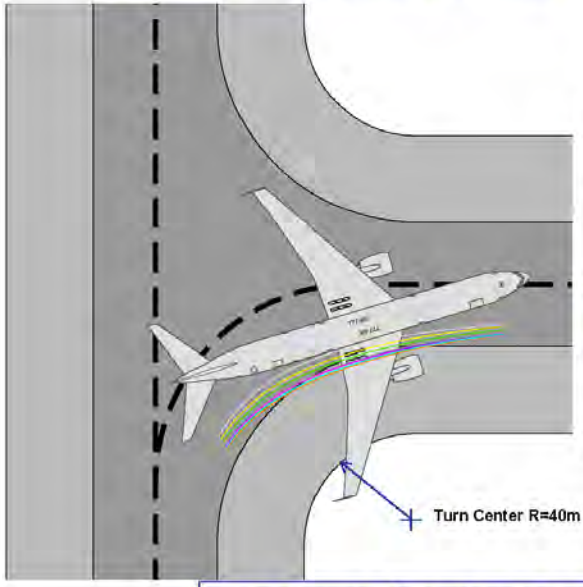
777X turning

777-9 Fillet Requirement Similar to 777-300ER



Model	ICAO design code	Tire edge to turn center (ft)
A340-600	E	38.4
A350-1000*	E	38.7
A380	F	39.0
777-9X*	E**	39.0
777-300ER	E	39.3
747-8	F	39.9
787-10*	E	40.8
747-400	E	41.8

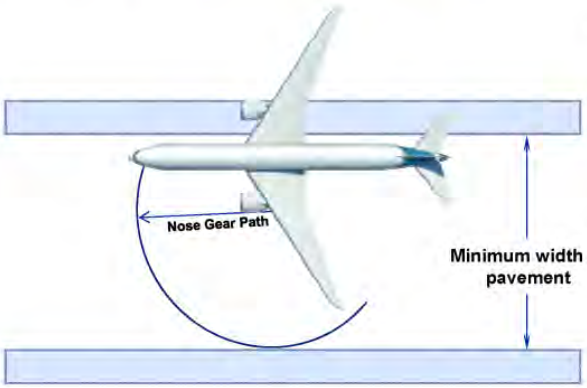
LESS CRITICAL

* PRELIMINARY
** E after exiting the runway

Judgmental Oversteering permits adequate tire edge clearance on most existing fillets

Dimensions shown are preliminary and may change during configuration development

777-9 180° Turn Capability



- U- us as
- Mi ba air no

	747-400	787-10 [1]	747-8	777-300ER	777-9X [1]	A340-600	A380-800 [2]
ICAO Airplane Design Code	E	E	F	E	F	E	F
180 turn width (m) max steering angle, no differential braking [3]	51m	51	52 m	57 m	59 m	57 m	57 m

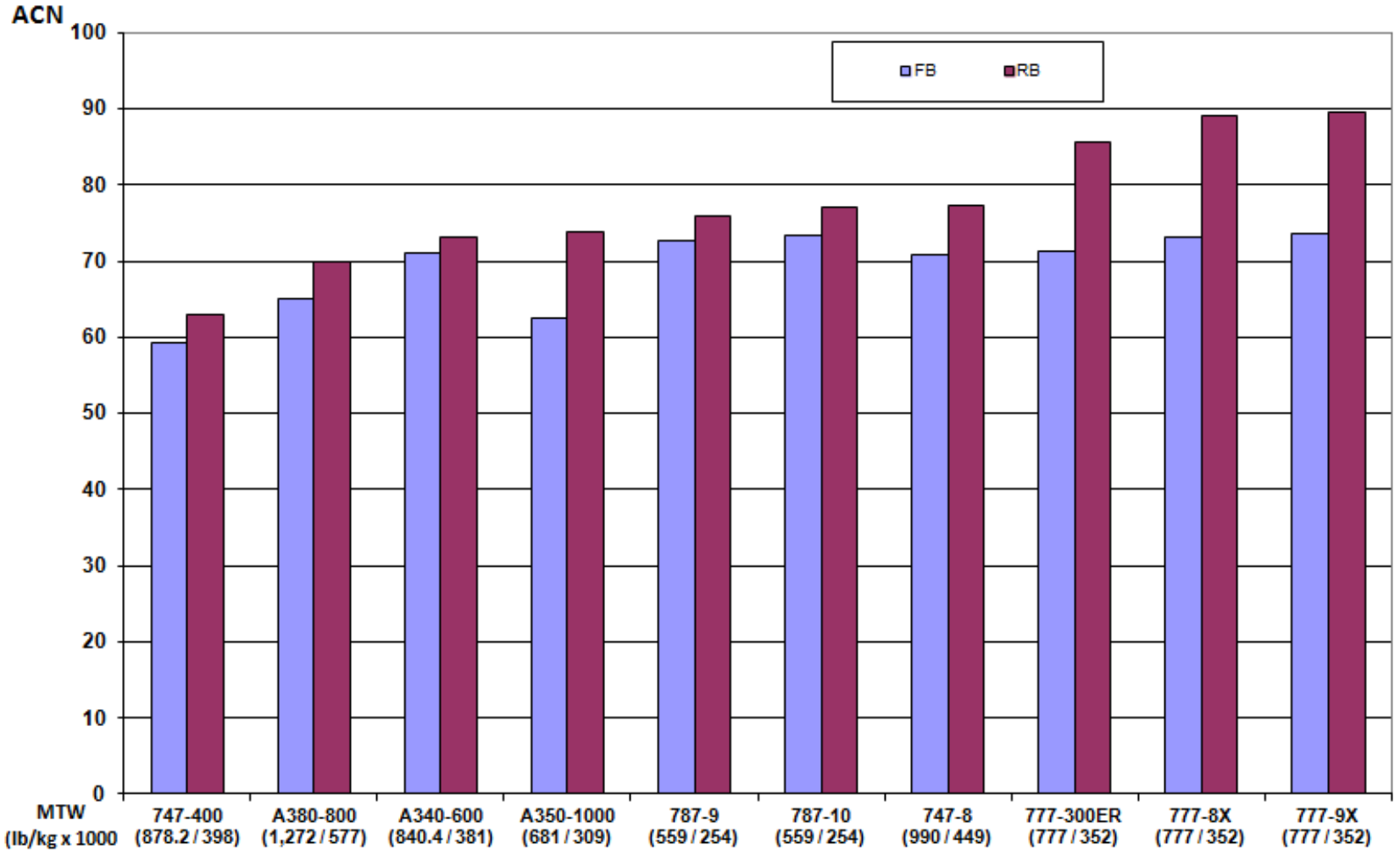
1. PRELIMINARY
2. Boeing calculation using no differential braking, asymmetric thrust – current Airbus A380 planning manual value (50.91) includes differential braking and asymmetric thrust
3. Minimum widths do not take into account tire-edge clearance of 15 ft (4.5m) at both pavement edges

Dimensions shown are preliminary and may change during configuration development

Dimensions shown are preliminary and may change during configuration development

777X Pavement Loading

ACN (Aircraft Classification Number) is similar to other wide body aircraft *



* ACN is preliminary and may change during design and development

777X Airport Compatibility Summary

- Airports and their regulators are delighted that Boeing is designing the 777X with airport compatibility in mind
- Airports appreciate that the folded wing will fit in today's 777-300ER gates
- Expected reductions in taxilane/taxiway to object separations (2016) will provide relief for the additional -9X length
- Most airports are confident their existing fillets are sufficient for the additional wheelbase
- Boeing will address airport procedures for FWT failure to fold procedures
- Boeing will work with airports as needed on: ground servicing, de-icing, dual runway entrance taxiways, higher RFF category, alternates and ETOPS airports, Jet Bridge and Fuel Pit Connectivity, etc.

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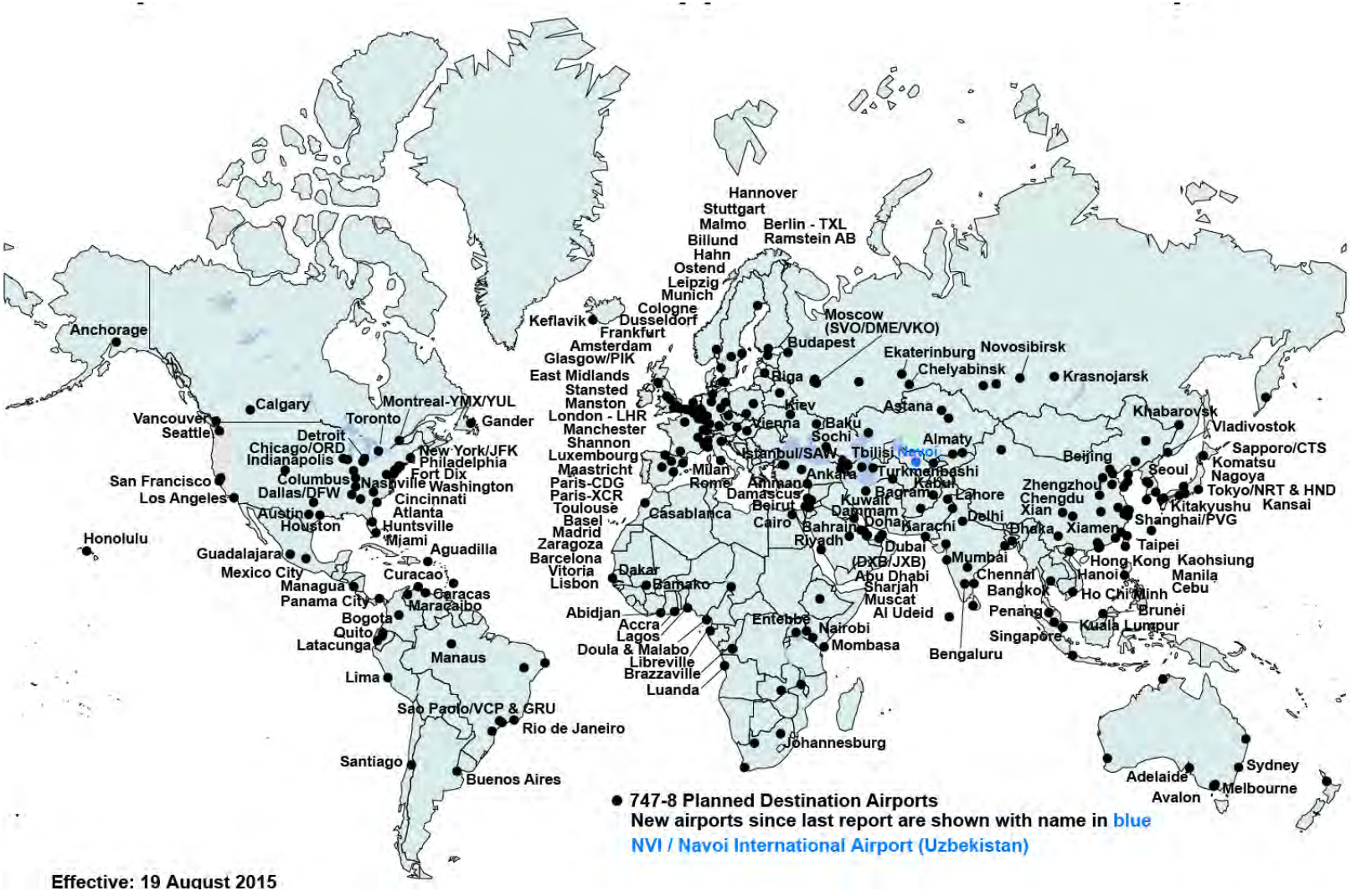
747-8: 490 destination and alternate airports approved

171 Airports with revenue operations



737 MAX in final assembly