Slide 1 - Title Slide

DRAFT: For Discussion Purposes Only

Aircraft Lavatory Accessibility

Joint Airline and Manufacturer Presentation

Slide 2 - Agenda

1. Level setting
2. Proposal
3. Definitions
    a. Tier Solutions
    b. Transfer Types
4. Tier 1
5. Tier 2
6. Size of Aircraft
7. Implementation Dates
8. Glossary of terms

Slide 3 - Level Setting: Providing Accessible Lavs on Single Aisle Airplanes

1. The ACCESS Charter's scope is limited to *"addressing the feasibility of accessible lavatories on new single aisle aircraft."*
    a. All ideas presented are therefore limited to new single aisle aircraft and do not consider upgrades to in-service aircraft
2. DOT's analysis in 1990 and later years showed accessible lavs on single aisle aircraft could not be justified
3. The Convener's Report (in 2016) asserts new accessible lav designs preserve existing seat count and galley space
    a. Unfortunately for airlines representing the majority of the market, these designs will still require loss of 3-6 seats
    b. Galley space and seat pitch on full-service carriers is an essential part of the business model; so additional lav space comes from seat loss
4. Requiring a change in lavatory footprint and surrounding area *(to provide a fully accessible lav)* on current type certified aircraft would drive retrofit of in-service aircraft to achieve uniform fleets. This drastically multiplies costs and takes aircraft out of service for modifications

Slide 4 - Level Setting: Providing Accessible Lavs on Single Aisle Airplanes

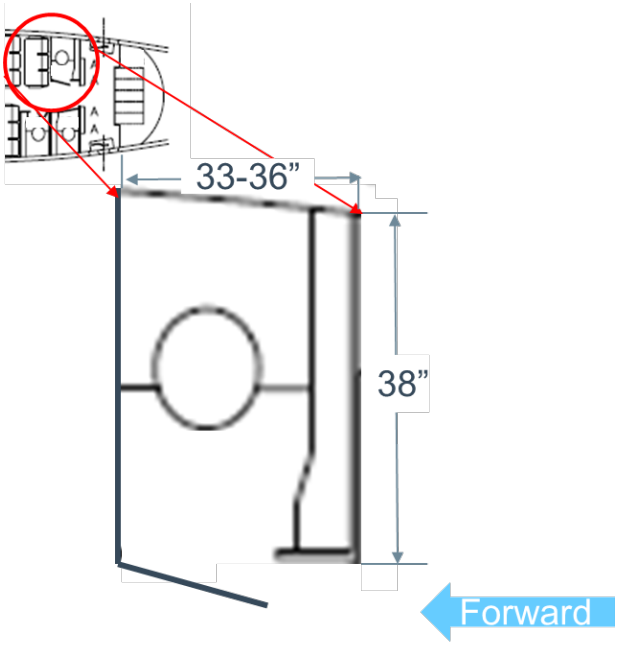
1. The report *"Lavatory Accessibility in Single-Aisle Aircraft Final Report of the Aircraft Accessibility Federal Advisory committee"* [1] documents the design challenges and cost associated with providing accessible lavatories on existing single aisle type design aircraft
    a. The challenges identified in the report (based on the prior rulemaking activity[2]) still exist today for single aisle aircraft; however, the cost are now much higher
2. Many single aisle aircraft flying today provide standing transfer access from an OBW into the lavatory
3. Providing seated transfers from an OBW to the toilet requires additional space in and/or around the lavatory
    a. Efficient cabin space utilization requires moving the lavatory and trading cabin space:
    b. Each airline deciding to provide seated transfer accessibility must choose, based on its business model, to accept a loss of seats or galley space. For airlines representing the majority of the market galley space must be maintained and seat loss as a result

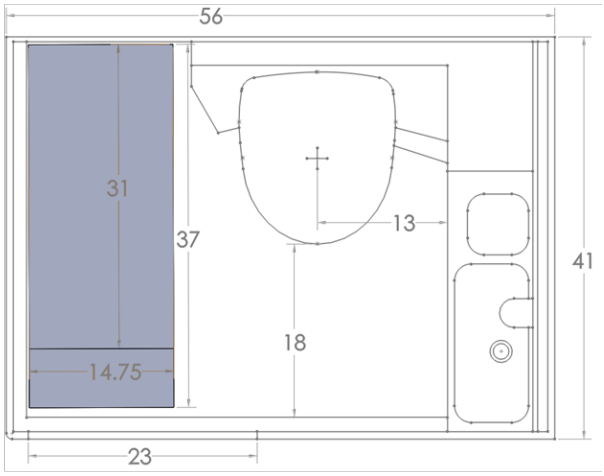
Slide 4 Foot Notes :

1 Published by the Office of Environment, Energy, and Safety : Office of the Secretary of Transportation

2 NPRM June 22, 1998 and ANPRM 90-10 published March 6, 1990

Slide 5 - Level Setting: Providing Accessible Lavs on Single Aisle Airplanes





Left Image : Typical single aisle lavatory measuring 33 inches (front to back) by 38 inches (aisle to window)

Right Image : Typical twin aisle accessible lavatory measuring 56 inches (front to back) by 41 inches (aisle to window)

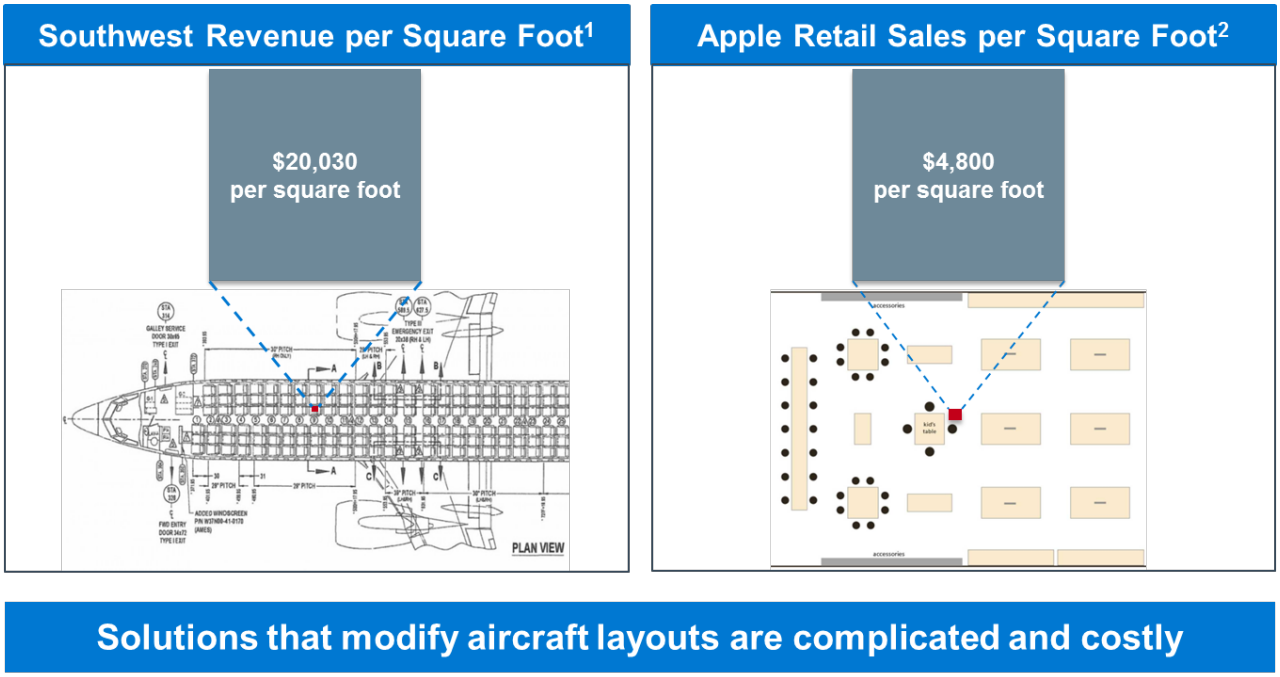
1. Typically an increase of 23” fore/aft and 3” inboard is needed to provide a seated transfer accessible lav
2. Providing an additional 23” cannot be accommodated without removing a row of seats and potentially new cabin crew seat installation/certification or moving the lav to a different location in the airplane.

Slide 6 - Level Setting: Providing Accessible Lavs on Single Aisle Airplanes

1. Executive Order 12866 and Executive Order 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs
2. Included herein is a part of the cost of implementing a lav similar to that currently required by 382.63(a)(1)(2)(3) on a single aisle aircraft
    a. Airline cost data for providing seated transfer accessibility

Slide 7 - Level Setting: Providing Accessible Lavs on Single Aisle Airplanes

1. Space on aircraft is a limited resource; every inch is engineered to optimize the efficient use of the space available



Left image : Southwest 737 revenue of $20,030 per square foot

Right image : Apple retail sales of $4800 per square foot

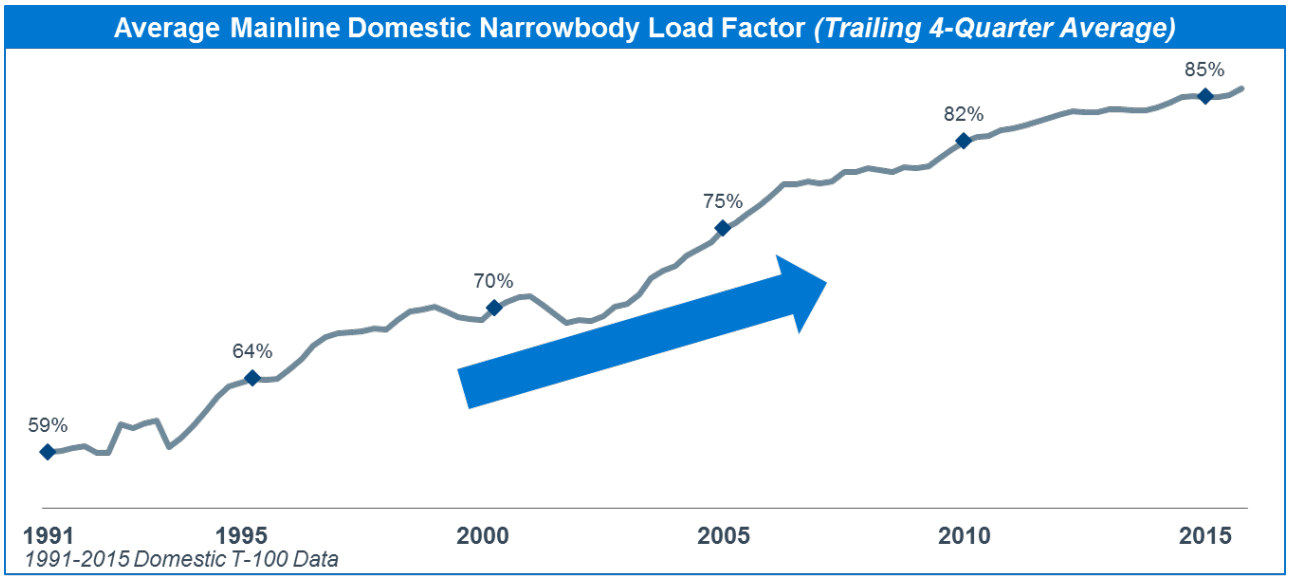
Slide 7 Footnotes :

1. Southwest airlines 2015 annual report, $18,299 million passenger revenue; 118 -300s, 11 -500s, 471 -700s, 104 -800s with 1,267, 1,033, 1,267, and 1,500 sq ft respectively

2. Apple sales: Fortune, Phil Wahba, 3/13/2015 “Apple extends lead in U.S. top 10 retailers by sales per sq ft” http://fortune.com/2015/03/13/apples-holiday-top-10-retailers-iphone/

Slide 8 - Level Setting: Domestic networks are increasingly full

1. Fill rates vary by individual flight, with many being completely full, but *'Average Load Factor'* shows the upward trend of the industry
    a. Even in cases where there is an open seat at time of flight, the selling solution of the entire cabin depends on the overall capacity



Ultimately, a loss of even one seat affects the selling of all other seats

Chart illustrates average mainline domestic narrowbody load factor showing a steady climb from 59% load factor in 1991 to 85% load factor in 2015.

Ultimately, a loss of even one seat affects the selling of all other seats.

Slide 9 - Level Setting: High value per square foot driven by high utilization

1. Removing a even a small number of seats from narrowbody aircraft has tremendous opportunity costs
    a. Every seat, regardless of if the aircraft goes out 100% full, is part of the available inventory of an aircraft and helps to determine selling strategy and market share

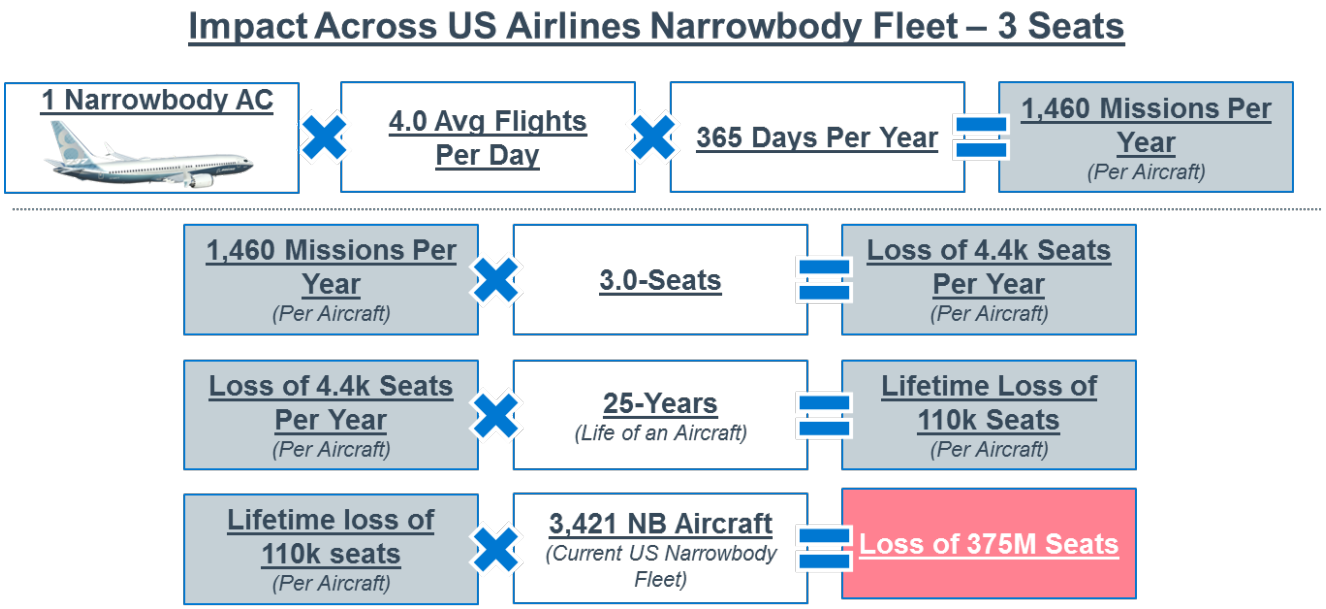


Image shows the impact of losing three seats on a narrowbody aircraft over the US fleet of 3421 aircraft over typical 25-year life time of an aircraft is 375 million seats.

Slide 10 - Level Setting: Marginal PRASM is the standard for seat valuation

1. Represents a conservative estimate of seat value, based on 'diminishing marginal return'
    a. Based on publicly-available SEC filings, the average US industry narrowbody seat is worth ~$143 per departure
    b. Because of diminishing marginal returns the last set of seats is worth a smaller portion of that average value
        i. Removed seats are valued at ~75% of the average revenue, based on historical observations and industry practice
        ii. A reduction in passengers will also reduce some variable costs – estimated at ~6% of revenue

Table - Per Seat Statistics: Marginal PRASM

Average Revenue / Seat[1]	**$143**
Revenue Lost / Seat @ 75% Marginal PRASM	($104)
Cost Avoided / Seat[2] @ Variable Cost = 6% of Rev	$6
Net Impact per Seat	**($98)**

Slide 10 Footnote :

1. Source: 2015 SEC Filings for Mainline Domestic Flying with Diio Schedule for Mainline Narrowbody flying

Slide 11 - Level Setting: Marginal PRASM for US airlines from SEC filings

1. Using SEC filings across the industry, the impact of a three seat loss can be evaluated using marginal PRASM
    a. The three seat impact is applied across the entire industry
        i. Does not consider costs to implement (recurring and non-recurring), such as modifications to production system, that would be incurred by both airlines and OEMs
        ii. Designs that utilize more space would lead to additional losses
    b. SEC data is available for carriers that represent 96.8% of narrowbody flying by US-based carriers
    c. Financial impact does not include foreign carriers operating in US (e.g. Westjet, Copa, Air Canada, Aeromexico, etc.)

Table - Annual Impact of 3 Seat Loss – 2015 SEC Data – 75% Marginal PRASM – 6% Inc Cost vs Rev

Carrier	AA	DL	UA	WN	Others[1]	Total[2]
Narrowbody Aircraft (YE'15)	**779**	**655**	**541**	**688**	**596**	**3,259**
NB ASMs	172.2B	130.3B	128.1B	141.8B	131.0B	**703.4B**
NB Deps	1.04M	0.86M	0.56M	1.21M	0.76M	**4.44M**
Avg Stage Length	1,091	994	1,465	803	1,175	**1,059**
Net/Dep	($319)	($321)	($388)	($218)	($282)	**($294)**
Net Impact	**($331M)**	**($275M)**	**($219M)**	**($264M)**	**($215M)**	**($1,304M)**

Table notes :

1. Others includes: B6, AS, NK, HA, VX, G4

2. Total is for publicly available only, and does not include 75 NB aircraft operated by non-listed US carriers (F9, SY)

3. Does not include foreign carriers operating in US (e.g. WestJet, Copa, Air Canada, Aeromexico, etc.)

Slide 11 Footnote :

1. Source: 2015 SEC Filings for Mainline Domestic RASM and Revenue with Diio Schedule for Mainline Narrowbody ASMs and Departures, Diio for fleet size

Slide 12 - Level Setting: The NPV of an industry-wide loss of 3 seats is $33.3B

1. Two Net Present Value (NPV) analyses were assembled for *seat value (excluding costs to implement)*, based on impact to existing aircraft as well as to newly delivered aircraft
    a. Current US carrier narrowbody fleet of 3,414 aircraft
    b. Deliveries replace Existing at rate of 176 aircraft / year (2014-2016 average)
    c. Discount rate = 7%
    d. Revenue growth rate = 2%
2. Much of the 'cost' would be incurred by the public through higher fares, reduced service to marginally-profitable locations, and reduced seating availability

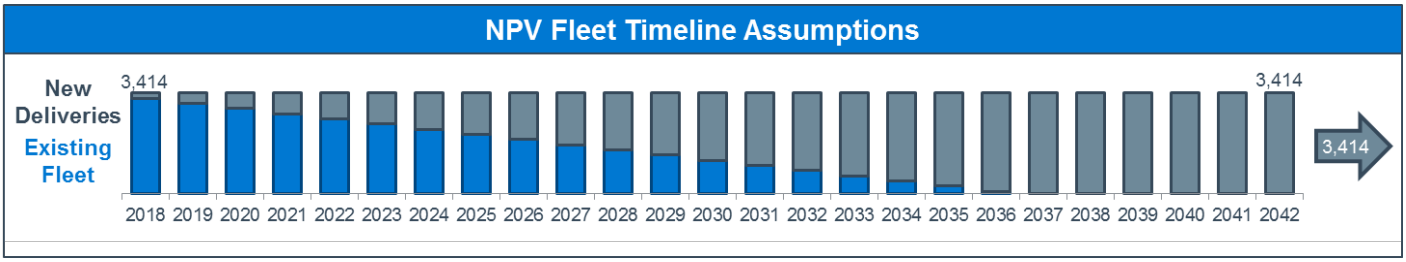


Image shows timeline for the US narrowbody fleet from 2018 to 2042 with phasing out of existing fleet and phase in of new deliveries and replacements to maintain a total of 3414 aircraft.

Table - Industry Seat Value NPV Results – 2018 Base Year

Source	3-Seat Loss
Existing Fleet	**$11.1B**
New Delivery	**$22.2B**
Total	**$33.3B**

Slide 13 - Proposal: Providing Accessible Lavs on Single Aisle Airplanes

1. Based on the historical reports/data and current analysis, Industry recommends considering accessible lavatories on single aisle airplanes in two tiers with increasing levels of access

Slide 14 - Tier Solution:

Table

Tier Level 1 Existing aircraft type design:

1. Any changes are constrained by existing aircraft fuselage geometry and each airline's specific interior configuration
2. Minimal changes to each airline's interior components may be considered*
3. Other accessible accommodations throughout the travel experience may be considered

Tier Level 3 New aircraft type design:

1. Changes that impact fuselage geometry and/or interior configuration may be considered

Comments

1. In all cases, it's very important to clarify that any changes be incorporated 'on the production line' and not considered for retrofitting in-service aircraft
2. It's important that implementation timeframe for the solutions be determined based on complexity of change, solutions pre-designed by the OEMs (for tier 1), and ability of the overall production system to support the change. Typical lead time for smaller aircraft changes is 24 months

Slide 15 - Definition: Transfer Types

For the purposes of this presentation, we are using the following definition to describe the transfer types:

Transfer Type	Formerly Referred As…
Standing Independent Transfer	**Pivot Independent Transfer**
Standing Assisted* Transfer	**Pivot Assisted Transfer**
Seated Independent Transfer	**Independent Transfer**
Seated Assisted* Transfer	**Dependent Transfer**

* On-aircraft assistance would be provided by the PRM's traveling companion and/or assistive equipment

Slide 16 - Transfer Types: Tier 1 Access

1. Industry recommends a focus on the travel system accommodations so that greater access can be provided in a reasonable time frame

	Airport	Aircraft *
Standing Independent Transfer	Accessible Assistance N/A	Accessible Assistance N/A
Standing Assisted* Transfer	Accessible Assistance provided inside the restroom	Accessible Assistance provided outside the lav
Seated Independent Transfer	Accessible Assistance N/A	Not accessible -
Seated Assisted* Transfer	Accessible Assistance provided inside the restroom	Not accessible -

*Given the constraint of minimal aircraft changes and the definitions of access, it is possible that some aircraft will not have Tier 1 access. With accessibility information provided on websites, a PRM should have the choice of airline and/or aircraft to reach their destination with access if they chose

Slide 17 - Transfer Types: Tier 1 Access *(Continued)*

1. The Industry recommends the DOT consider Aircraft changes such as a visual barrier around an accessible lavatory entrance to provide privacy during a standing transfer*

Slide 17 Footnote :

* Assuming the change is shown to be beneficial to increase usability and access for a standing transfer

Slide 18 - Transfer Types: Tier 1 Access *(Continued)*

1. The most challenging environment for providing increased access of PRMs to commercial aviation is on-board the aircraft.
    a. Space constraints, airline economics and OEM development and FAA oversight schedules make it extremely challenging to offer solutions that meet all PRM needs in the near term while meeting the USG cost-benefit requirements.
2. Given that, it may be useful to broaden the discussion of potential solutions to include all components of the air travel experience, for example:
    a. Increased US airport accessibility
    b. Increased comfort and usability of an OBW compatible with existing aircraft seats and existing space limitations (to facilitate ease of transfer to the lavatory area)
    c. Flight attendant training

Slide 19 - Transfer Types: Tier 2 Access

1. Industry recommends the DOT consider that Tier 2 Access should be provided for **new aircraft type design** and that the design considerations be consistent with what currently exists for the twin aisle aircraft under 382.63(a)(1)(2)(3) which outlines performance standards for accessible lavs
2. A new 382.XX rule should:
    a. Define the requirements for accessible lavatories on single aisle new aircraft type designs
    b. Cleary state no retrofit is required
    c. Define the implementation plan stating the applicability to new type design

Slide 20 - Aircraft Size

1. For both Tiers, we suggest that the rule should be based on maximum certified passenger capacity (as documented in the FAA type certification data sheet)
    a. Industry considers that providing accessible lavatories on airplanes with a maximum certified passenger capacity above 125 captures 87% of single-aisle ASMs[1]

Chart : US Carrier Cumulative Single-Aisle ASM Distribution (By Max Seats)

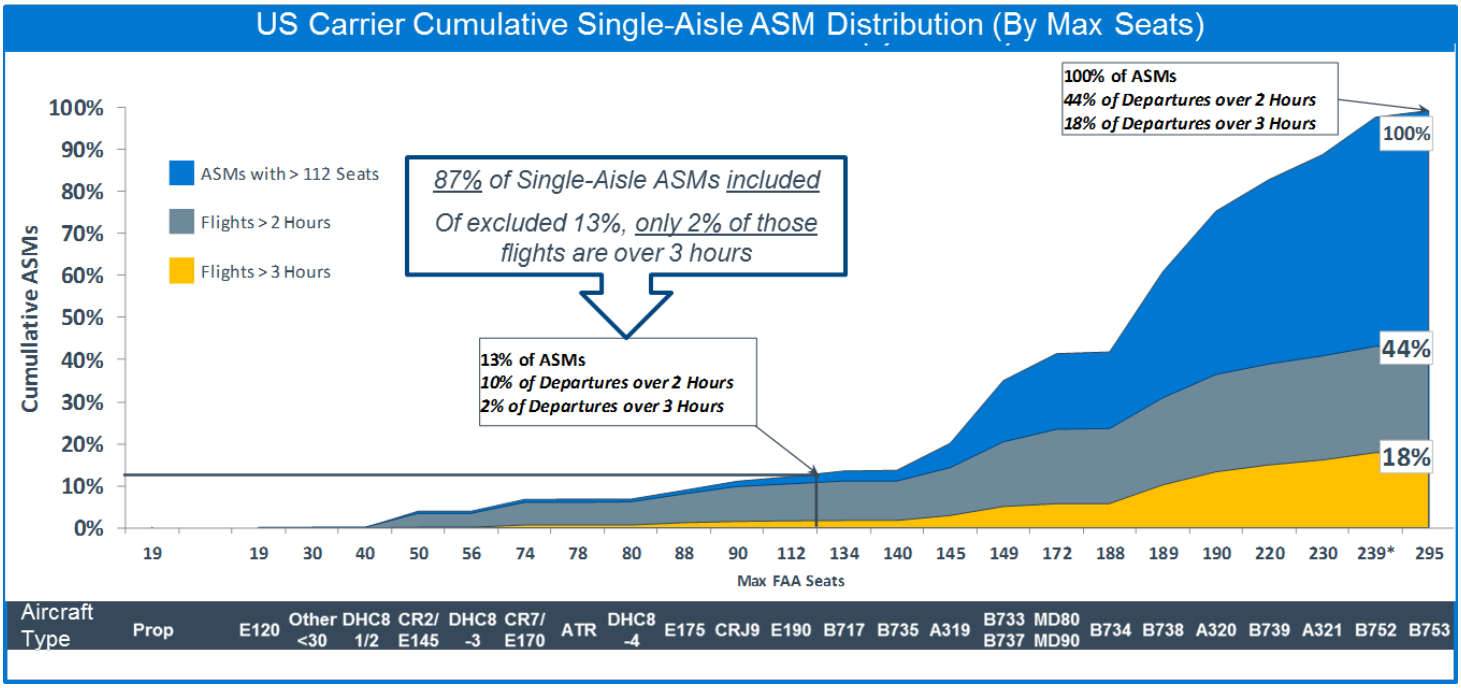


Chart shows that out of 13% of ASM (Available Seat Miles) that are flown, 10% of departures are for flights of over 2 hours and only 2% of departures are for flights of over 3 hours

Slide 20 Footnote :

1. Based on current data available for US scheduled flights

Slide 21 - Implementation dates

1. Industry recommends the following implementation considerations:
    a. The DOT ACCESS Advisory Committee charter states that the Committee will provide recommendations based on a consensus-based process related to *'Addressing the feasibility of accessible lavatories on new single aisle aircraft.'* Therefore, in line with the charter, retrofitting aircraft is not currently under consideration.
    b. For tier 1 aircraft, requirements for new production aircraft should go into effect no less than 24 months after the final rule is published.
        i. There should be an exception process for the small number of airplane configurations where providing access requires major changes to the interior
    c. For tier 1 transportation system – TBD
    d. For tier 2 aircraft, requirements should go into effect for applications for a new type certificate submitted to the FAA 24 months after the final rule is published

Slide 22 - Glossary of Terms

ASM: Available Seat Mile

DOT: Department of Transportation

ISO: International Standards Organization

Lav: Lavatory

NCAT: National Centre for Accessible Transportation

NPV: Net Present Value

OBW: On-Board Wheelchair

OEM: Original Equipment Manufacturer

Pax: Passenger

PRM: Person with Reduced Mobility

PRASM: Passenger Revenue Per Available Seat Mile

Table : Existing type design as defined on existing type certification data sheets. EX:

OEM	Model	TCDS
Boeing	B737-600/700/800/900/900ER (and soon to be added B737-MAX versions)	A16WE
Airbus	A318 / A319 / A320 / A321	A28NM
Bombardier	CS100 / CS300	T00008NY

Table : New type design where the FAA issues a new type certification data sheet EX:

OEM	Model	TCDS
Boeing	B-New	BNEW
Airbus	A-New	ANEW
Bombardier	BD-New	BDNEW

Slide 23 – Appendix (section divider)

Slide 24 : US Carrier Narrowbody Fleet (YE'15)

Table : 2015 Narrowbody Fleets – US Carriers Only – Ascend

	American Airlines	Delta Air Lines	United Airlines	Southwest Airlines	JetBlue Airways	Alaska Airlines	Spirit Airlines	Allegiant Air	Virgin America	Frontier Airlines	Hawaiian Airlines	Other	Total
E190	20				60								80
717		91									18		109
A319	125	57	57				28	15	10	27			319
MD-80	86	116						49					251
A320	50	69	97		130		42	16	49	23			476
MD-90		65											65
737	265	133	310	688		142						20	1558
A321	174				25		8			5			212
757	59	124	77					4					264
Total	**779**	**655**	**541**	**688**	**215**	**142**	**78**	**84**	**59**	**55**	**18**	**20**	**3334**

Slide 25 - US Carrier Narrowbody Fleet (Current)

Table : Current Narrowbody Fleets – US Carriers Only – Diio Fleet Report (07/28/16)

	American Airlines	Delta Air Lines	United Airlines	Southwest Airlines	JetBlue Airways	Alaska Airlines	Spirit Airlines	Allegiant Air	Virgin America	Frontier Airlines	Hawaiian Airlines	Other	Total
E190	20				60								80
717		91									18		109
A319	125	57	57				28	15	10	27			319
MD80	86	116						49				10	261
A320	50	69	97		130		45	16	53	24		1	493
MD90		65											65
737	274	143	314	702		154							1587
A321	187	5			29		13			10			245
757	59	124	77					4					264
Total	801	670	545	702	219	154	86	84	63	61	18	18	3414