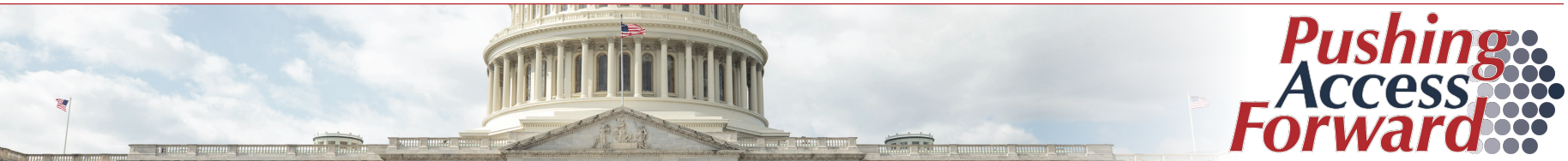
75th ANNIVERSARY
PVA
Paralyzed Veterans of America
EST. 1946

ACAA 35: Updates on Efforts to Improve the Air Travel Experience for People with Disabilities

Heather Ansley & Lee Page, PVA
Peter Axelson, Beneficial Designs

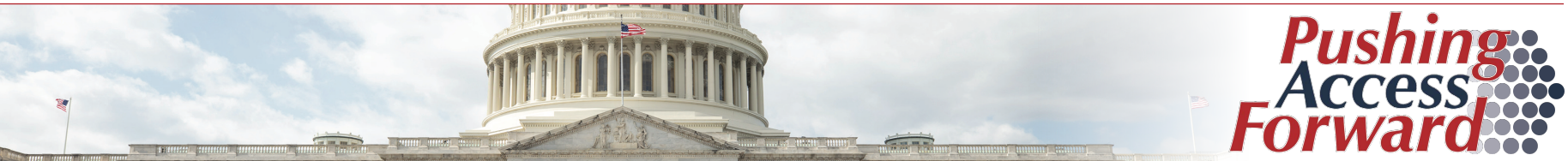
Webinar Process

- Today's webinar will be recorded and available for viewing on PVA.org.
- Closed Captioning is available. Click the CC button in the meeting controls bar at the bottom of your screen to turn it on.
- If you have a question, please type it into the Q&A box.



Introductions and Overview

- Welcome
- Air Carrier Access Overview
- Efforts to Improve Access to Air Travel
- Assistive Technology for Air Travel
- Next Steps
- Q&A

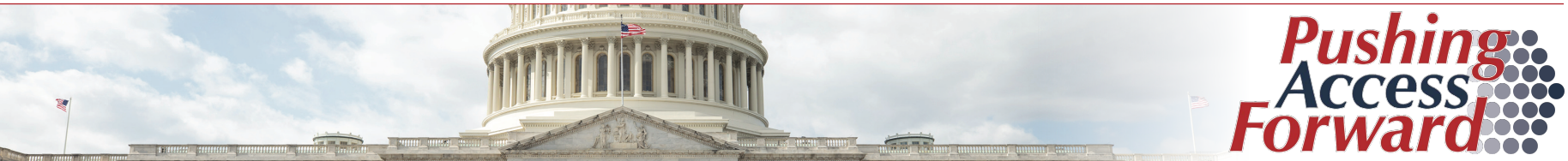


Air Carrier Access Act Overview

Heather Ansley

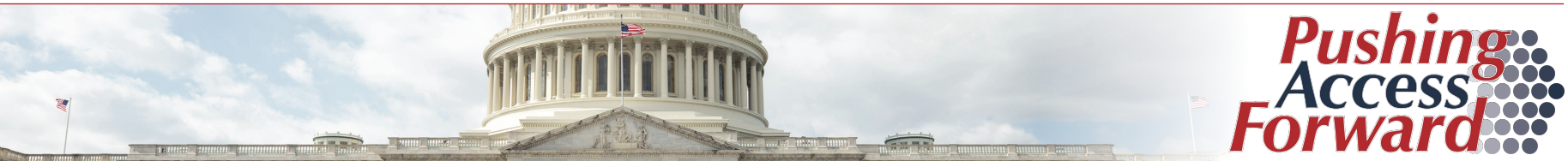
History of the Air Carrier Access Act

- PVA's involvement in improving access to air travel pre-dates the Air Carrier Access Act (ACAA).
- In a case that went to the U.S. Supreme Court, PVA sought to establish the right of people with disabilities to travel by air under Section 504 of the Rehab Act. Unfortunately, the Court held that law didn't confer the right to air travel.
- The decision in the case led to the passage of the bipartisan ACAA in 1986.



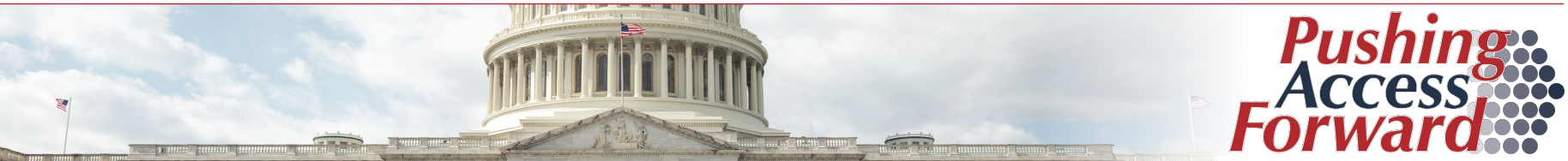
ACAA Protections and Rights

- Prohibits disability-based discrimination in air travel.
- Provides protections including:
  - Timely assistance in boarding and deplaning from trained air carrier and contract personnel.
  - Priority stowage of a manual wheelchair in a cabin closet or strapped to a passenger seat.
  - Seating accommodation needed due to a disability without additional cost in class of service.
- Covers domestic airlines (all flights) and foreign airlines on flights to or from the United States.



Remedies Available Under ACAA

- Complaints can be filed directly with the airline.
- DOT accepts complaints for ACAA violations.
  - Easiest way to file is online: https://airconsumer.dot.gov/escomplaint/ConsumerForm.cfm.
  - May also be emailed or mailed.
- No private right of action.

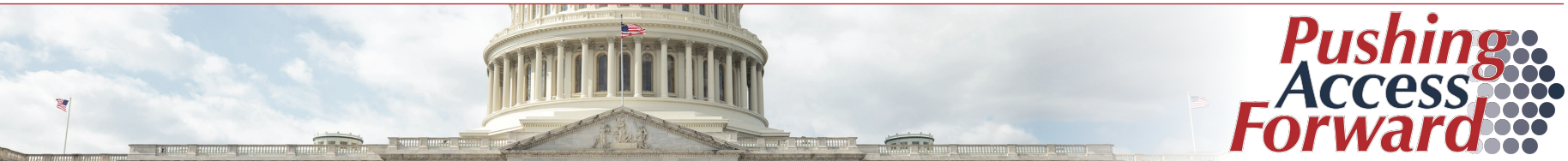


Efforts to Improve Access to Air Travel

Lee Page & Heather Ansley

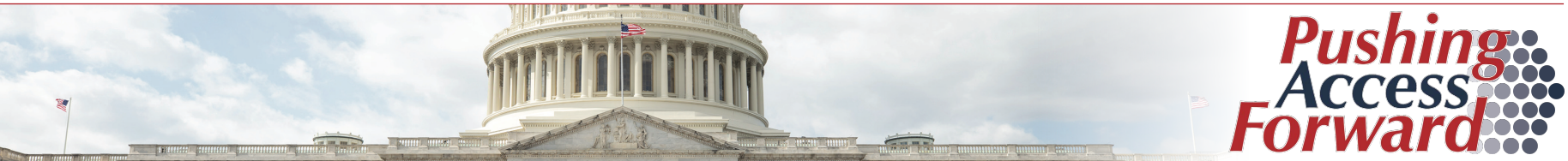
Why is Reform Needed?

- Untrained or delayed assistance in boarding.
- Physically being harmed in the boarding process.
- Damage to wheelchairs.
- Not receiving appropriate seating accommodations.



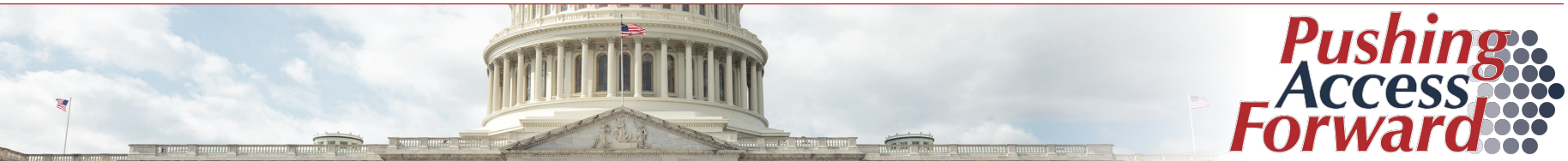
Launching ACAA Reform

- In preparation for the 30th anniversary of the ACAA, PVA convened six other disability organizations to discuss options for reform.
- We launched a website to collect stories and began working with the Department of Transportation (DOT) and industry to improve efforts to make needed changes for passengers with disabilities.
- We also developed proposed legislation that would become the Air Carrier Access Amendments Act.



ACCESS Advisory Committee

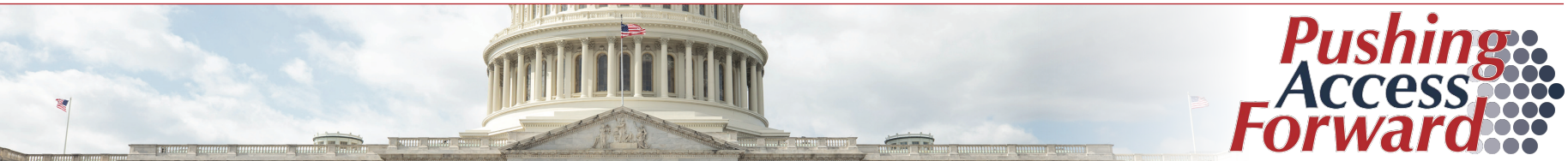
- In 2016, DOT established the Advisory Committee on Accessible Air Transportation (ACCESS Advisory Committee) to conduct a negotiated rulemaking on the following issues:
  - Service animals
  - In-flight communications
  - Accessible lavatories on single-aisle aircraft
- Negotiations ended with consensus agreements on lavatories and in-flight communications. The Committee did not reach agreement on service animals.



Pushing Access Forward

Regulatory Actions

- DOT issued proposed and final rules on service animals and a proposed rule on short-term lavatory improvements.
- Waiting on DOT to publish a proposed rule that would require an accessible lavatory on large single-aisle aircraft in coming decades and a proposed rule on in-flight communications.



FAA Reauthorization of 2018

- The FAA Reauthorization Act of 2018 is a major piece of legislation covering many aspects of air travel that was signed into law in October 2018.
- This legislation included several disability-related provisions:
  - Study on the feasibility of flying in your wheelchair
  - Mishandled wheelchair data
  - ACAA Federal Advisory Committee
  - Bill of right for passengers with disabilities

beneficial designs

designing beyond the norm to meet the needs of all people

Assistive Technology for Air Travel

Peter Axelson MSME, ATP, RET

Airline Travel: Assistive Technology
for Non-Ambulatory Passengers Demographics

TOTAL subjects in study	**24**
Male	20
Female	4
Manual WC users	18
Powered WC users	7
Age range 19-78	Median 56
Number of years with disability 3-58	Median 27

PVA Research Foundation Grant award #3028

Air Travel Issues Identified in Project

Issue 1	Narrow aircraft aisles
Issue 2	Lack of accessible lavatories
Issue 3	Steep jetway slopes
Issue 4	Damage to mobility devices
Issue 5	Dangerous transfer methods
Issue 6	Unstable boarding devices
Issue 7	Hazardous sitting pressures
Issue 8	Unusable onboard wheelchairs

Issue 1: Narrow Aircraft Aisles

Lack of standards for the minimum width
of the aisle way in aircraft leads to…
narrower and narrower aisle width in aircraft

Boarding device manufacturers are **unable** to optimize the design of boarding devices for stability

Aircraft Aisle Specifications

The current FAA standard for aisle width has not been updated since the **1954** Civil Air Regulations code

20 inches minimum width
above 25 inches above the aircraft cabin floor

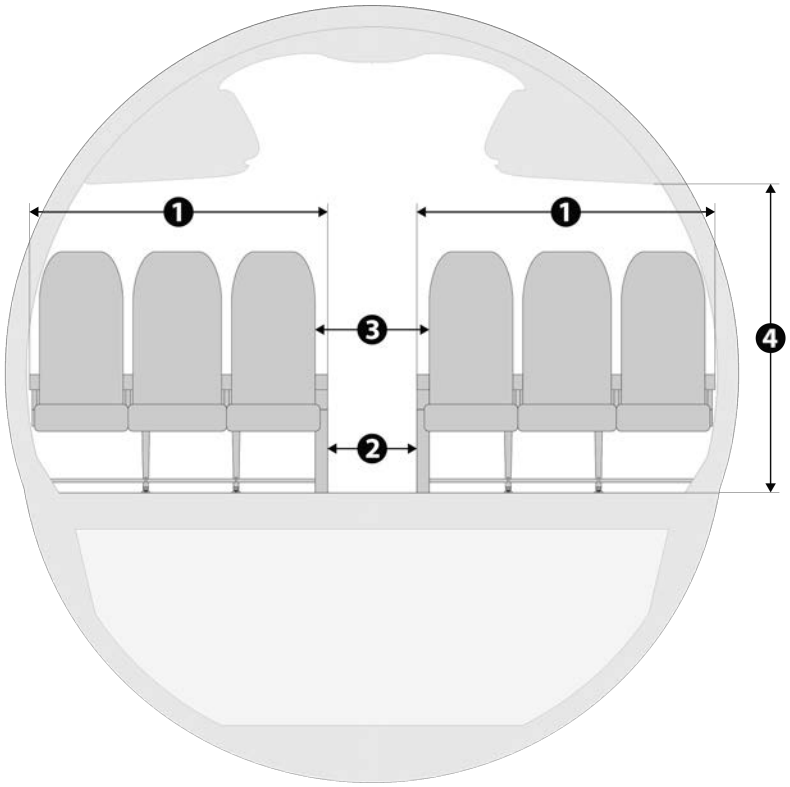
15 inches minimum width
below 25 inches above the aircraft cabin floor

The FAA never anticipated persons entering the aircraft down at a seated height

Airplane Seating Configurations and Interiors

Cross-Section Dimensions

Cross-section of narrow-body cabin interior with six-abreast seating

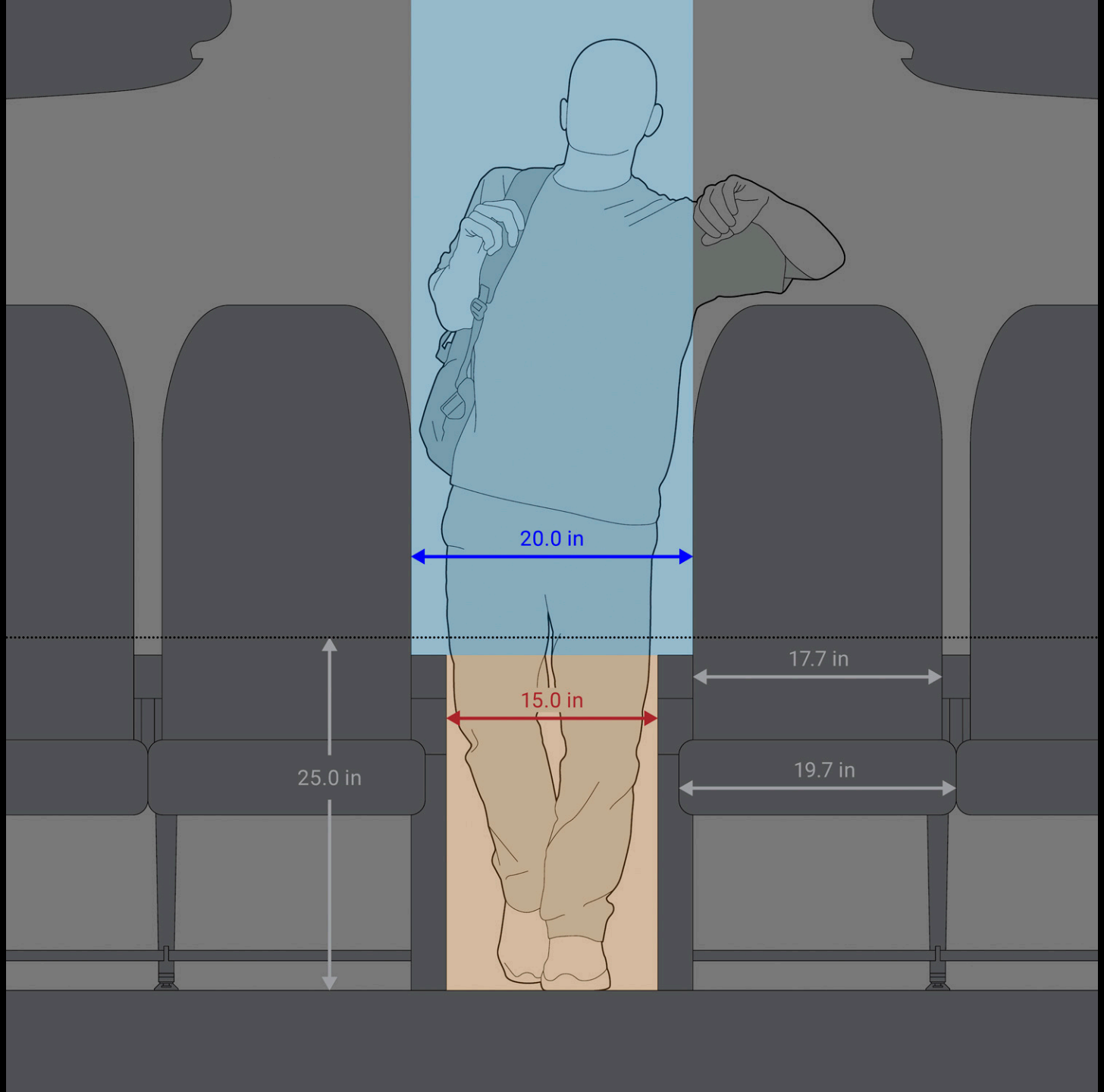


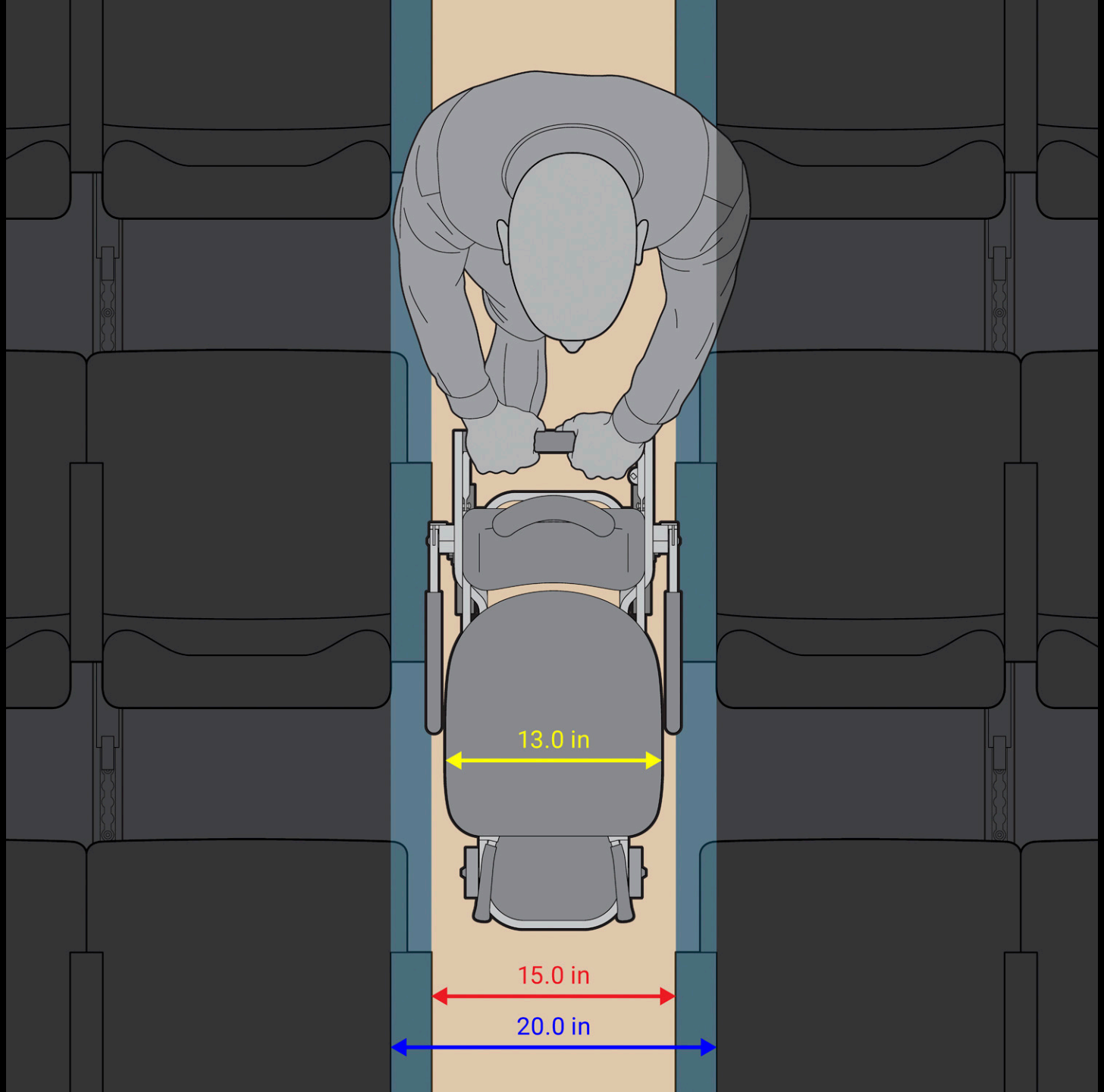
1 Typical seat assembly width:
56.5 to 60 in.

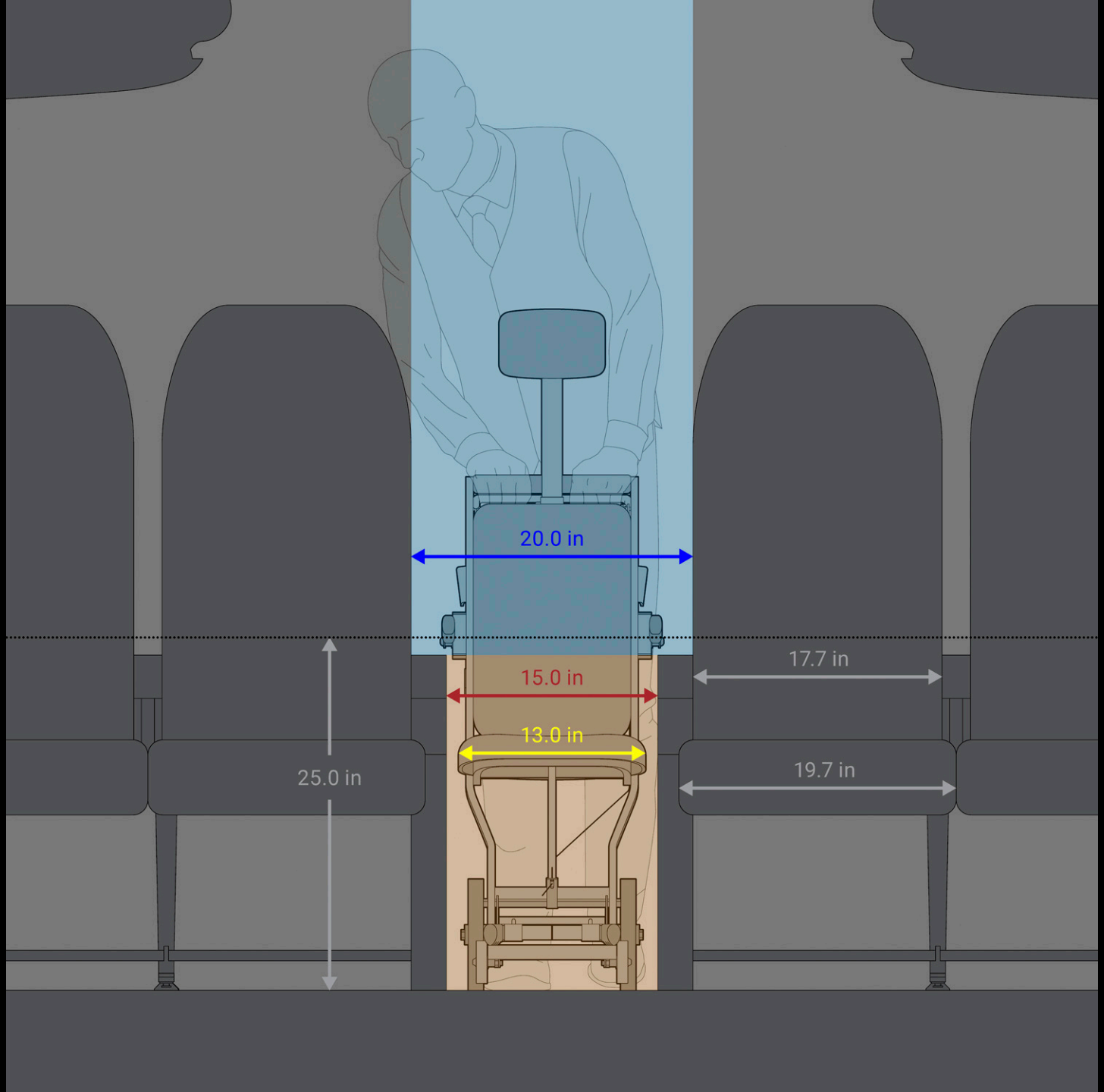
2 Lower aisle width:
15 to 18 in. from the floor
up to 25 in. above the floor

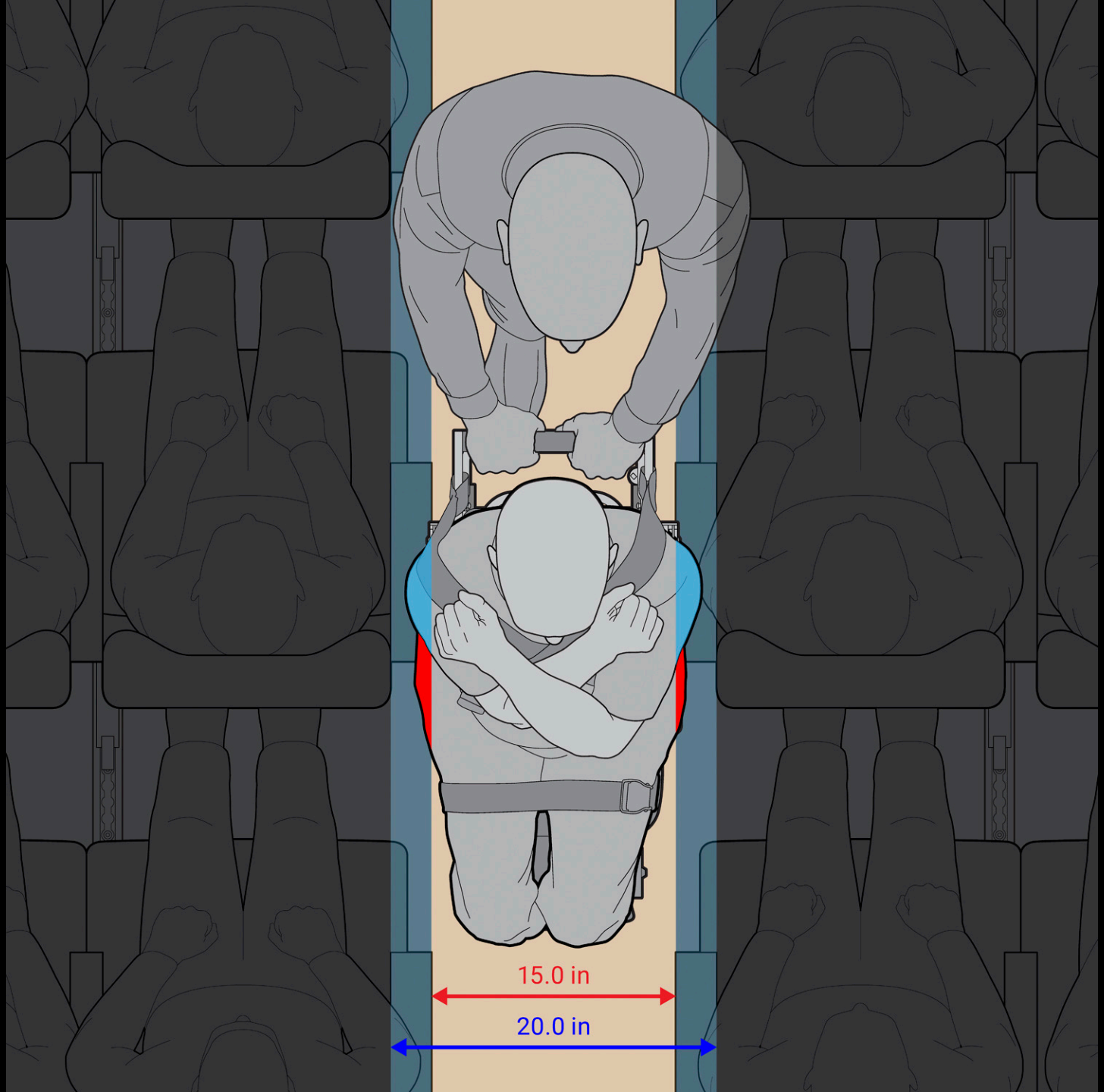
3 Upper aisle width:
20 to 25 in. from 25 in. above the floor

4 Height beneath overhead bin:
62.2 in. (Boeing) and **63.1 in.** (Airbus) from the lower surface of the standard overhead bin to the floor


20.0 in
17.7 in
15.0 in
25.0 in
19.7 in


13.0 in
15.0 in
20.0 in


20.0 in
15.0 in
13.0 in
25.0 in
17.7 in
19.7 in


15.0 in
20.0 in

Injuries

The 15-in. wide aisle results in
injuries while boarding and deplaning from the aircraft

The injuries are to the hips and legs of the passenger who is rammed through a space that is smaller than the passenger's hips

Out of 315 boarding device users, 15, or 5%, received bruises, scrapes or cuts during the boarding process to their legs, knees, hips, arms, buttocks or tailbones.

Issue Steep Jetway Slopes

- Airport terminals are high for truck clearance beneath
- Building design leads to steep jetways
  - Jetways are typically steeper than a standard ramp
  - Many jetways are exempt from ADA ramp slope guidelines
  - The steep grade becomes a side slope when turning toward the aircraft
  - At the end of the jetway is where the transfer typically occurs into the boarding device

214
6°

Injuries

The 15-in. wide aisle results in
boarding devices as narrow as **13 in. wide.**

In an online research survey of non-ambulatory passengers, 585 passengers were surveyed…
315 or 54% required the use a boarding device…

12% 38 indicated they have ***fallen over*** in a boarding device…and another

10% 32 indicated that they have ***fallen out*** of the boarding device

The 15-in. wide aisle results in
injuries and death while boarding and deplaning

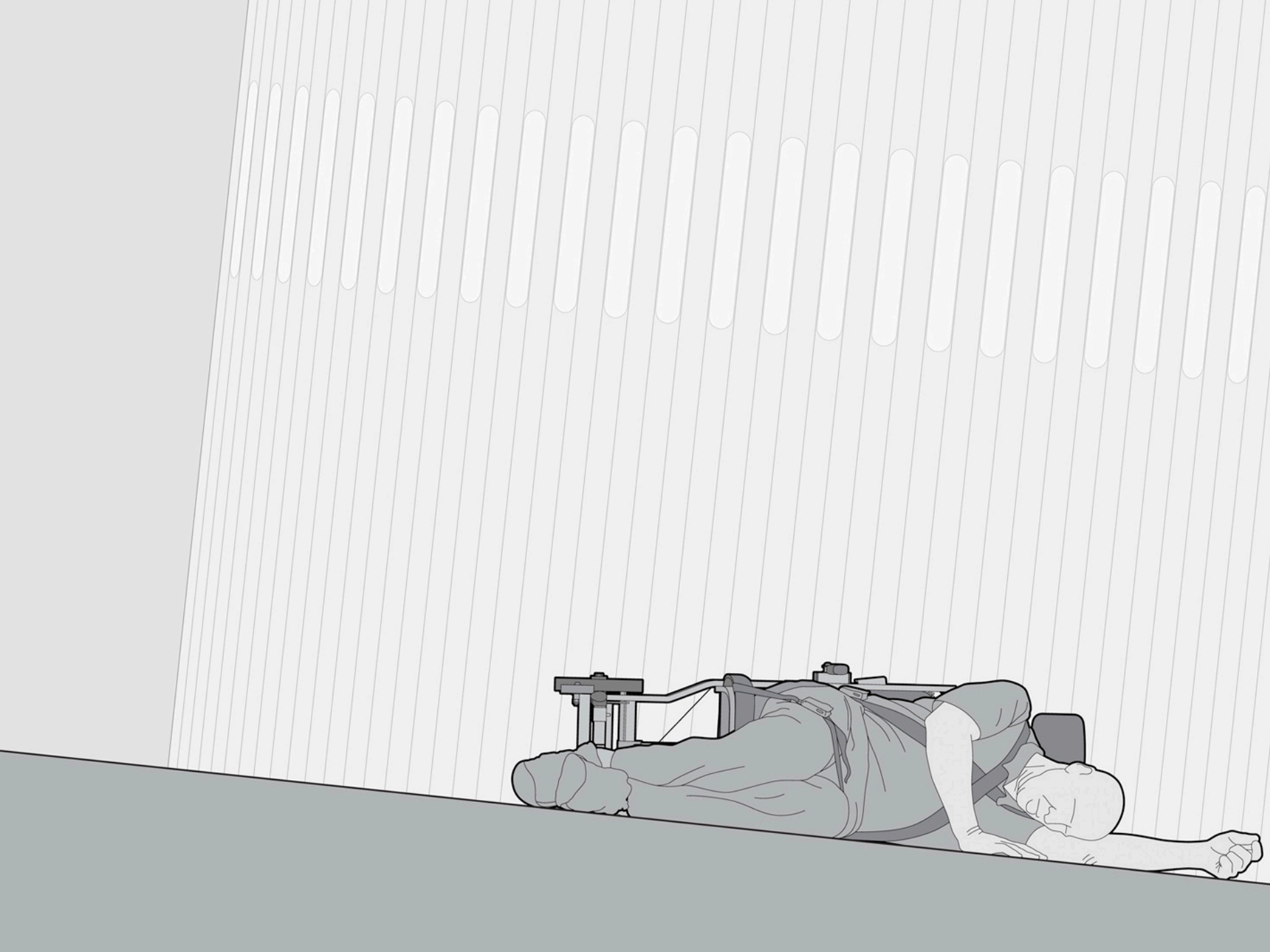
Lateral Tipping Angle

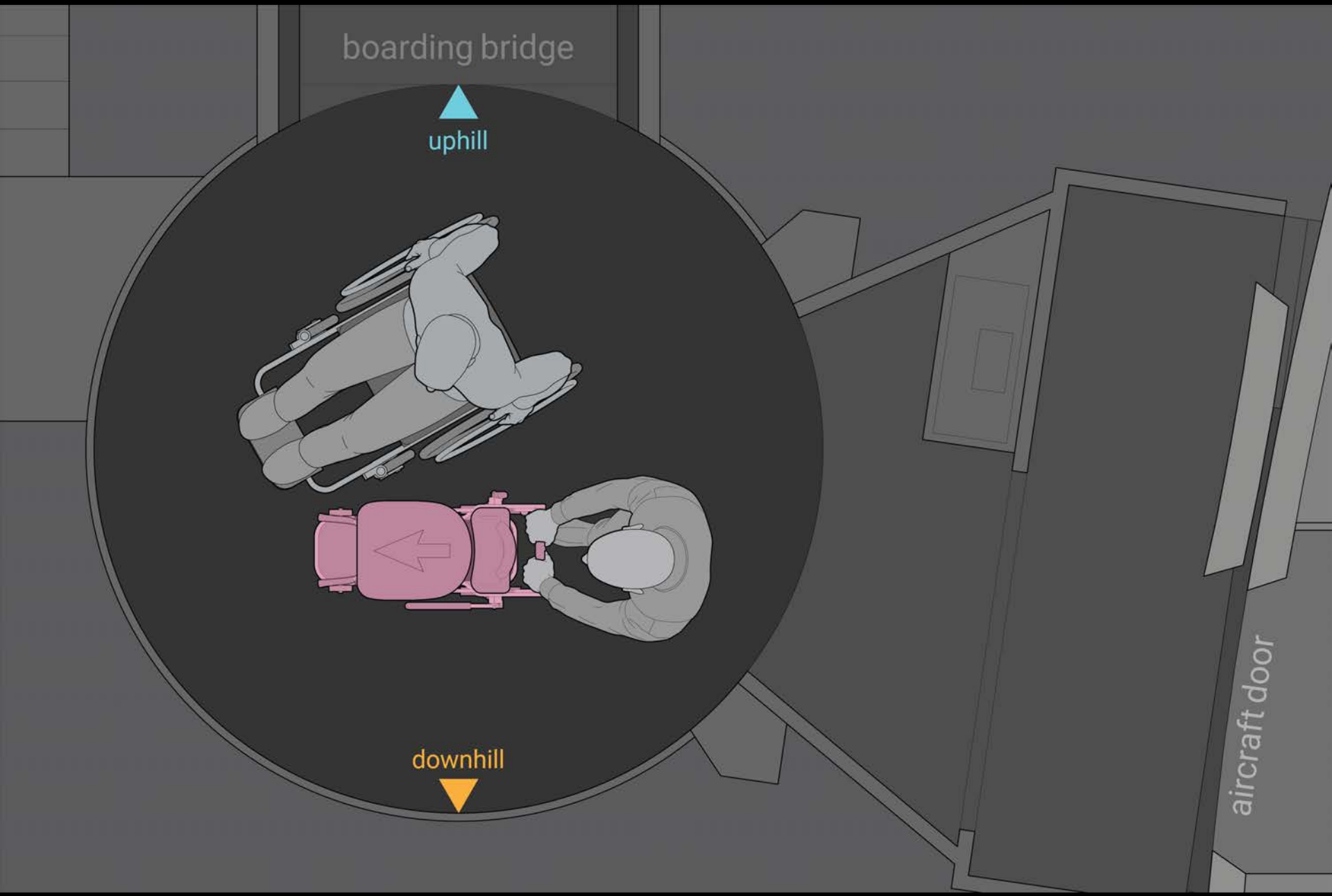
Common Boarding Device 1

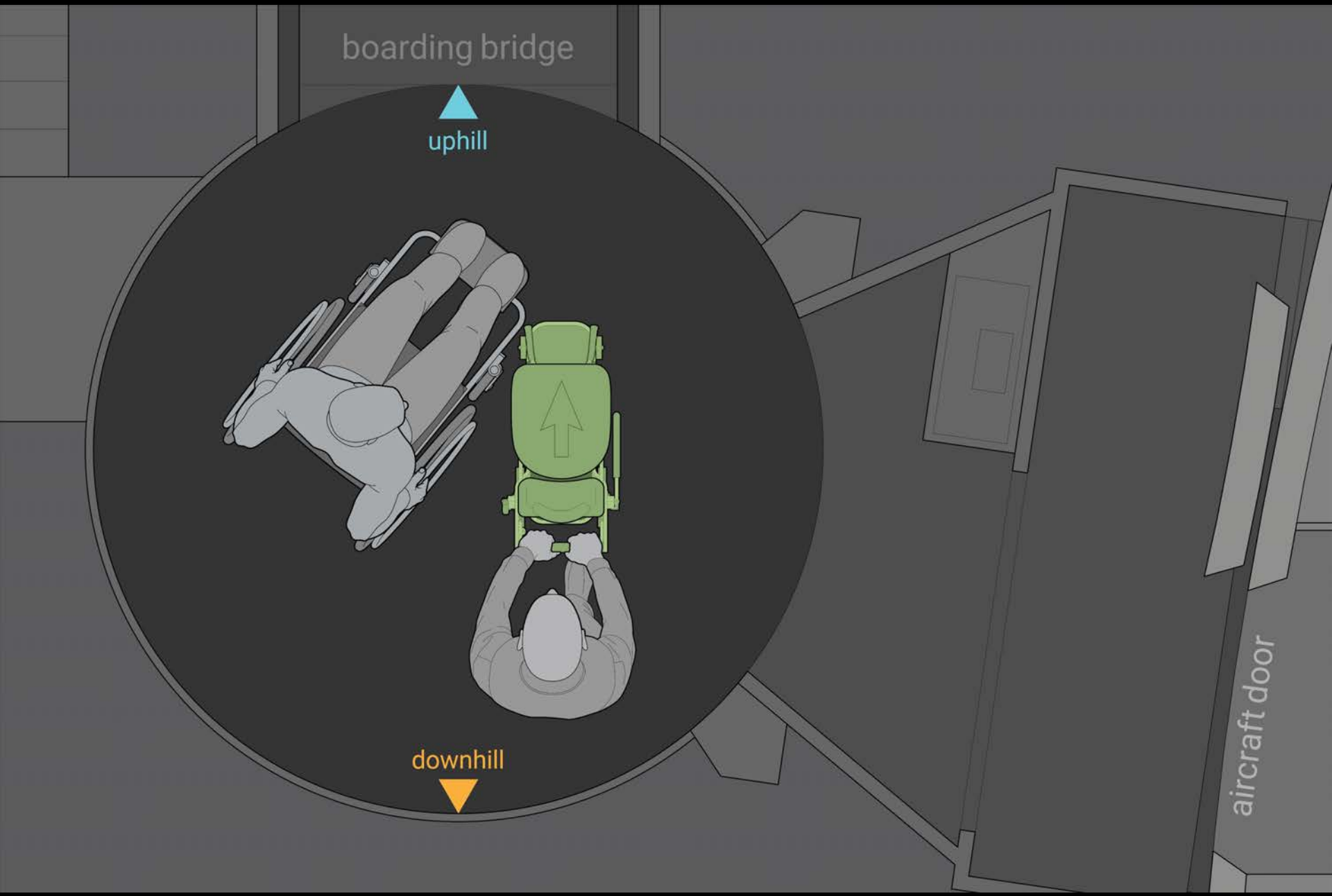
Common Boarding Device 2

Portable Overhead Lift

29
SabadellCAM
6°




boarding bridge
uphill
downhill
aircraft door


boarding bridge
uphill
downhill
aircraft door

Steep Jetways…Potential Solution

Create access designs standards for jetways that apply in all situations

Design jetways to be level at the end of the jetway

Short-Term Solutions

- Always hold onto boarding devices in the jetway
- Point the boarding device uphill during transfers
- Hold onto the boarding device when turning toward the aircraft to board a passenger

Narrow Aisles…Potential Solution

Require a minimum center aisle minimum clearance width of 20 inches at all heights to accommodate standard adults with a 18 in. hip width…this is the width of the seat cushions on the aircraft

A 20 in clear width at all heights would allow boarding devices to be 18 in. wide providing them with greater lateral stability

Transferring to Seat

Live to Roll
https://www.youtube.com/watch?v=i7MiR5EOK7Q

Aircraft-Compatible Wheelchair

Transferring by Manual Lifting

121 survey respondents were dependent on a 2-person lift for transfer; 28, or 23% of them have fallen or been dropped

Transfer-assist staff person standing behind a boarding device is **not able to lift a heavy passenger**

- Injuries occur to the **untrained assistance providers** and to the **passengers** who get scraped on the seat, the arm support, or get dropped on the floor
- Half of the powered wheelchair users in our research study said they will never fly again due to the risk

EAGLE 2A

Transfer Assist Technology

Moves laterally over aircraft seating

Potential Solution

Just like hotels and swim centers are required to provide lifts to get into pools…

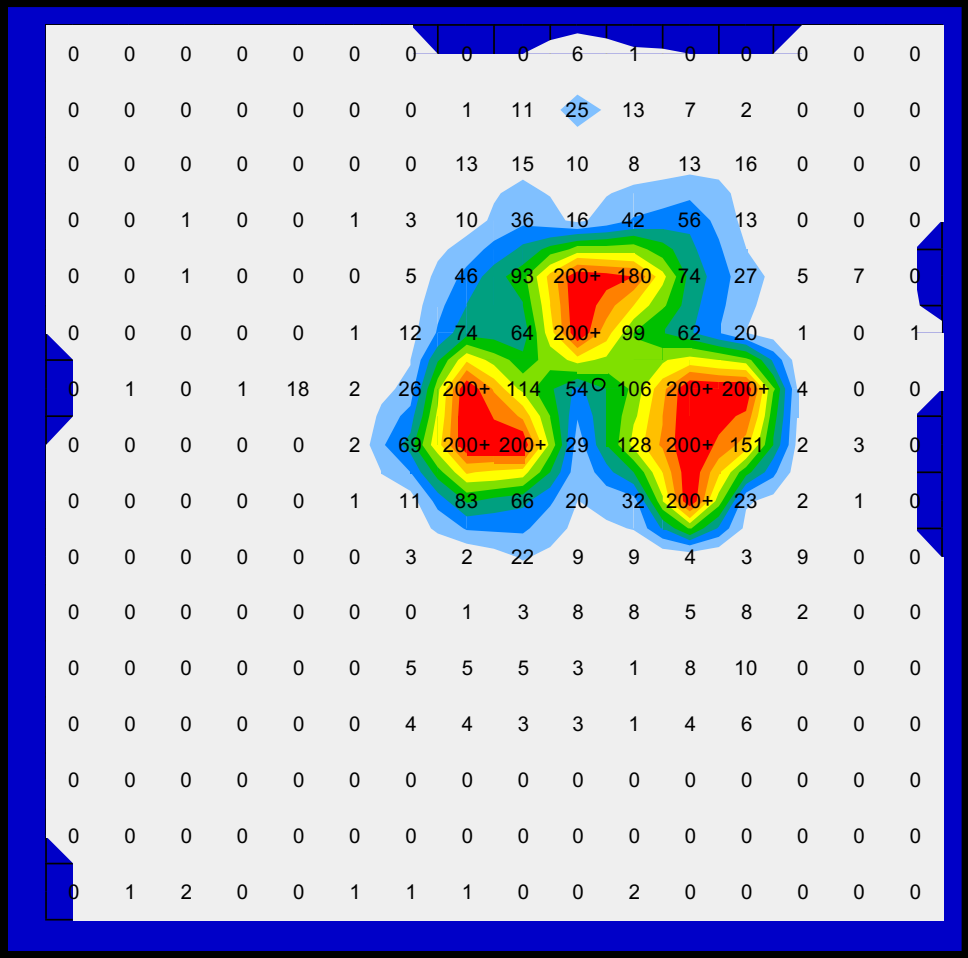
> Require the use of technologies that do not require physical lifting of non-ambulatory passengers that are unable to independently transfer onto boarding devices and AC seating

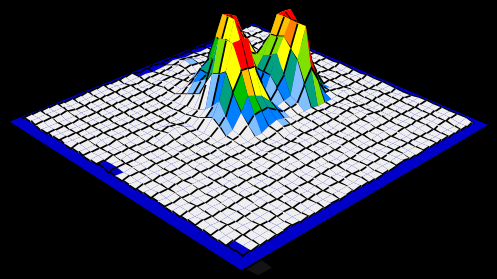
Safe transfers with respect and dignity

Fund-raising efforts could occur to provide gantry-style lifts for non-ambulatory passengers unable to independently transfer into an aircraft seat

Boarding Devices with Hard Seating

Boarding Devices Sitting Pressures





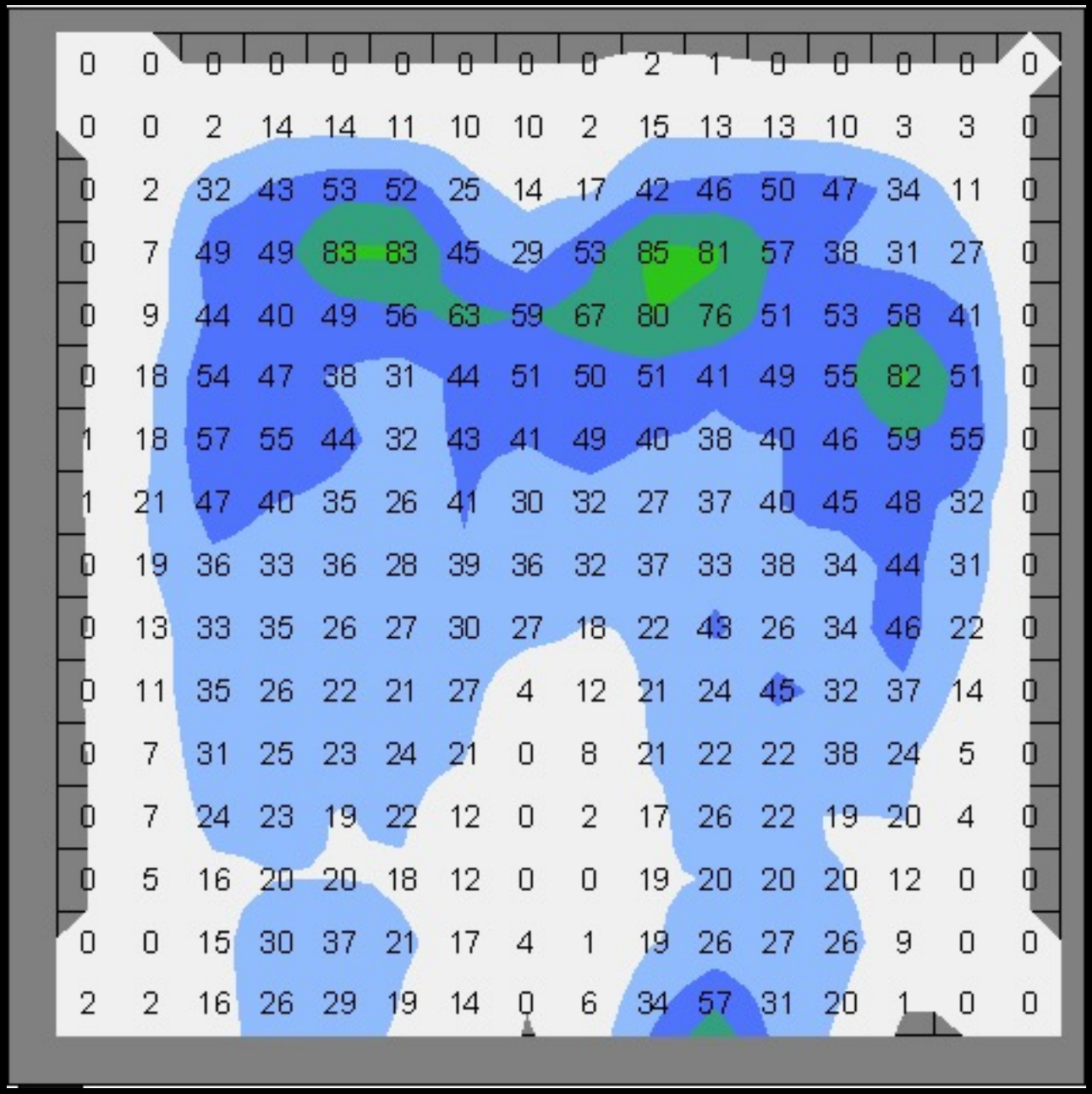
Minimum (mmHg)	0.00
Maximum (mmHg)	200.00
Average (mmHg)	15.64
Variance (mmHg²)	1823.88
Standard deviation (mmHg)	42.71
Coefficient of variation (%)	272.99
Horizontal center (in)	10.47
Vertical center (in)	10.20
Sensing area (in²)	289.27
Regional distribution (%)	100.00

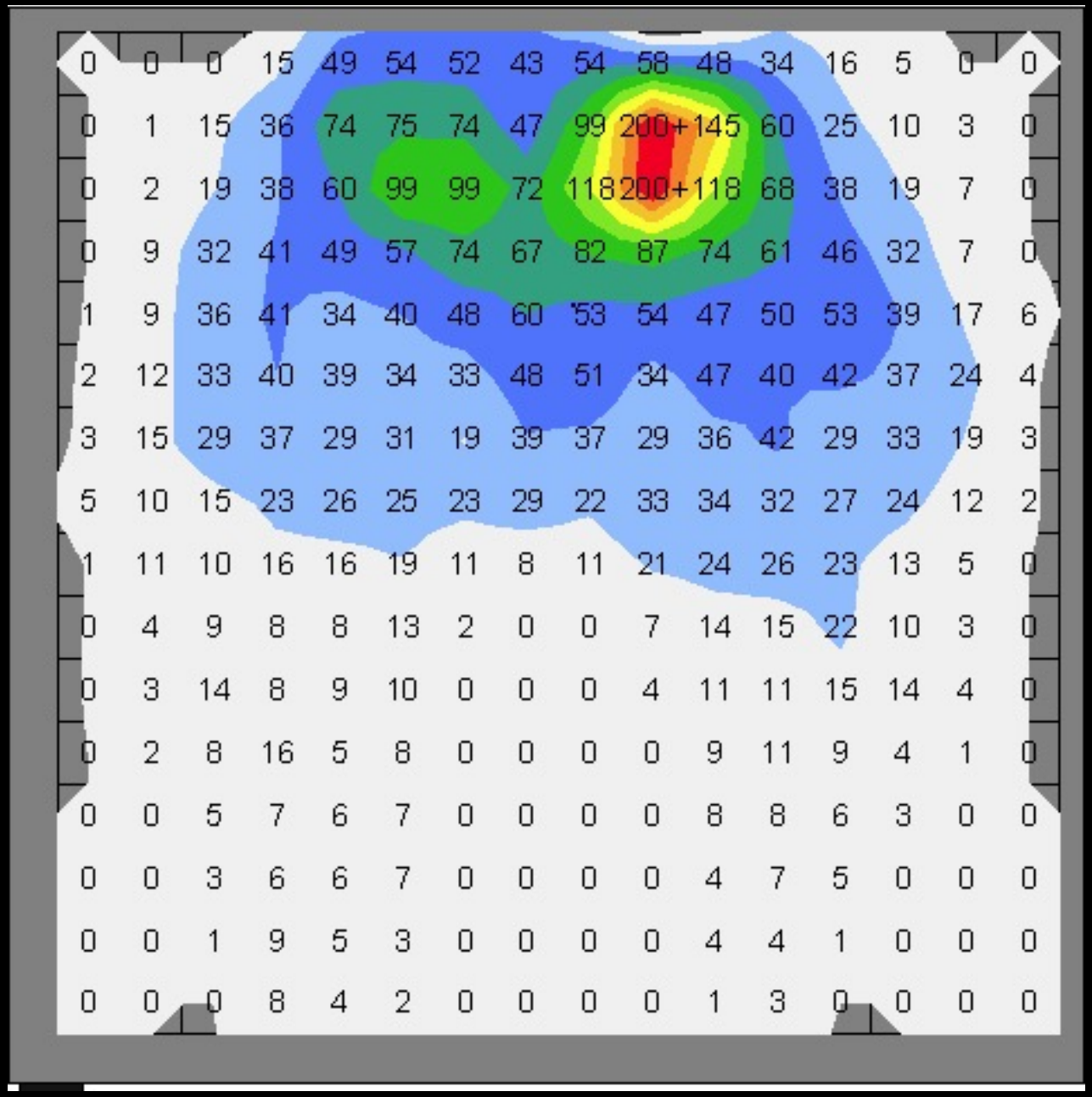
Sitting Pressures
on Boarding Devices

N=23

Peak sitting pressures (mmHg)

No cushion on boarding device	145-200	Median 200
With cushion on boarding device	65-200	Median 115


0 0 0 0 0 0 0 0 0 2 1 0 0 0 0 0
0 0 2 14 14 11 10 10 2 15 13 13 10 3 3 0
0 2 32 43 53 52 25 14 17 42 46 50 47 34 11 0
0 7 49 49 83 83 45 29 53 85 81 57 38 31 27 0
0 9 44 40 49 56 63 59 67 80 76 51 53 58 41 0
0 18 54 47 38 31 44 51 50 51 41 49 55 82 51 0
1 18 57 55 44 32 43 41 49 40 38 40 46 59 55 0
1 21 47 40 35 26 41 30 32 27 37 40 45 48 32 0
0 19 36 33 36 28 39 36 32 37 33 38 34 44 31 0
0 13 33 35 26 27 30 27 18 22 43 26 34 46 22 0
0 11 35 26 22 21 27 4 12 21 24 45 32 37 14 0
0 7 31 25 23 24 21 0 8 21 22 22 38 24 5 0
0 7 24 23 19 22 12 0 2 17 26 22 19 20 4 0
0 5 16 20 20 18 12 0 0 19 20 20 20 12 0 0
0 0 15 30 37 21 17 4 1 19 26 27 26 9 0 0
2 2 16 26 29 19 14 0 6 34 57 31 20 1 0 0


0 0 0 15 49 54 52 43 54 58 48 34 16 5 0 0
0 1 15 36 74 75 74 47 99 200+145 60 25 10 3 0
0 2 19 38 60 99 99 72 118 200+118 68 38 19 7 0
0 9 32 41 49 57 74 67 82 87 74 61 46 32 7 0
1 9 36 41 34 40 48 60 53 54 47 50 53 39 17 6
2 12 33 40 39 34 33 48 51 34 47 40 42 37 24 4
3 15 29 37 29 31 19 39 37 29 36 42 29 33 19 3
5 10 15 23 26 25 23 29 22 33 34 32 27 24 12 2
1 11 10 16 16 19 11 8 11 21 24 26 23 13 5 0
0 4 9 8 8 13 2 0 0 7 14 15 22 10 3 0
0 3 14 8 9 10 0 0 0 4 11 11 15 14 4 0
0 2 8 16 5 8 0 0 0 0 9 11 9 4 1 0
0 0 5 7 6 7 0 0 0 0 8 8 6 3 0 0
0 0 3 6 6 7 0 0 0 0 4 7 5 0 0 0
0 0 1 9 5 3 0 0 0 0 4 4 1 0 0 0
0 0 0 8 4 2 0 0 0 0 1 3 0 0 0 0

Aircraft Seating with Pressure Relief From…

Wheelchair Cushion

- Legs hanging
- Shoulders forward
- Neck extended
- Arms not supported
- Not comfortable
- Legs swell due to poor circulation

Aircraft Seating with Pressure Relief From…

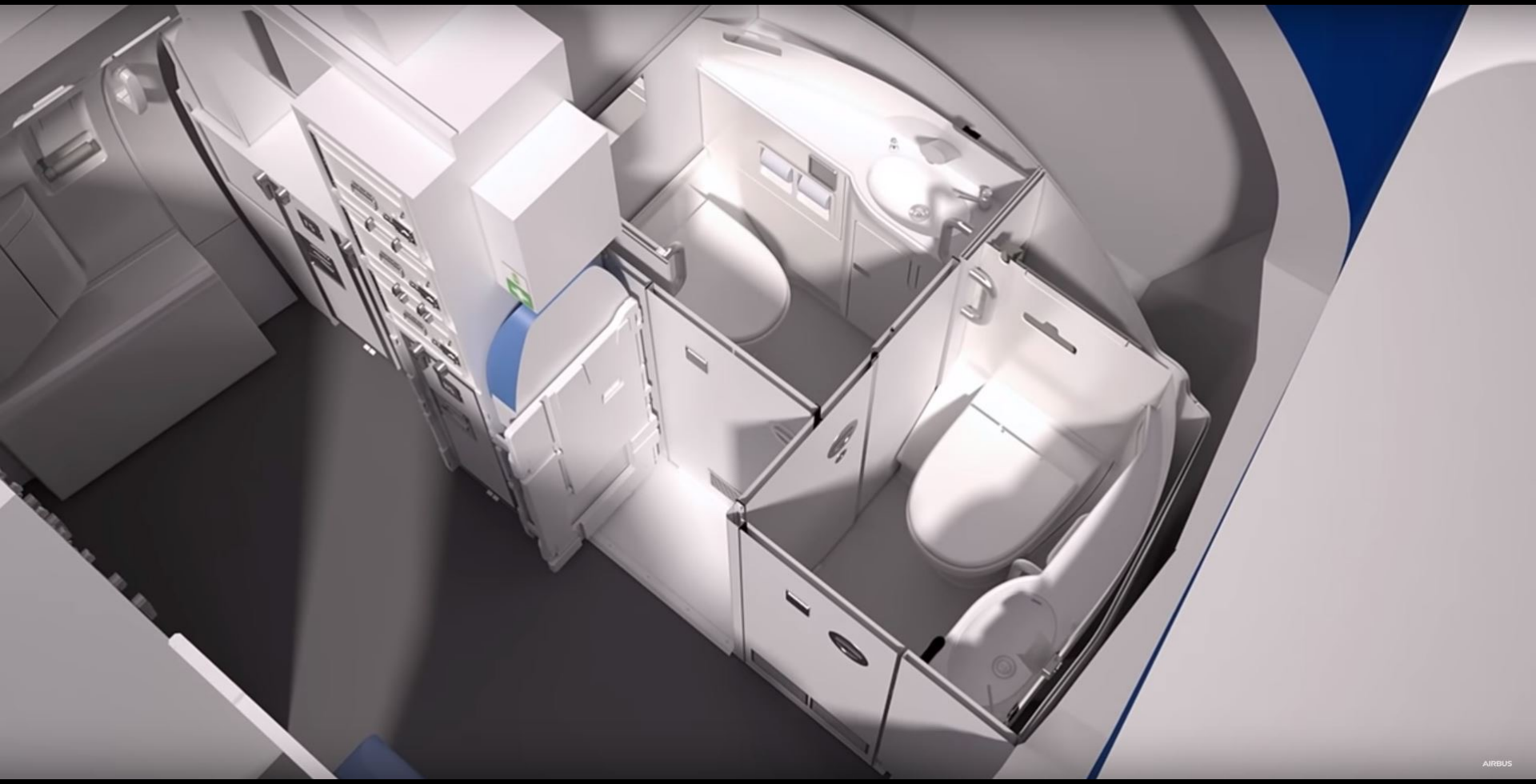
Wheelchair Cushion & Accessories

- Foot support
- Inflatable lumbar and spine support
- Inflatable neck and head support
- Arm support

Aircraft Seating with Pressure Relief From…

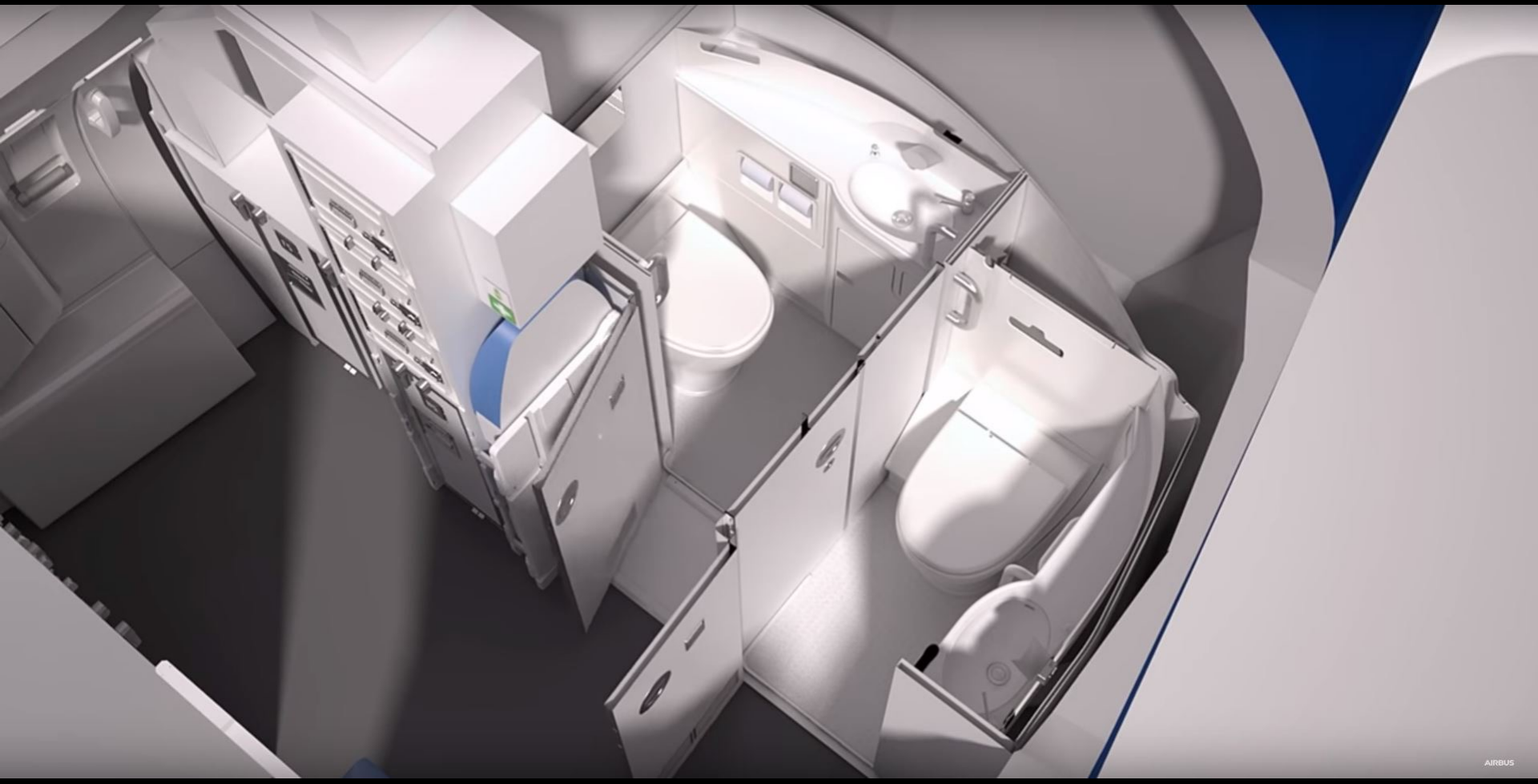
Wheelchair Cushion & Accessories

- Foot support
- Lumbar and spine support
- Neck/head support
- Arm support



Airbus 320 **Space Flex**

Airbus
https://www.youtube.com/watch?v=Any6R1dGnrM



Airbus 320 **Space Flex**

Airbus
https://www.youtube.com/watch?v=Any6R1dGnrM

Airbus 320 **Space Flex**

Airbus
https://www.youtube.com/watch?v=Any6R1dGnrM

Airbus 320 **Space Flex**

Airbus
https://www.youtube.com/watch?v=Any6R1dGnrM

Airbus 320 **Space Flex**

Airbus
https://www.youtube.com/watch?v=Any6R1dGnrM

Examples of Damage

Damage to drive wheel that came off powered wheelchair

Examples of Damage

Courtesy of Open Doors and Global Repair Group; Rehabilitation Institute of Chicago/Beneficial Designs/PVA #3028

Examples of Damage

Courtesy of Open Doors and Global Repair Group; Rehabilitation Institute of Chicago/Beneficial Designs/PVA #3028

Device Damage

Manual and powered wheelchairs stored
in the cargo area of aircraft are often damaged

Powered wheelchairs often have to be
laid on their side

- Damage occurs to the joystick controller
- Wheels and casters are often broken off the chair

Damage to powered wheelchairs is why many people ***will no longer fly***

Device Damage

Out of 543 Total Respondents

250 (46%)	had loss or damage to WC or Scooter
66 (12%)	had WC or Scooter lost
72 (13%)	had lost component
155 (29%)	had no damage

71% had a **mishandled mobility device**

Folding for Onboard Stowage

https://www.totalmobilityltd.com/xenon-2-ff

Strap or latch Mechanism

to hold a wheelchair in a folded position

Prevents damage

Easier to handle

https://wheelchairtravel.org/air-travel/flying-with-manual-wheelchair/

RESNA ATAT

Assistive Technology for Air Travel Standard

Objective:

To address wheelchair stowage and handling issues that currently result in damage to wheelchairs

Scope:

Powered and manual wheelchairs including scooters and power assist devices

Requirements and Test Methods Related to Mobility Devices

Section 1	Vocabulary and Terms for Assistive Technology and Air Travel
Section 2	Information and Instructions for Preparing Wheelchairs to be Stored and Transported in Commercial Aircraft
Section 3	Handling Procedures for PMDs to be Stored and Transported in Commercial Aircraft
Section 4	Labeling and Design Requirements for Wheelchairs Designed for Stowage and Transportin Commercial Aircraft

Battery Requirements

Batteries must be **non-spillable**

Batteries shall be **visible** for inspection to confirm the battery is non-spillable

A spillable battery is **dangerous** on an aircraft

> If a spillable battery were installed into a powered wheelchair or scooter this would be dangerous

Tool-free access

21st Century
SCIENTIFIC Inc.

https://www.sunrisemedical.eu/e-mobility/e-mpulse/power-assist-wheelchairs/wheeldrive

https://www.epc-wheelchairs.co.uk/wheelchairs-powerchairs/triride-kids-power-add-on_

https://gtk.com.au/wp-content/uploads/2019/12/maxmobility_smartdrive_1.jpg

Labeling of the

Mobility Device **Unoccupied Mass**

as manufactured, including batteries,
as prepared for transport

To allow Carrier Agents to be prepared
to handle the weight of the Mobility Device

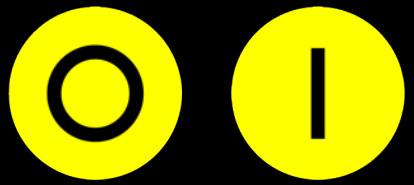
Unoccupied mass of the Mobility Device

Power Isolation Switch

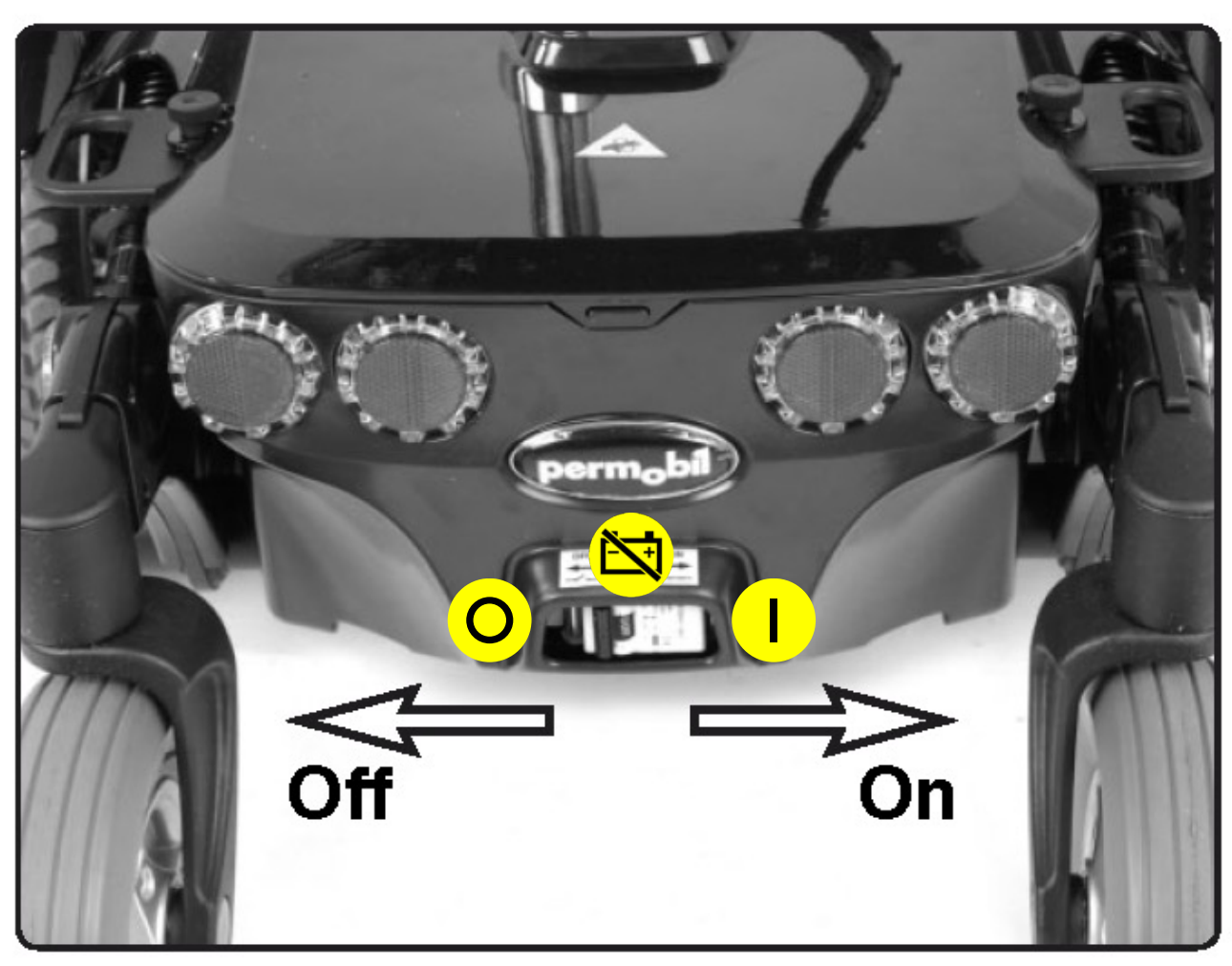
Adjacent to the Power Source

To prevent a Mobility Device from turning on in flight
To prevent a seating system from moving during flight
To prevent a fire in the cargo area of the aircraft

Battery isolation switch indication

“Off” / “On” status of battery isolation switch 

Battery Isolation Switch



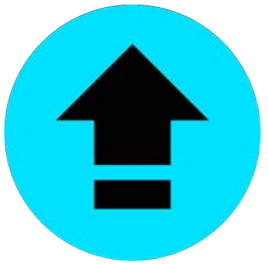
Mobility Devices Need Removable

Component Latch Mechanisms

to remove components for storage in aircraft to prevent loss or damage

Air carriers want these components stored in the aircraft

Latch mechanism



Removable Joystick or Control Device
is required

https://shopusatex.com/power-wheelchair-pour-fauteuil-roulant-lectrique-electric-wheelchair-joystick-controller/

Fold Forward Backrest

Means to reduce
the height of the Mobility Device

33-inch

maximum height

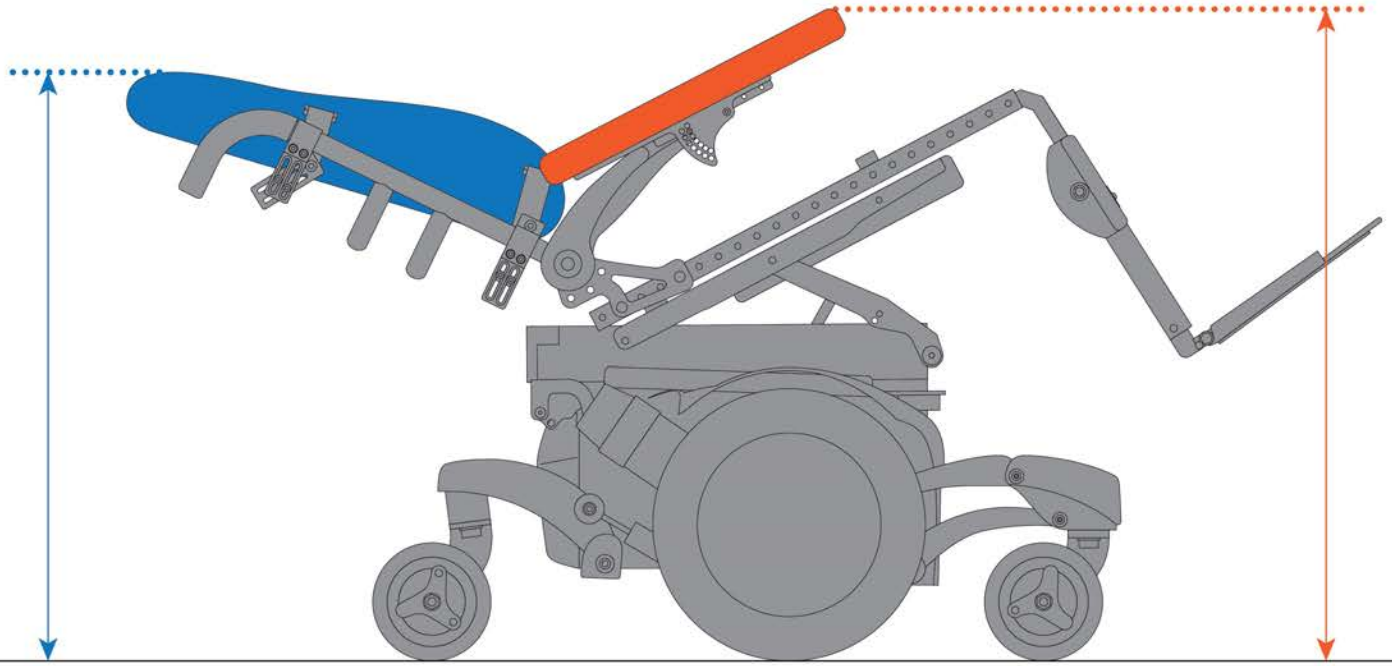
Annex F

Aircraft Baggage Door Height Data

				TOTAL USA FLEET	7356	6543	Total on this list	
Manufacture	Aircraft Type	Cargo Door Height (in)	Cargo Door Width (in)	# of Craft 2018 aeroweb	# of Craft 2018 this list	% of USA Fleet	% of this list	Last year of production from wikipedia
Airbus	**Fleet**			**1558**	**1457**	**21.2%**	**22.3%**	
Airbus	A220	32.0	44.0		4	0.1%	0.1%	Present
Airbus	A310	66.0	104.0		10	0.1%	0.2%	1998
Airbus	A319 FWD	48.0	71.0		365	5.0%	5.6%	Present
Airbus	A319 AFT	40.0	71.5					Present
Airbus	A320 FWD	48.0	71.0		561	7.6%	8.6%	Present
Airbus	A320 AFT	40.0	71.5					Present
Airbus	A321	48.0	71.0		417	5.7%	6.4%	Present
Airbus	A330	66.0	106.0		89	1.2%	1.4%	Present
Airbus	A340	66.2	107.1			0.0%	0.0%	2011
Airbus	A350	66.0	96.0		11	0.1%	0.2%	Present
Airbus	A380	64.0	67.0			0.0%	0.0%	2021
ATR	**Fleet**			**46**	**46**	**0.6%**	**0.7%**	
ATR	ATR 42	48.2	25.5		25	0.3%	0.4%	Present
ATR	ATR 72	48.2	25.5		21	0.3%	0.3%	Present
Boeing	**Fleet**			**3226**	**3203**	**43.9%**	**49.0%**	
Boeing	Boeing 707 FWD	50.0	48.0					1978
Boeing	Boeing 707 AFT1	49.0	48.0					1978
Boeing	Boeing 707 AFT2	35.0	30.0					1978

N855VA
BL-51

33" max



Travel
Back

Travel
Arm

33" max

Travel
Back

Travel
Arm

Drive Disengagement System

Required to allow Carrier Agents to manually propel the powered wheelchair

Wheelchair must be pushed to the nearest elevator down to the tarmac and to the aircraft for loading

Battery isolation switch indication

Battery isolation switch indication

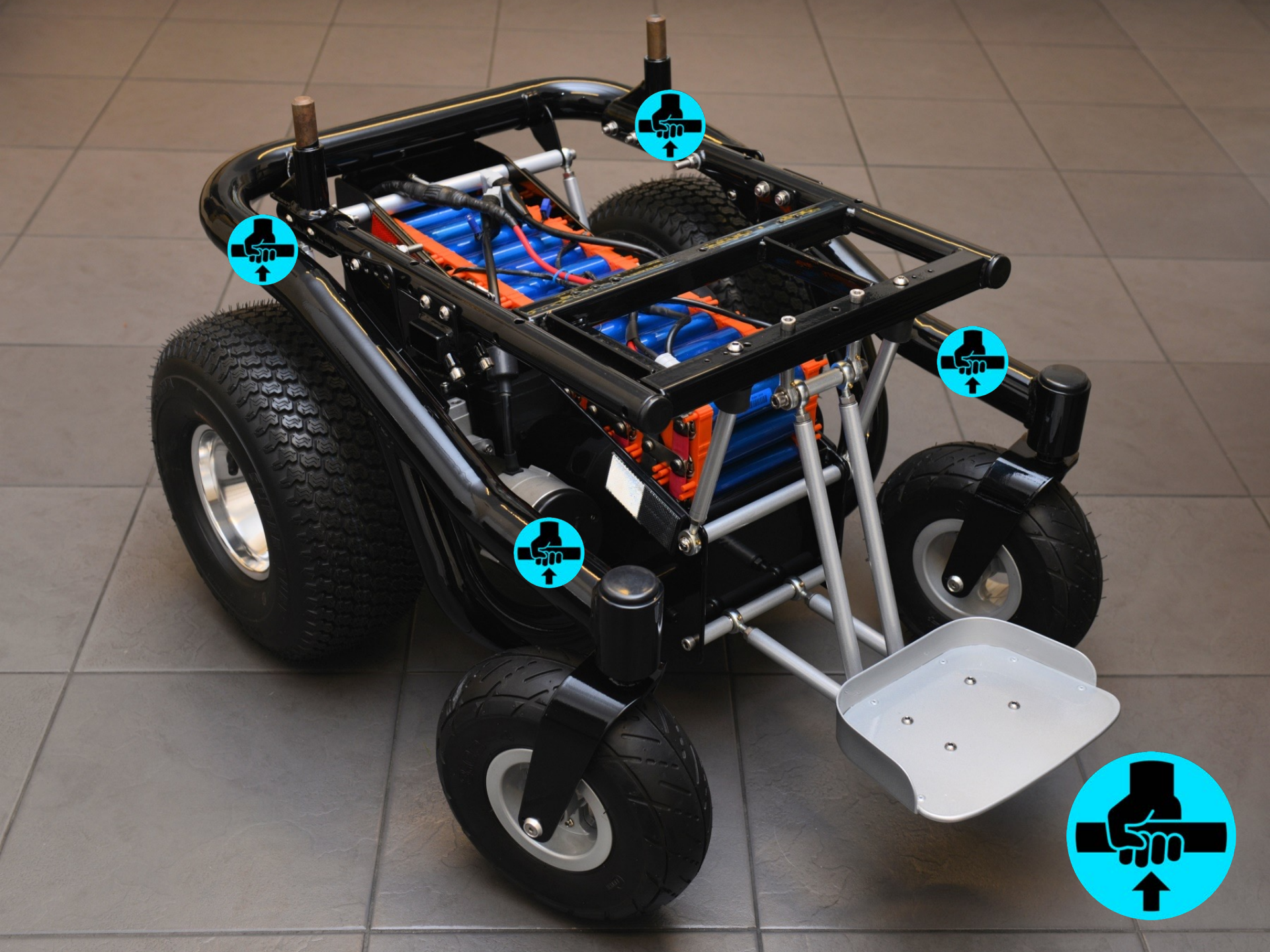
Location of Manual Lifting Points

To prevent	damage to the wheelchair
To prevent	injury to the baggage handler
To plan	for the right equipment for people to load the mobility device

Manual lifting point

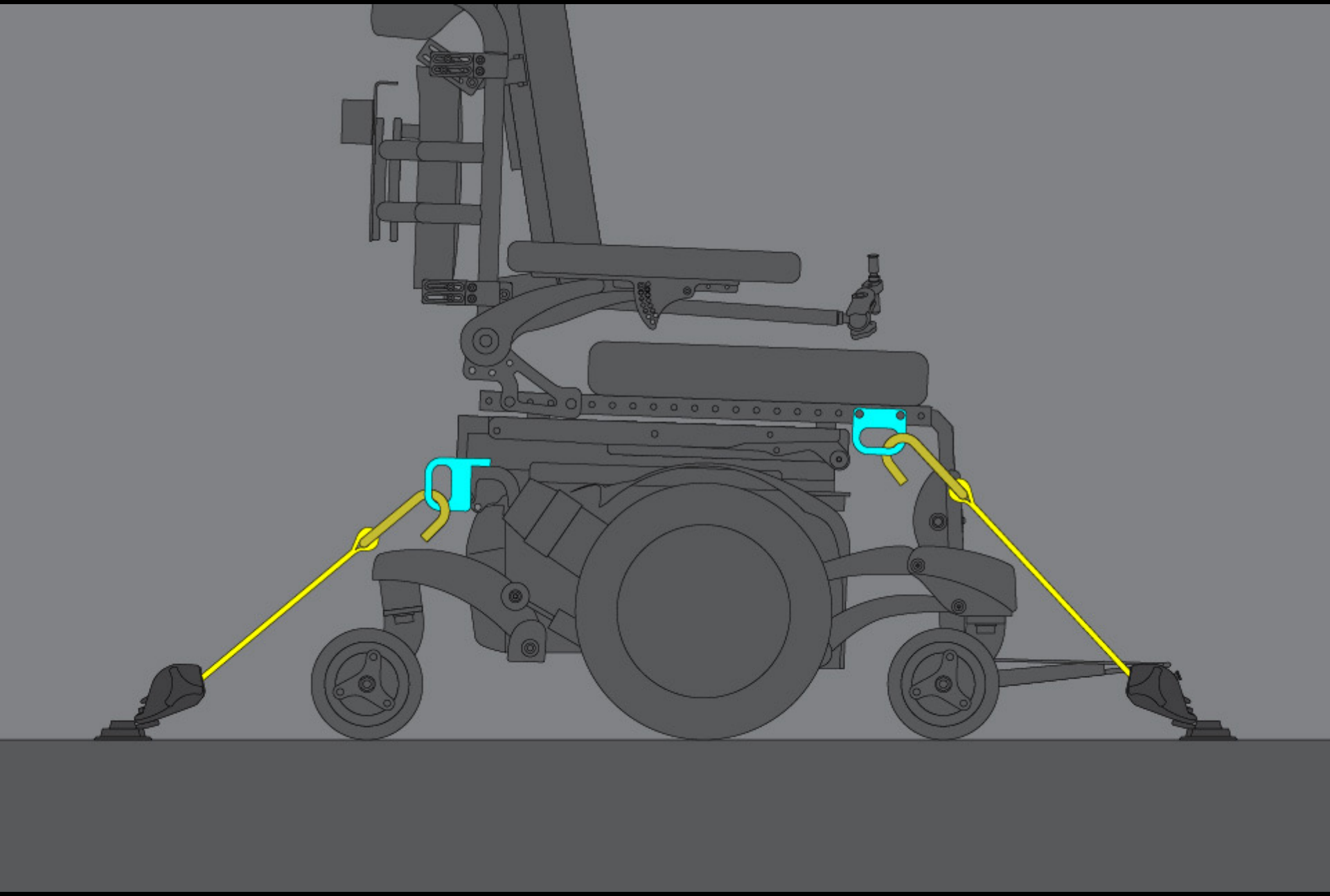
https://wheelchairtravel.org/air-travel/reduce-risk-wheelchair-damage/

C400



Powered Mobility Device

with the WC19 Transit Option



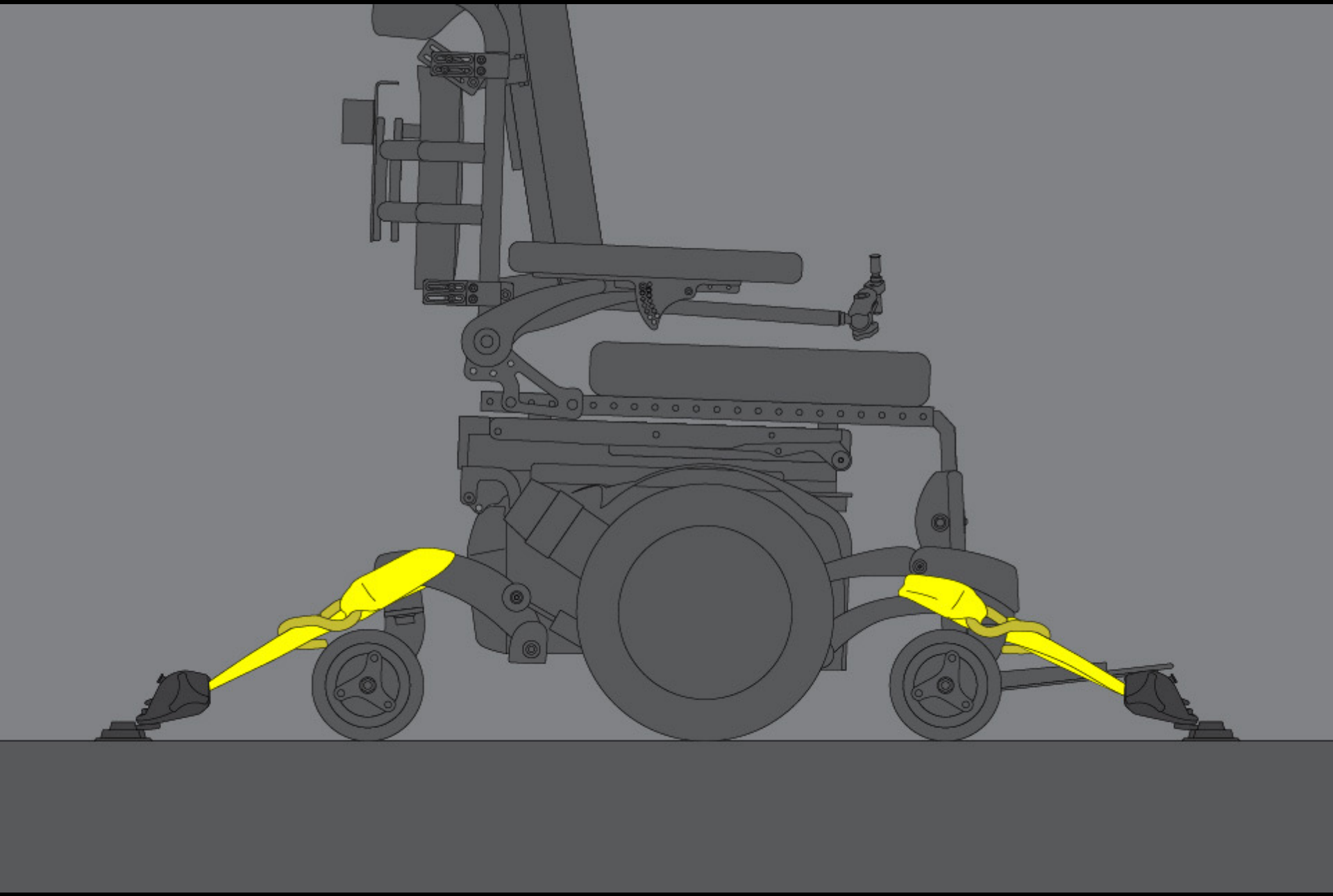
Attachment Points for Securement

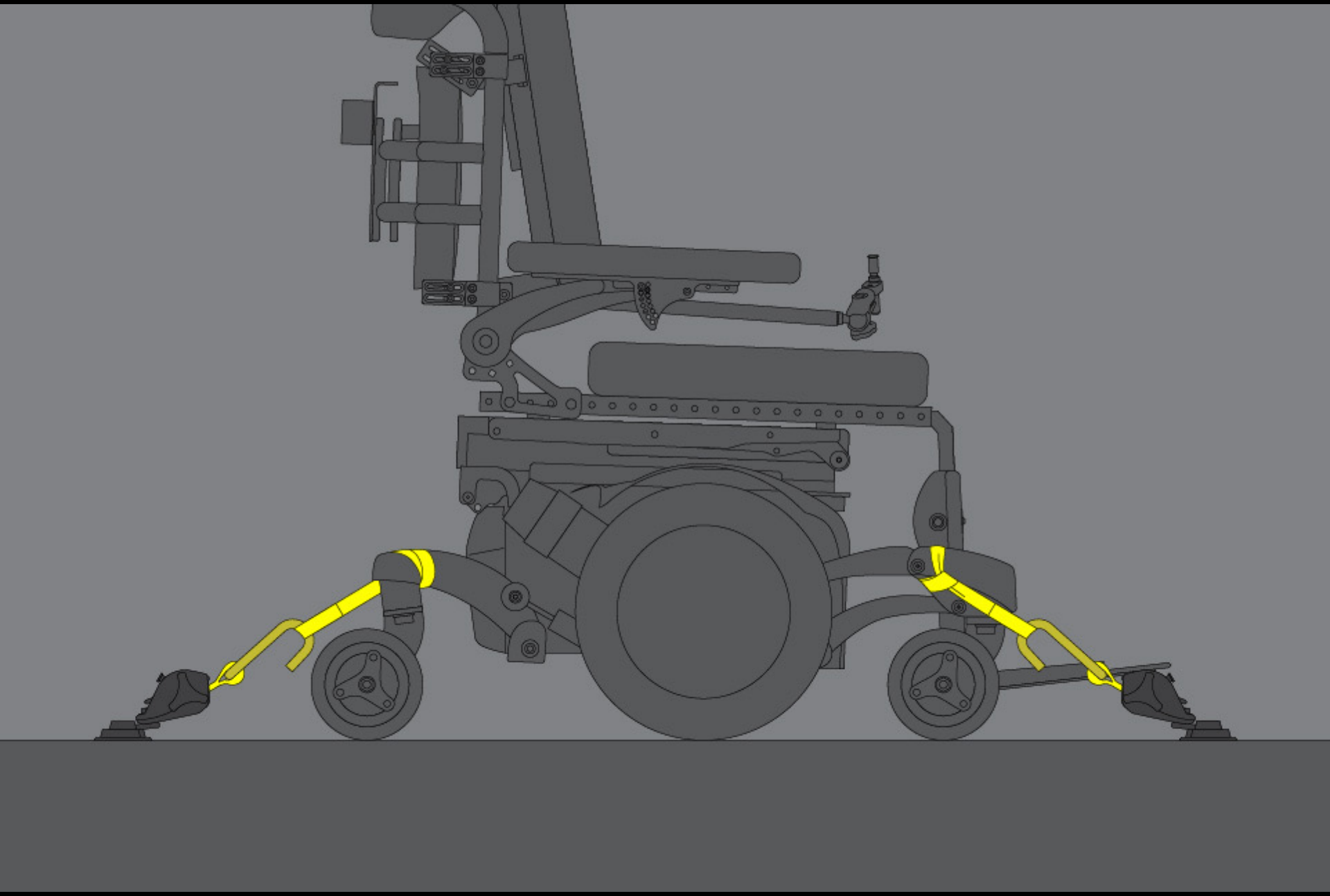
Securement for non-WC19-compliant Mobility Devices

Mobility Device will have been tested at these locations for unoccupied securement forces

Securement sling securement point

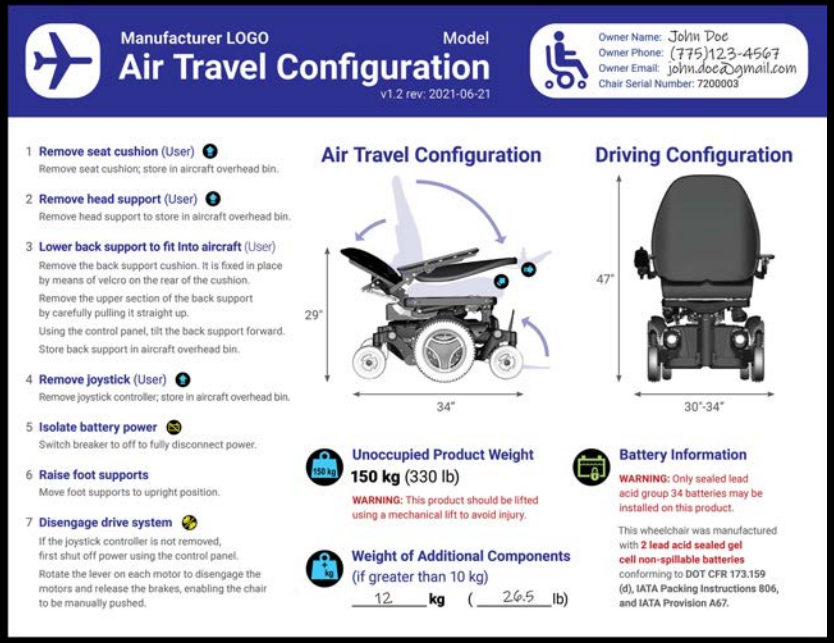
Cargo strap securement point





Air Travel Configuration Card

Front and Back Sides



Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration

29"

34"

Driving Configuration

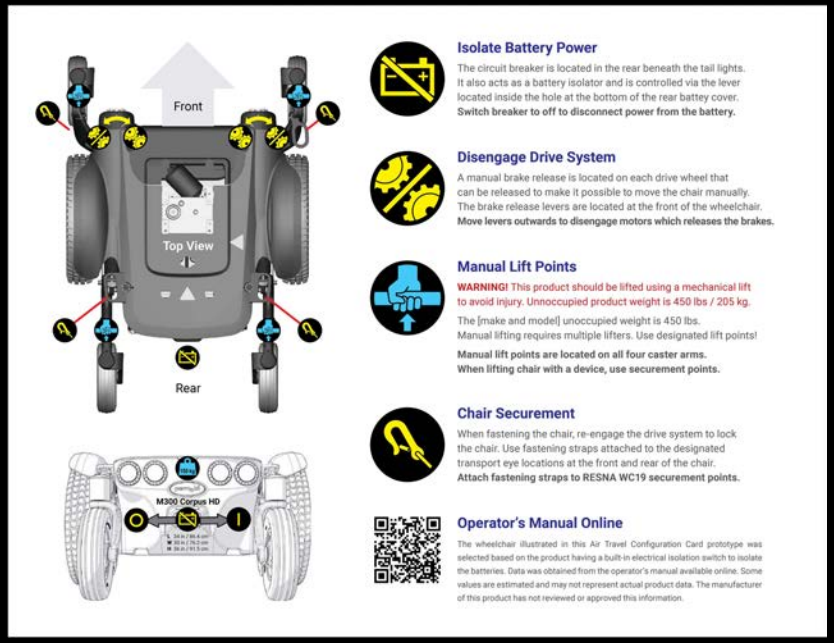
47"

30"-34"

Unoccupied Product Weight
150 kg (330 lb)
WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information
WARNING: Only sealed lead acid group 34 batteries may be installed on this product.
This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**



Front

Top View

Rear

M300 Corpus HD

Isolate Battery Power
The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System
A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

Manual Lift Points
WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.
The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!
Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

Chair Securement
When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

Operator's Manual Online
The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

8.1
A place for the user to write their name, cell phone number, and email address

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

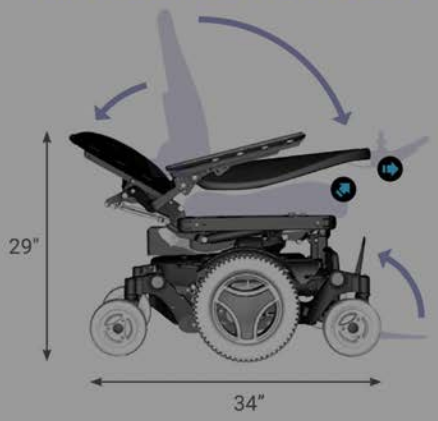
4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

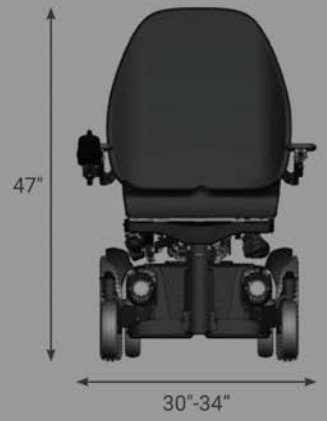
6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration



Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information

WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.3

The unoccupied Mobility Device mass as manufactured, including batteries, as prepared for transport

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

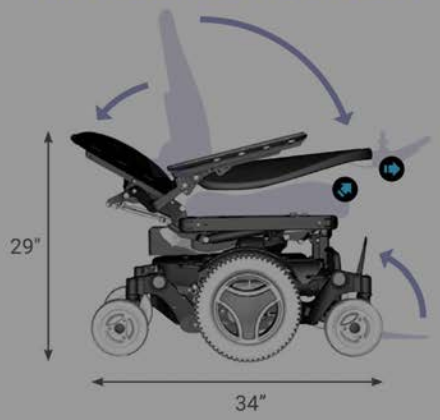
4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

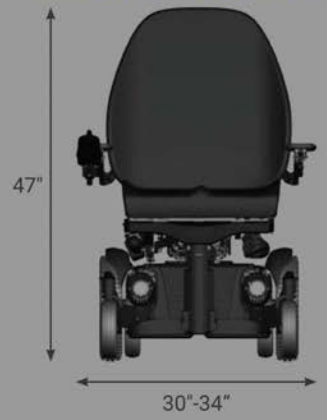
6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration



Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)
WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information
WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.7

A statement confirming that the Mobility Device was manufactured with and shall only be outfitted with non-spillable batteries

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

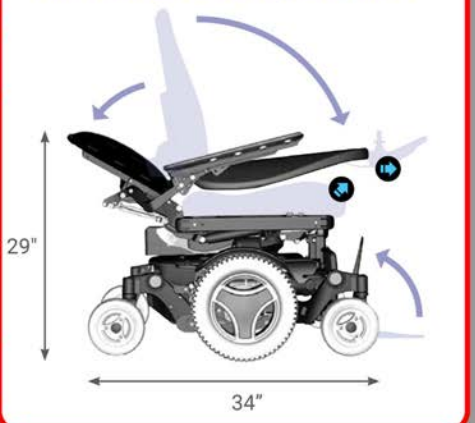
4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

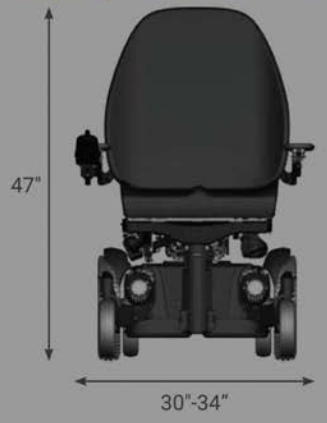
6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration



Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information

WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.15
The Mobility Device length, width, and height as configured for air travel

8.18
An image of the Mobility Device in the Air Travel Configuration

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

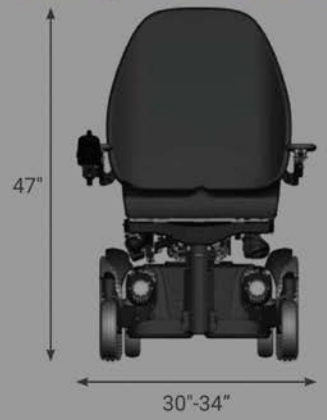
5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration

Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information

WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.16
An image of the Mobility Device in its Driving Configuration

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

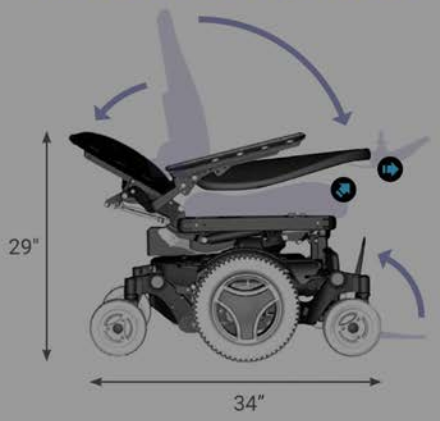
4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

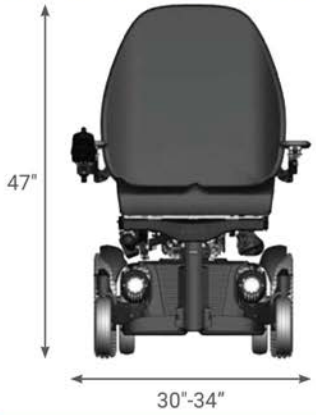
6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration



Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information

WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.17 Required steps to prepare the Mobility Device for Air Travel Configuration

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

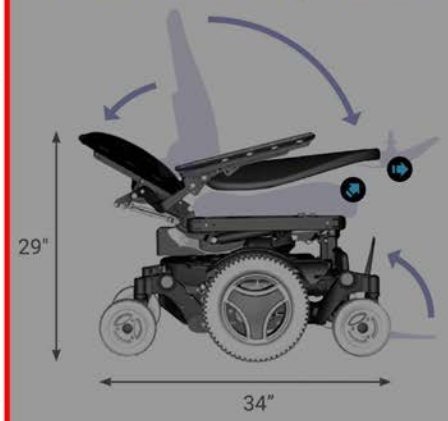
4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

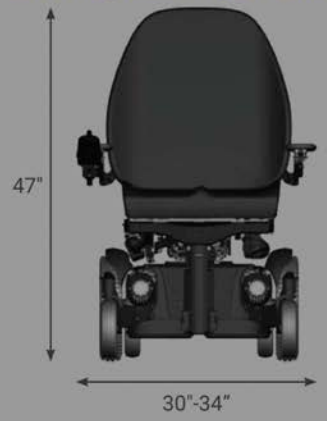
6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration



Driving Configuration



Unoccupied Product Weight
150 kg (330 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

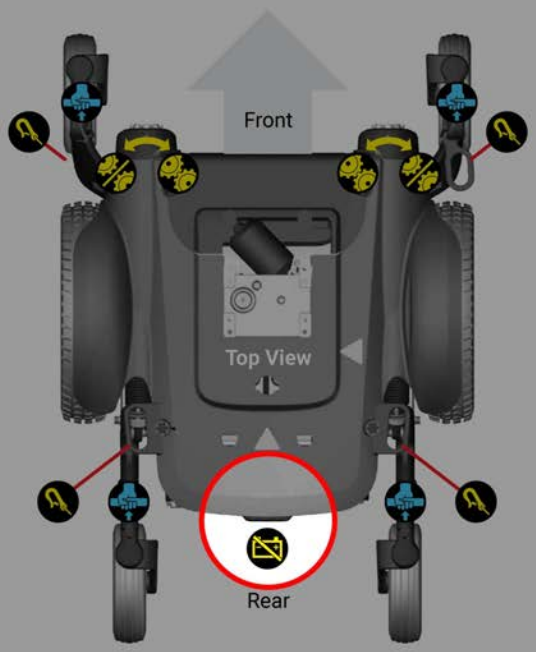
Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

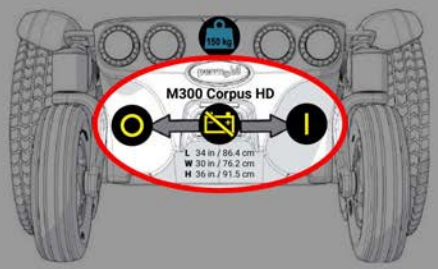
Battery Information

WARNING: Only sealed lead acid group 34 batteries may be installed on this product.

This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

8.13
The location of the battery isolation switch or control and its direction of operation





Isolate Battery Power

The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System

A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

Manual Lift Points

WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.

The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!

Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

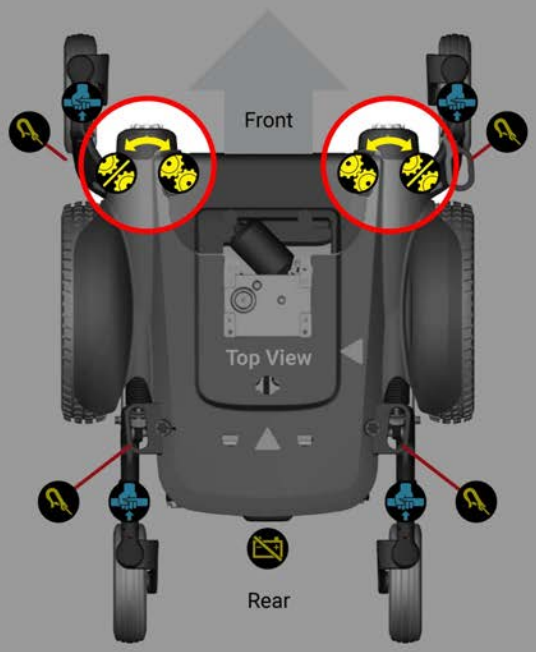
Chair Securement

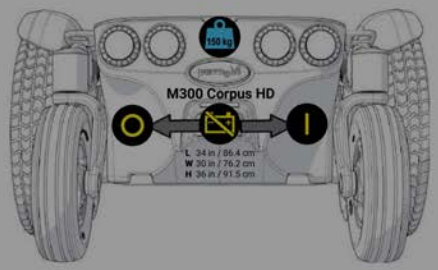
When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

Operator's Manual Online

The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

8.12
The location(s) of the Drive Disengagement system





Isolate Battery Power

The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System

A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

Manual Lift Points

WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.

The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!

Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

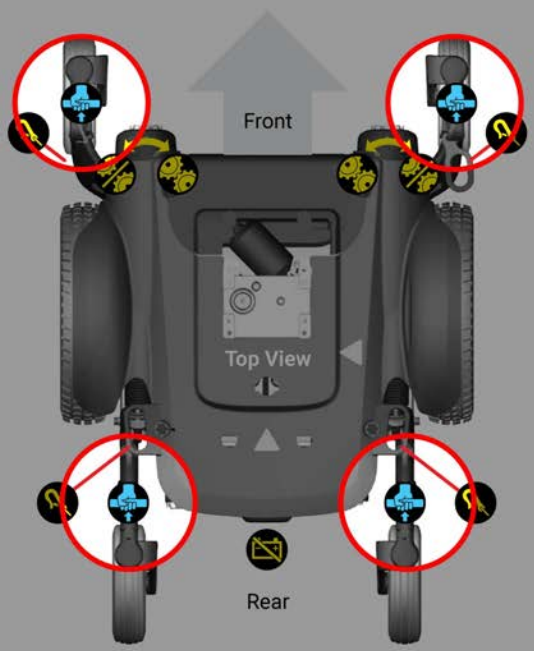
Chair Securement

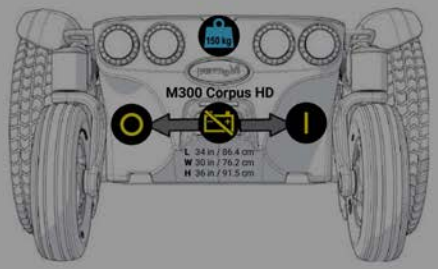
When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

Operator's Manual Online

The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

8.11
The locations of the manual lifting points on the Mobility Device





Isolate Battery Power

The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System

A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

Manual Lift Points

WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.

The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!

Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

Chair Securement

When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

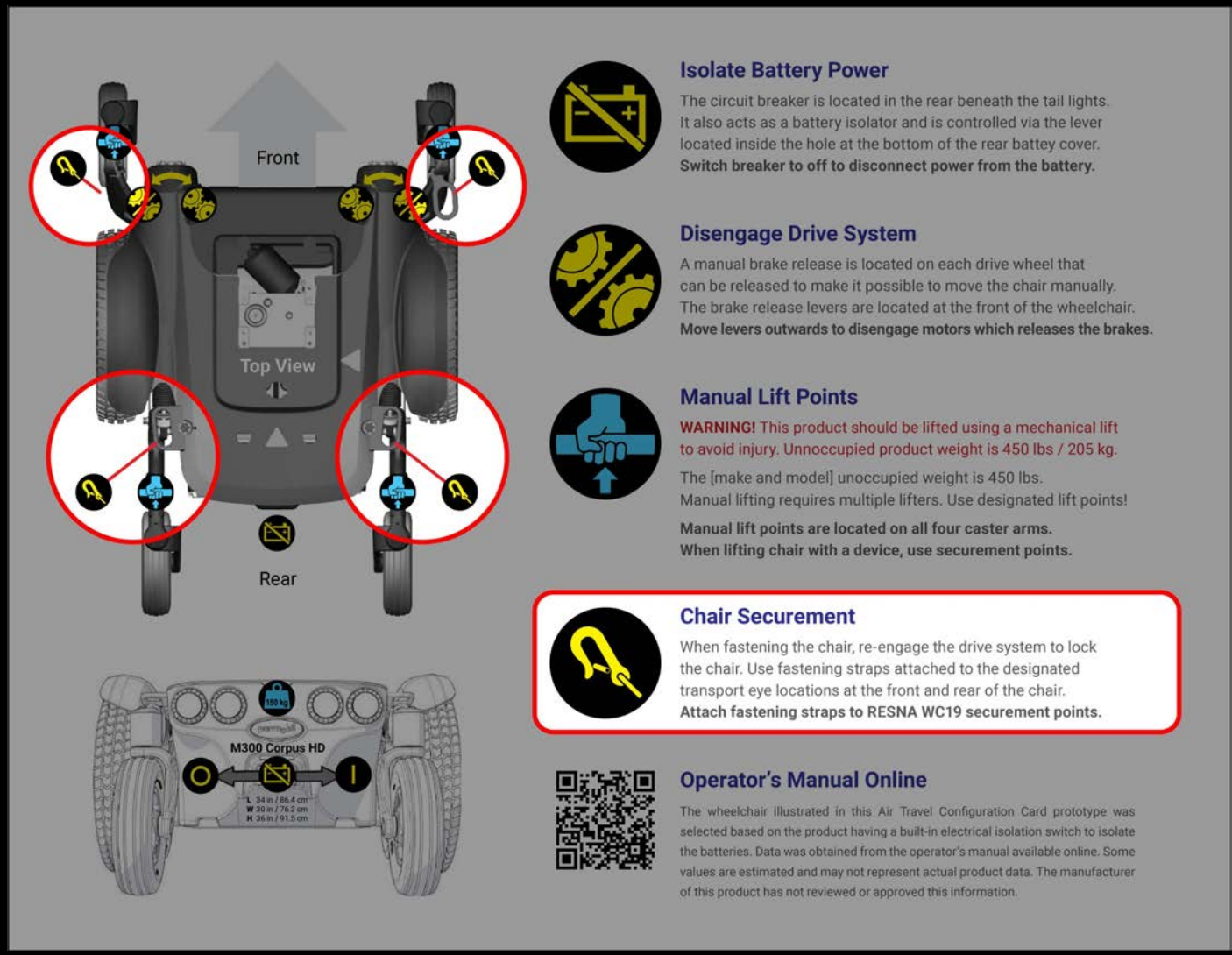
Operator's Manual Online

The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

8.10

The locations of the securement points for either the WC19 Transit Option or Securement Slings and cargo straps

NOTE: The symbol in this example is used only for the WC19 Transit Option



Travel Scooter

Front side

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove key** (User)
Store key in bag attached to tiller.

2 **Lock tiller in straight position** (User)
Push the tiller lock knob in and turning it clockwise 90 degrees. The front wheel must face forward in order to lock the tiller.

3 **Fold seat back down** (User)

4 **Fold tiller down** (User)
Fold tiller down to folded position resting on seat.

5 **Lock tiller in place** (User)

6 **Isolate battery power**
Switch breaker to off to fully disconnect power.

7 **Disengage drive system**
Push the lever on each motor forward to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration

Driving Configuration

Unoccupied Product Weight

52.7 kg (116 lb)

WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components

(if greater than 10 kg)

11 **kg** (24.3 lb)

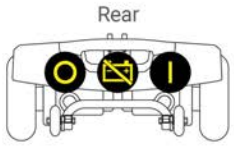
Battery Information

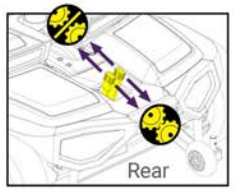
WARNING: Only sealed AGM or Gel-Cell type lead acid batteries may be installed on this product.

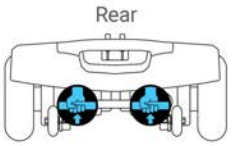
This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**

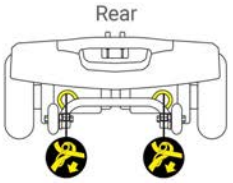
Travel Scooter

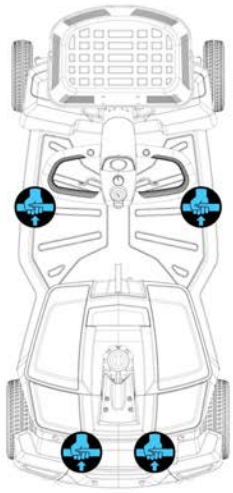
Back side

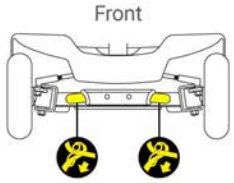












Isolate Battery Power

The circuit breaker is located on the top of the battery pack.
It also acts as a battery isolator and is controlled via the lever located inside the hole at the top of the battey pack.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System

A manual brake release is located above each wheel motor that can be released to make it possible to move the chair manually.
The brake release levers are located at the rear of the scooter.
Move levers forward to disengage motors which releases the brakes.

Manual Lift Points

WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 116 lbs / 52.7 kg.

The [make and model] unoccupied weight without additional components added to the device is 116 lbs.
Manual lifting requires multiple lifters. Use designated lift points!

Side lifting points are located at the middle edges of the foot plate.
Rear lifting points are located near the motors and the anti-tip wheels.

Chair Securement

When fastening the scooter, re-engage the drive system to lock the device. Use cargo straps with or without the use of securement straps attached to the designated transit eye locations at the front and rear of the chair. The rear anchor points should be placed directly behind the rear securement points. The front anchor points should be placed wider than the scooter to provide incrased lateral stability.
Attach fastening straps to marked securement points ONLY.

The make and model of wheelchair selected to draft this prototype of an Air Travel Configuration Card was modified for illustration purposes and does not represent a specific device. Some data was obtained from a sample user manual and specification sheet that was available online. Other values are estimated. The manufacturer of the product illustrated has not reviewed or approved this information.

Manual Wheelchair

Front side

Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

Remove seat cushion (User)

Remove seat cushion and store in aircraft overhead bin.

- **Fold back support forward** (User)

  Pull the release cord beneath the back support to rotate the back support forward until the back support locks in the folded position.

  WARNING! When reconfiguring the chair in the driving configuration, ensure that the back support is fully locked in the proper position to prevent release of the back support and rearward tipping, which can result in injury or death.

Remove rear wheels (User)

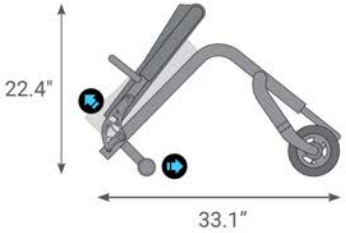
Remove rear wheels and store in aircraft overhead bin.

Remove the rear wheels by carefully performing the following steps:

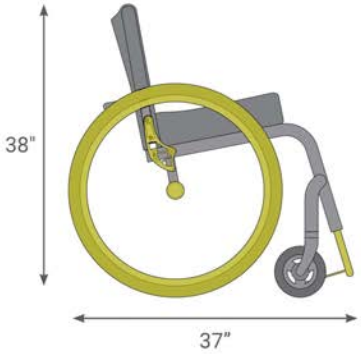
1. Depress the quick-release button fully.
2. Remove wheel by sliding axle completely out of camber plug.
3. Repeat steps for opposite wheel.

NOTE: When reattaching the wheels, the axle is not locked until the quick-release buttton pops out fully. Always check to ensure that each axle is locked and secure by pulling on the wheel in the direction of the axle.

Travel Configuration



Driving Configuration



6.4 kg

Unoccupied Product Weight

6.4 kg (14 lb)

+ kg

Weight of Additional Components

(if greater than 10 kg)

__11__ **kg** (__24.3__ lb)

Important Information

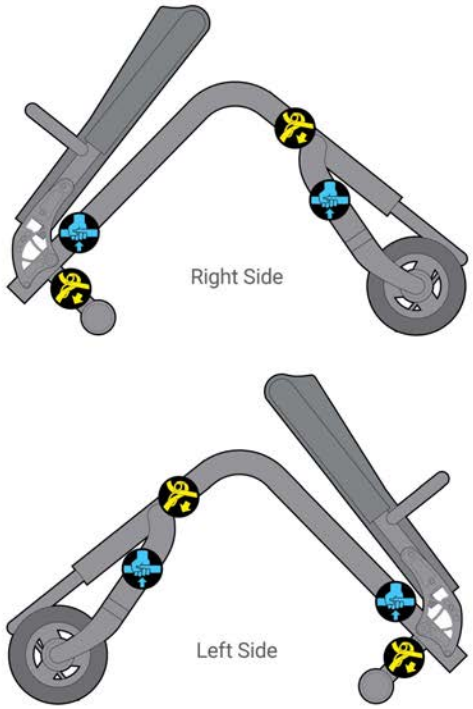
Ensure all detachable components **(highlighted yellow)** are properly secured before use.

WARNING! This chair is not to be used unless all detachable components have been checked for securement. Failure to check detachable parts could lead to failure of the device during use, causing a fall and resulting in injury or death.

Manual Wheelchair

Back side

Model Side View



Both sides of the wheelchair in the Air Travel Configuration have been shown to illustrate the manual lifting points and the securement points along the non-detachable parts of the frame.

Manual Lift Points

WARNING! Do not lift the wheelchair while occuppied. Lifting the wheelchair while the user is seated in the chair could lead to back injury or imbalance and tipping, resulting in injury or death.

WARNING! Do not lift this wheelchair by grasping the Back Support Release Cord or footrest or any other detachable element of the device. Detachable elements may not bear the weight of the device and may detach, leading to unexpected swinging or dropping, which could result in damage or injury to others.

This wheelchair has been designed to be easily lifted by one person. However, proper lifting technique should be maintained by keeping knees slightly bent and back upright.

Designated manual lifting points have been indicated by the above black and blue symbol in order to mark non-detachable areas of the main frame that are safe for lifting. Failure to lift the device using the designated manual lift points may lead to dropping and accidental damage to the device or injury to others.

Front manual lift points are located in front of the seat above the front caster arms. Rear manual lift points are located on the main frame adjacent to the seat cushion, near the back support pivot point.

Chair Securement

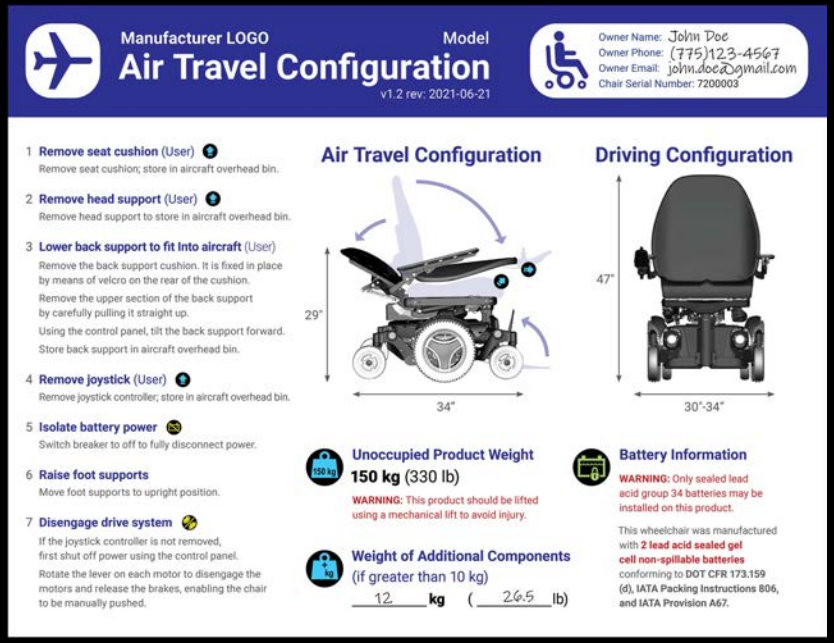
WARNING! This chair is not designed to be occuppied during transit. Move rider to an approved vehicle seat. Occupying the seat while in transit could cause the rider to be thrown from the chair in the event of a sudden stop, resulting in injury or death.

In order to secure the chair for transit, use cargo straps with or without the use of securement straps. Attach the cargo straps to the designated securement points marked on the chair using the above black and yellow securement point symbol.

The make and model of wheelchair selected to draft this prototype of an Air Travel Configuration Card is provided as an example only and does not represent a specific device.

Recommendation:

Create an Air Travel Configuration Card for Existing Devices



Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration

29"

34"

Driving Configuration

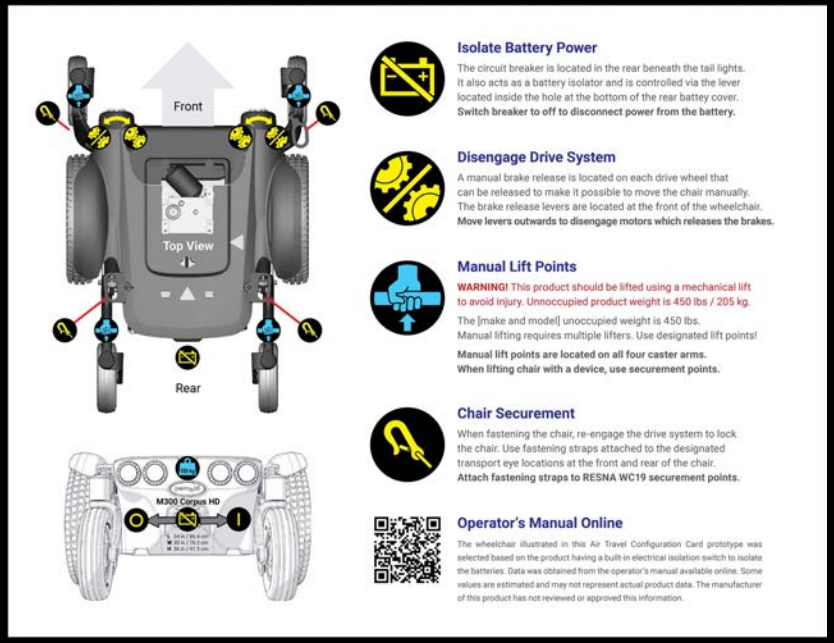
47"

30"-34"

Unoccupied Product Weight
150 kg (330 lb)
WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information
WARNING: Only sealed lead acid group 34 batteries may be installed on this product.
This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**



Front

Top View

Rear

M300 Corpus HD

Isolate Battery Power
The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System
A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

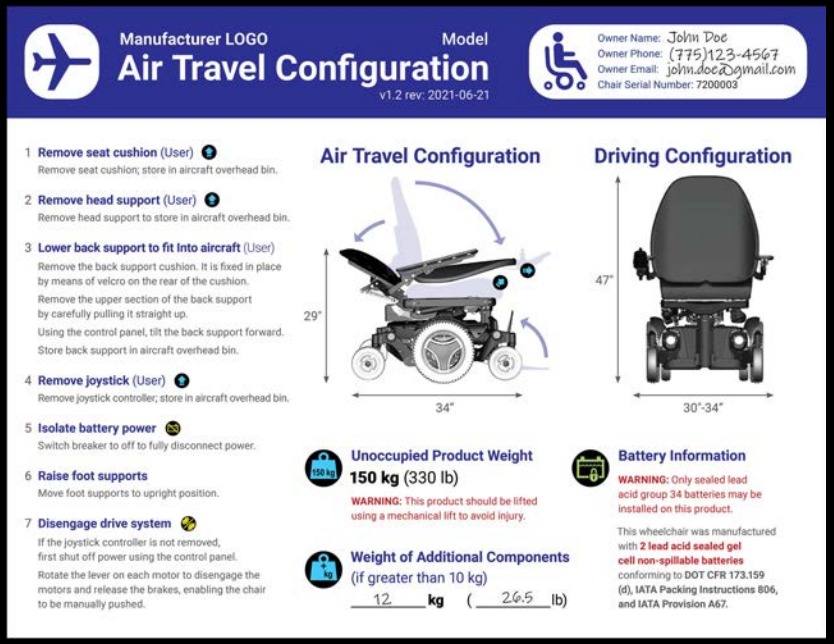
Manual Lift Points
WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.
The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!
Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

Chair Securement
When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

Operator's Manual Online
The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

Recommendation:

Create an Air Travel Configuration Card for existing devices



Manufacturer LOGO

Model

Air Travel Configuration

v1.2 rev: 2021-06-21

Owner Name: John Doe
Owner Phone: (775)123-4567
Owner Email: john.doe@gmail.com
Chair Serial Number: 7200003

1 **Remove seat cushion** (User)
Remove seat cushion; store in aircraft overhead bin.

2 **Remove head support** (User)
Remove head support to store in aircraft overhead bin.

3 **Lower back support to fit Into aircraft** (User)
Remove the back support cushion. It is fixed in place by means of velcro on the rear of the cushion.
Remove the upper section of the back support by carefully pulling it straight up.
Using the control panel, tilt the back support forward.
Store back support in aircraft overhead bin.

4 **Remove joystick** (User)
Remove joystick controller; store in aircraft overhead bin.

5 **Isolate battery power**
Switch breaker to off to fully disconnect power.

6 **Raise foot supports**
Move foot supports to upright position.

7 **Disengage drive system**
If the joystick controller is not removed, first shut off power using the control panel.
Rotate the lever on each motor to disengage the motors and release the brakes, enabling the chair to be manually pushed.

Air Travel Configuration

29"

34"

Driving Configuration

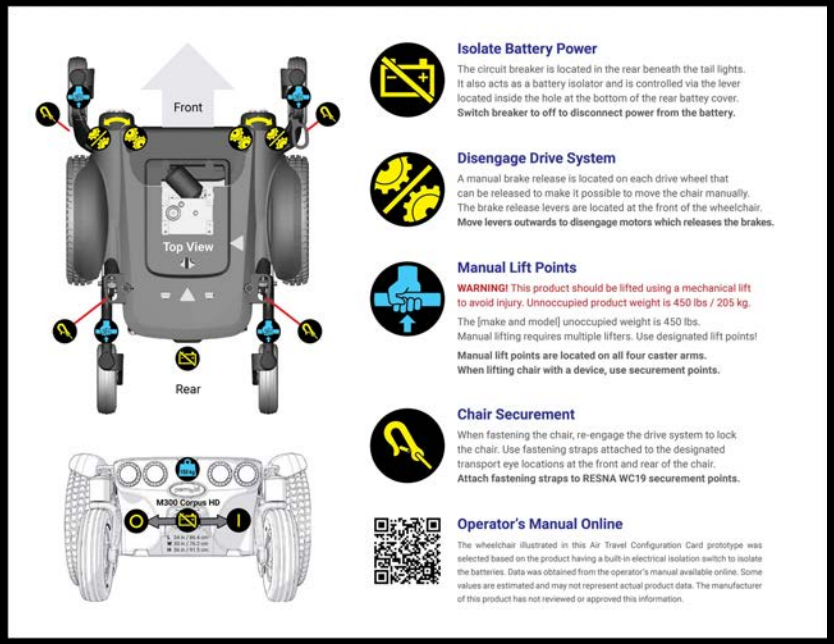
47"

30"-34"

Unoccupied Product Weight
150 kg (330 lb)
WARNING: This product should be lifted using a mechanical lift to avoid injury.

Weight of Additional Components
(if greater than 10 kg)
12 **kg** (26.5 lb)

Battery Information
WARNING: Only sealed lead acid group 34 batteries may be installed on this product.
This wheelchair was manufactured with **2 lead acid sealed gel cell non-spillable batteries** conforming to **DOT CFR 173.159 (d), IATA Packing Instructions 806, and IATA Provision A67.**



Isolate Battery Power
The circuit breaker is located in the rear beneath the tail lights. It also acts as a battery isolator and is controlled via the lever located inside the hole at the bottom of the rear battey cover.
Switch breaker to off to disconnect power from the battery.

Disengage Drive System
A manual brake release is located on each drive wheel that can be released to make it possible to move the chair manually. The brake release levers are located at the front of the wheelchair.
Move levers outwards to disengage motors which releases the brakes.

Manual Lift Points
WARNING! This product should be lifted using a mechanical lift to avoid injury. Unnoccupied product weight is 450 lbs / 205 kg.
The [make and model] unoccupied weight is 450 lbs.
Manual lifting requires multiple lifters. Use designated lift points!
Manual lift points are located on all four caster arms.
When lifting chair with a device, use securement points.

Chair Securement
When fastening the chair, re-engage the drive system to lock the chair. Use fastening straps attached to the designated transport eye locations at the front and rear of the chair.
Attach fastening straps to RESNA WC19 securement points.

Operator's Manual Online
The wheelchair illustrated in this Air Travel Configuration Card prototype was selected based on the product having a built-in electrical isolation switch to isolate the batteries. Data was obtained from the operator's manual available online. Some values are estimated and may not represent actual product data. The manufacturer of this product has not reviewed or approved this information.

Air Travel Issues Identified in Project

Issue 1	Narrow aircraft aisles
Issue 2	Lack of accessible lavatories
Issue 3	Steep jetway slopes
Issue 4	Damage to mobility devices
Issue 5	Dangerous transfer methods
Issue 6	Unstable boarding devices
Issue 7	Hazardous sitting pressures
Issue 8	Unusable onboard wheelchairs

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

CONSENSUS STUDY REPORT

Technical Feasibility of a Wheelchair Securement Concept for Airline Travel

A Preliminary Assessment

COMMITTEE FOR A STUDY ON THE FEASIBILITY OF WHEELCHAIR RESTRAINT SYSTEMS IN PASSENGER AIRCRAFT

Alan M. Jette (NAM), Boston University, Boston, Massachusetts, *Chair*
Naomi Armenta, Nelson\Nygaard, Oakland, California
Peter W. Axelson, Beneficial Designs, Inc., Minden, Nevada
Rory A. Cooper, University of Pittsburgh, Pittsburgh, Pennsylvania
Karen J. Erazo, Sun Country Airlines (retired), Eagan, Minnesota
Francis S. Heming, Jr., Goodrich Interiors (retired), Colorado Springs, Colorado
Kevin L. Hiatt, Alexandria, Virginia
Katharine M. Hunter-Zaworski, Oregon State University, Corvallis
George A. Lesieutre, The Pennsylvania State University, University Park
Miriam A. Manary, University of Michigan Transportation Research Institute, Ann Arbor
Clinton V. Oster, Jr., Indiana University, Troy, Montana
Gary M. Weissel, Tronos Aviation Consulting, Woodstock, Georgia

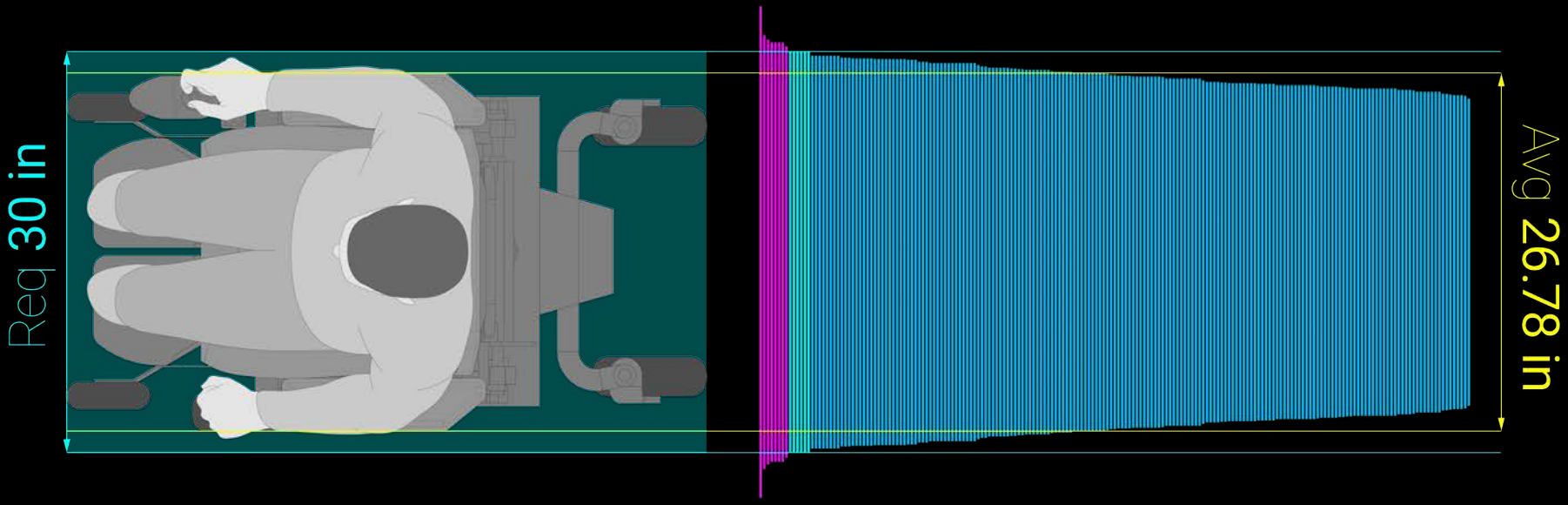
Staff

Melissa Welch-Ross, Study Director, Consensus and Advisory Studies, Transportation Research Board
Tracy Lustig, Senior Program Officer, Health and Medicine Division
Anusha Jayasinghe, Associate Program Officer, Consensus and Advisory Studies, Transportation Research Board
Claudia Sauls, Program Coordinator, Consensus and Advisory Studies, Transportation Research Board
Thomas R. Menzies, Jr., Director, Consensus and Advisory Studies, Transportation Research Board

Powered Wheelchair Specifications

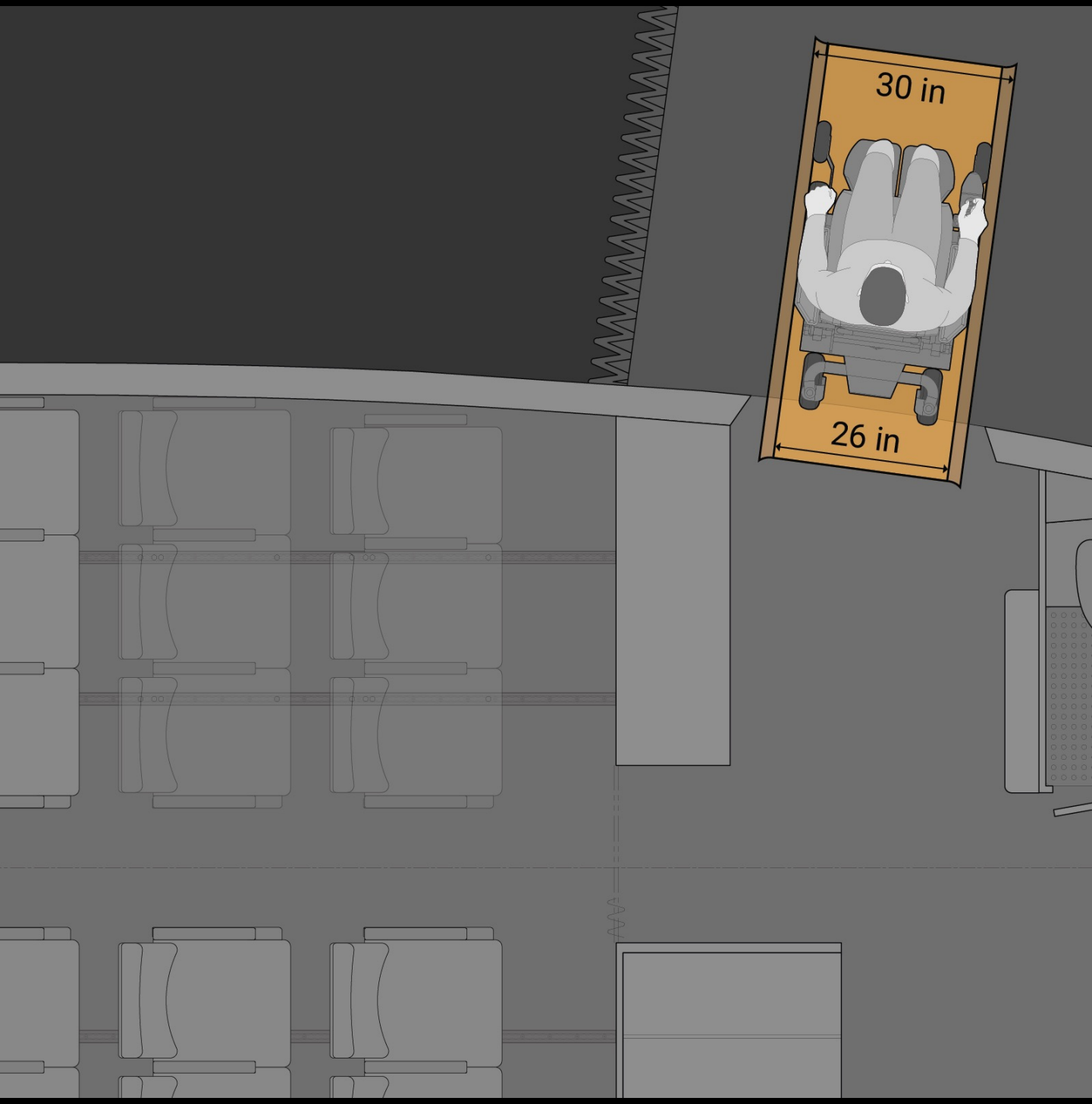
Maximum **Width**

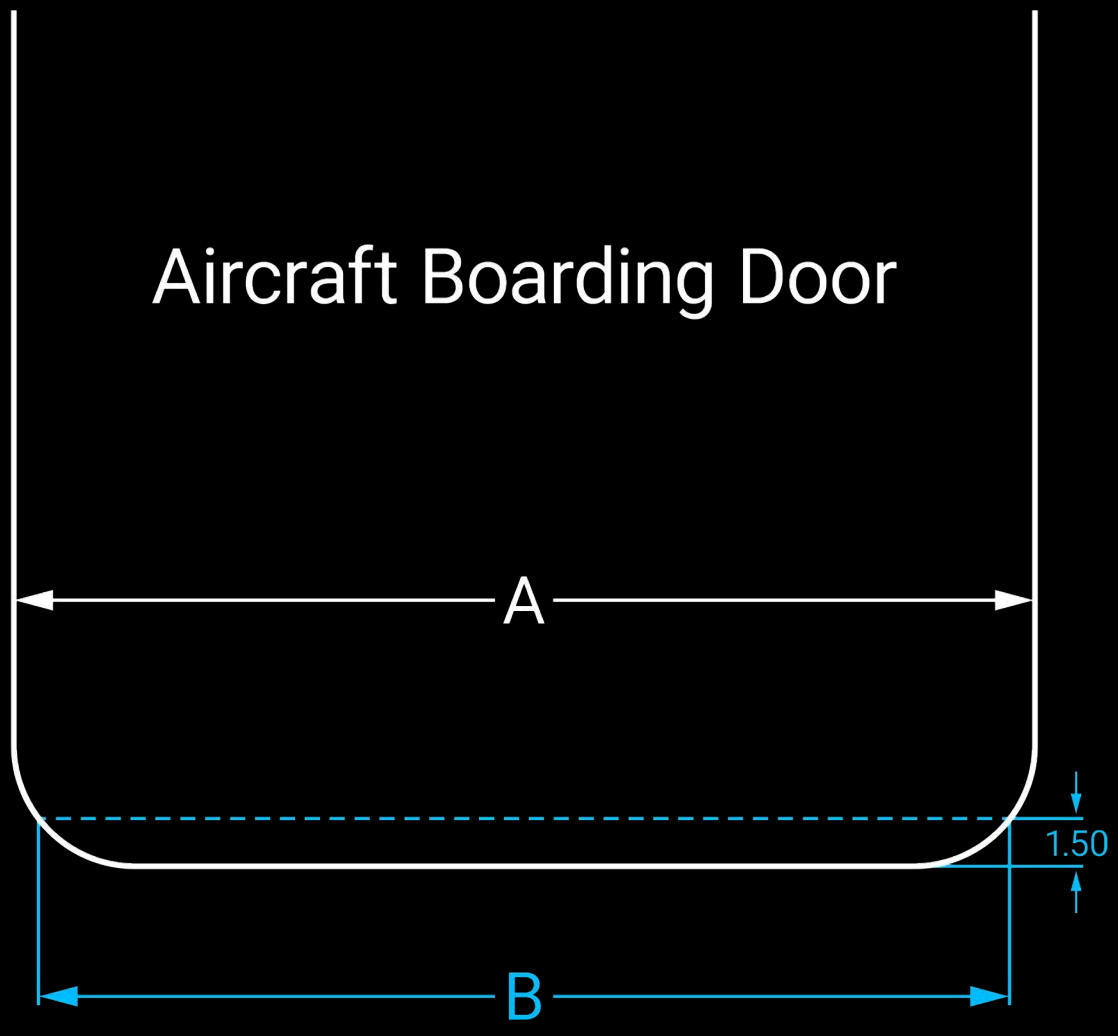
Widest point (normally at arm supports)



Out of 193 tested models, only 7 models (< 4%) exceeded the 30-in. width dimension used by ADAAG for clearance and clear space guidance.

Testing data were obtained from Beneficial Designs, Inc. and Ammer Consulting, LLC; these data did not include scooters.

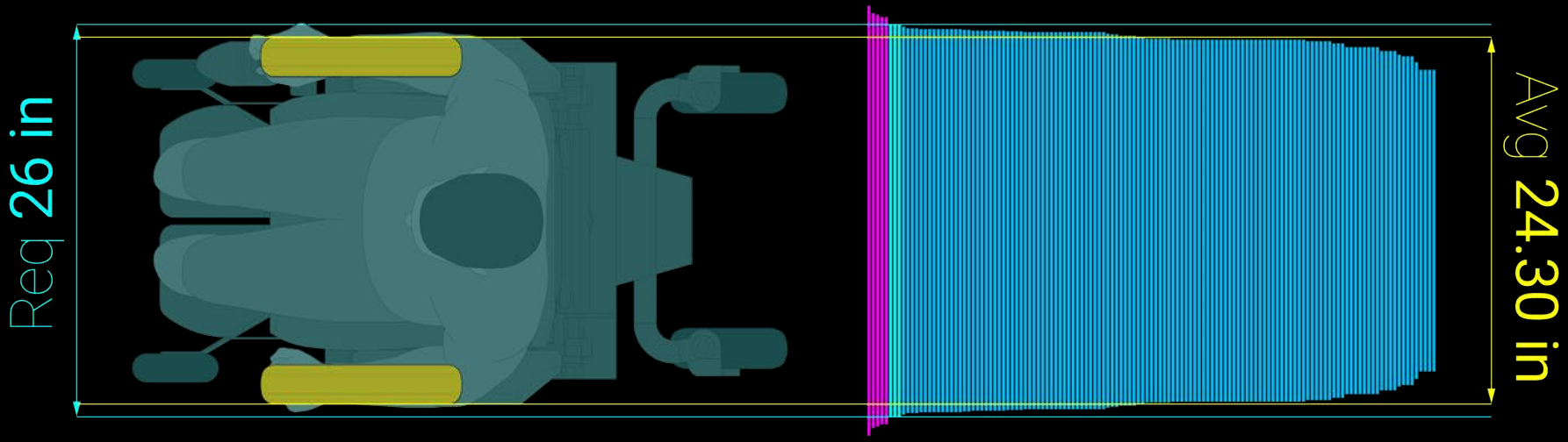

30 in
26 in


Aircraft Boarding Door
A
1.50
B

Powered Wheelchair Specifications

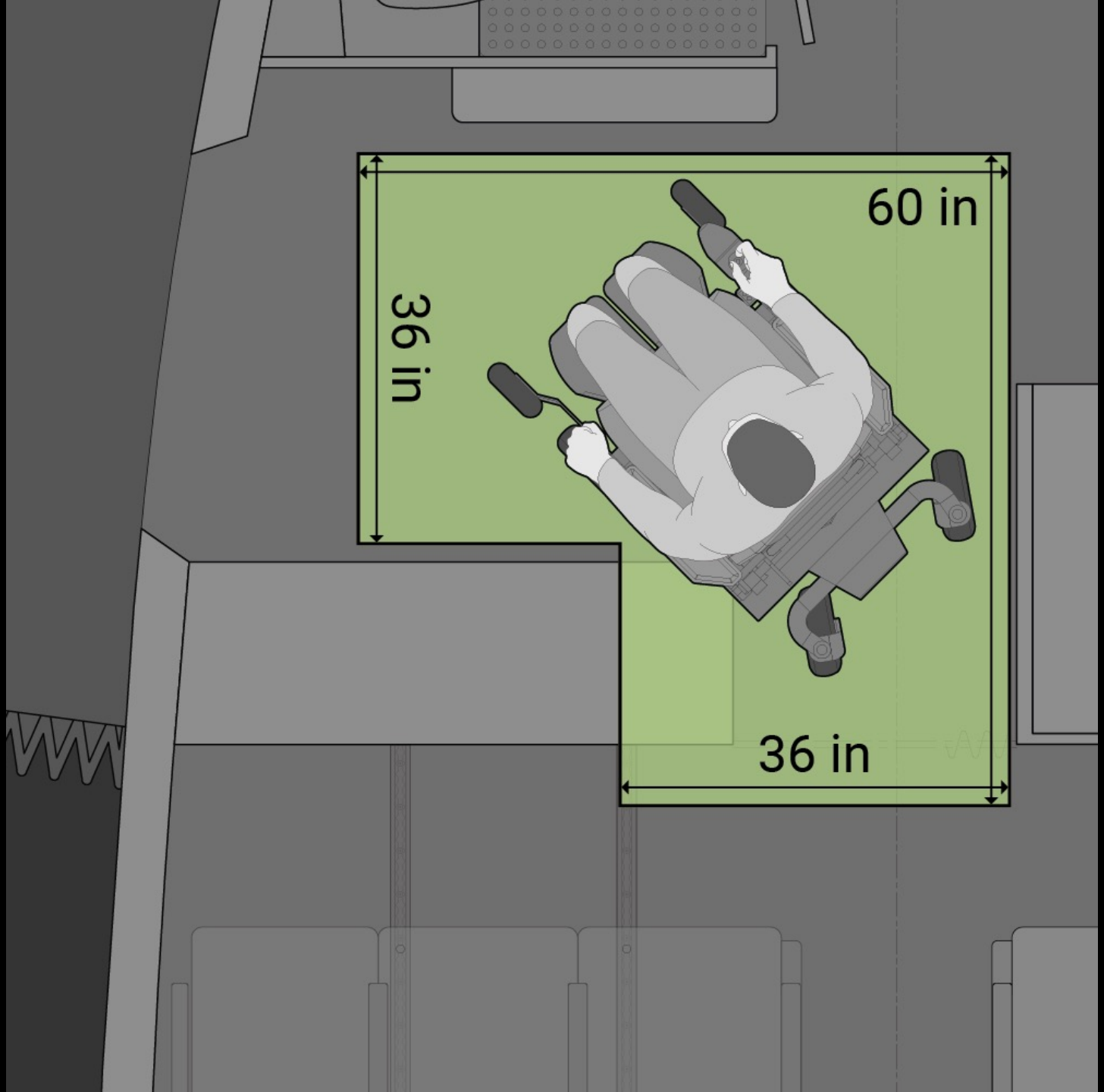
Maximum **Wheelbase Width**

Wheelbase width (below the armrests)



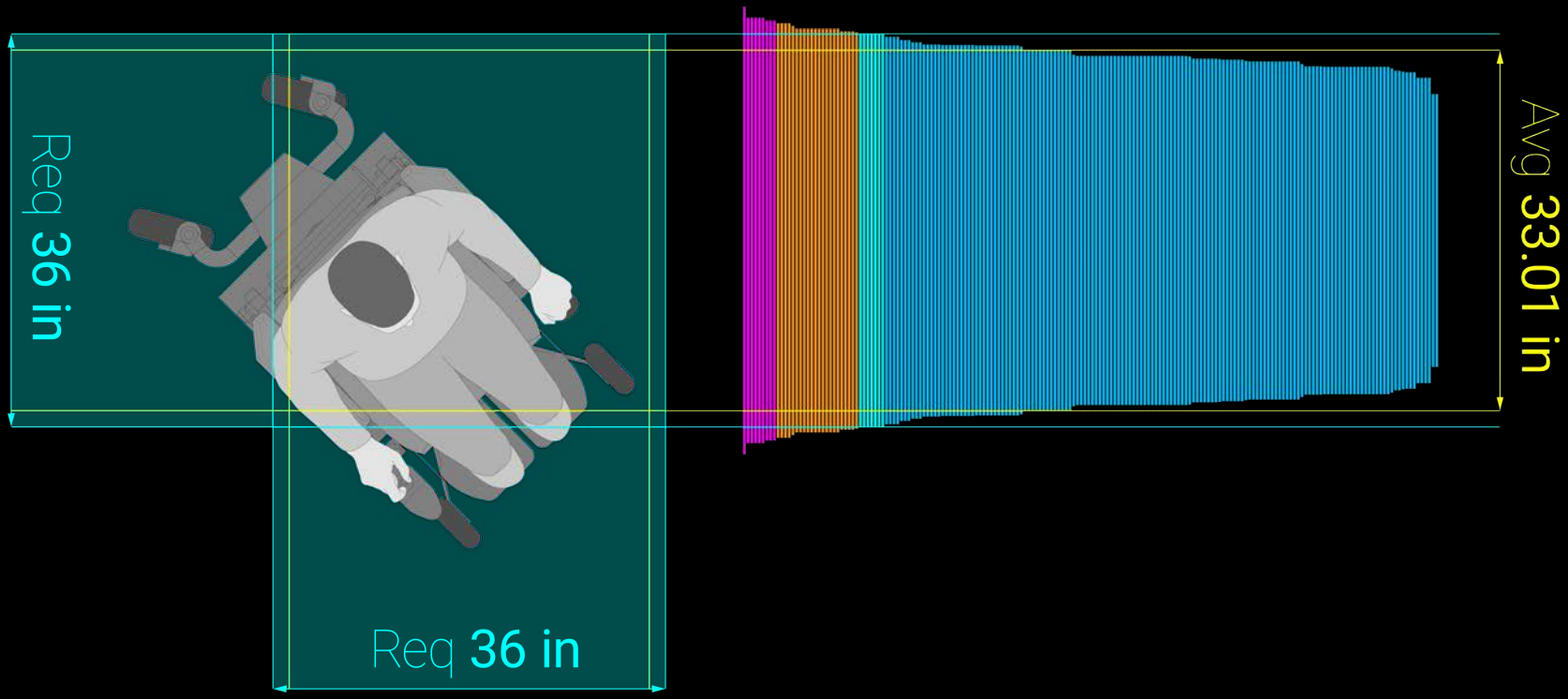
These measurements were available for 131 of the 193 models tested. Of those 131 models, only 5 models (< 4%) have a wheelbase width in excess of 26 in.

Testing data were obtained from Beneficial Designs, Inc. and Ammer Consulting, LLC; these data did not include scooters.


60 in
36 in
36 in

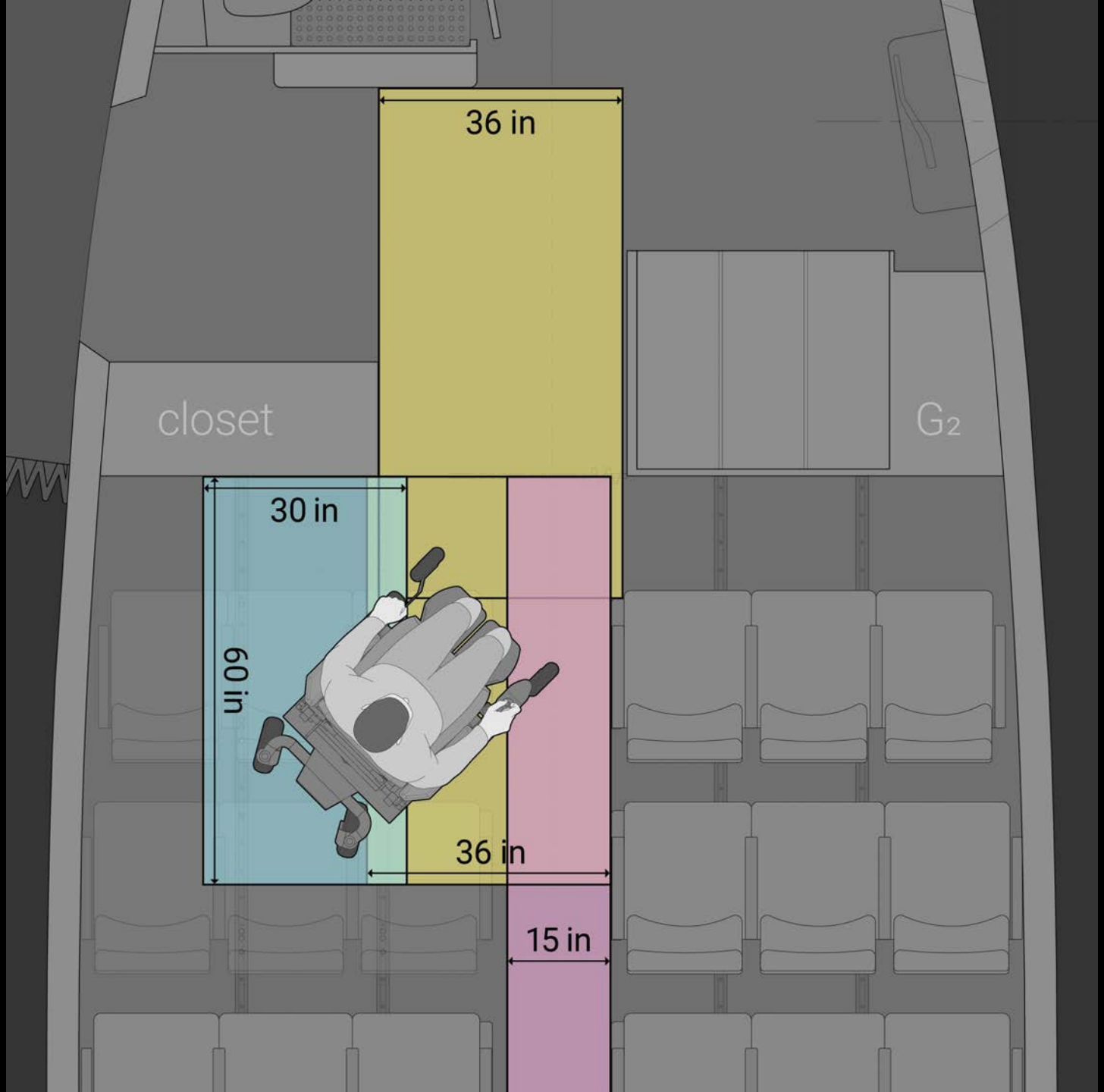
Powered Wheelchair Specifications

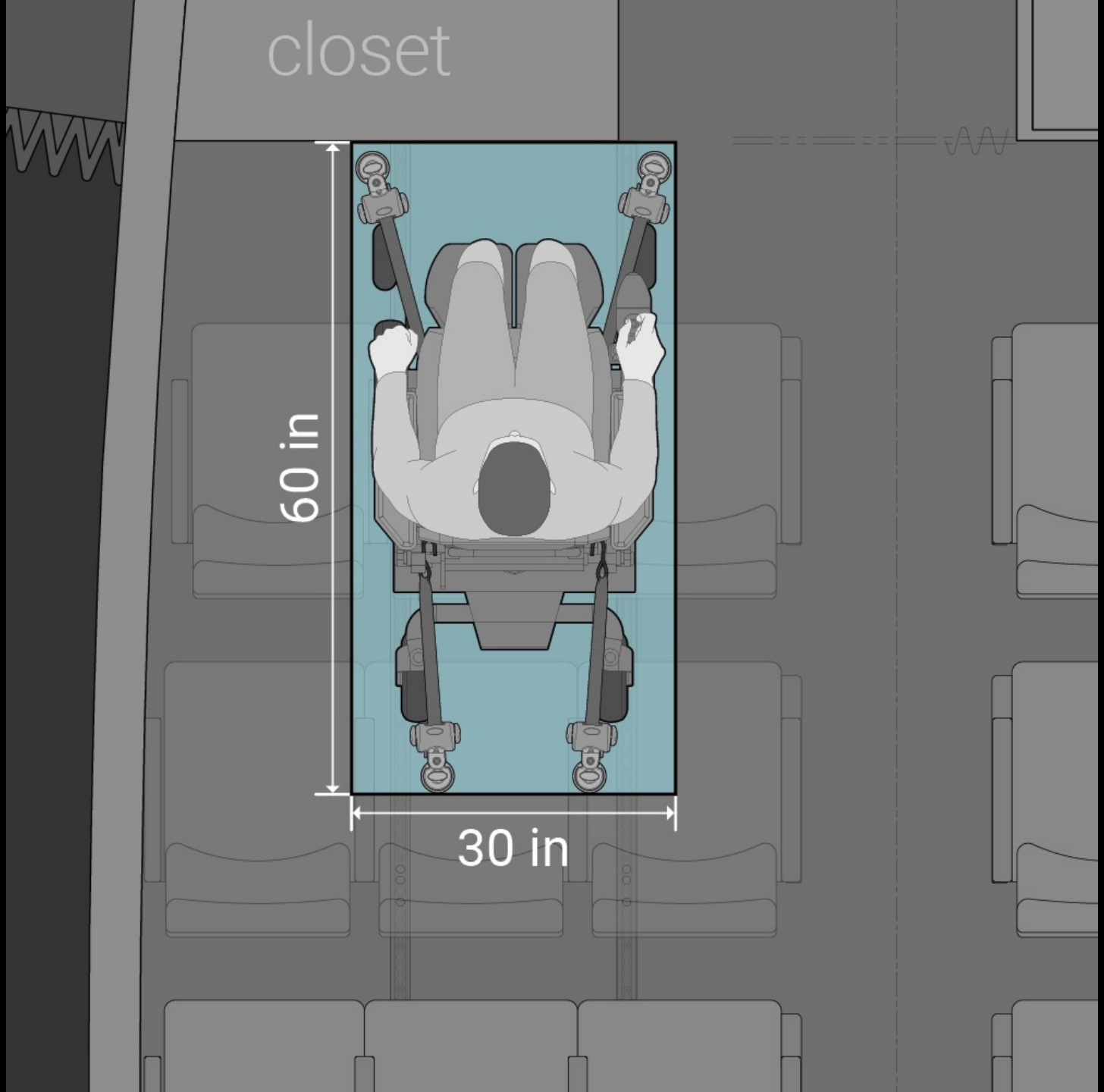
Maximum **Angle Corridor Distance**

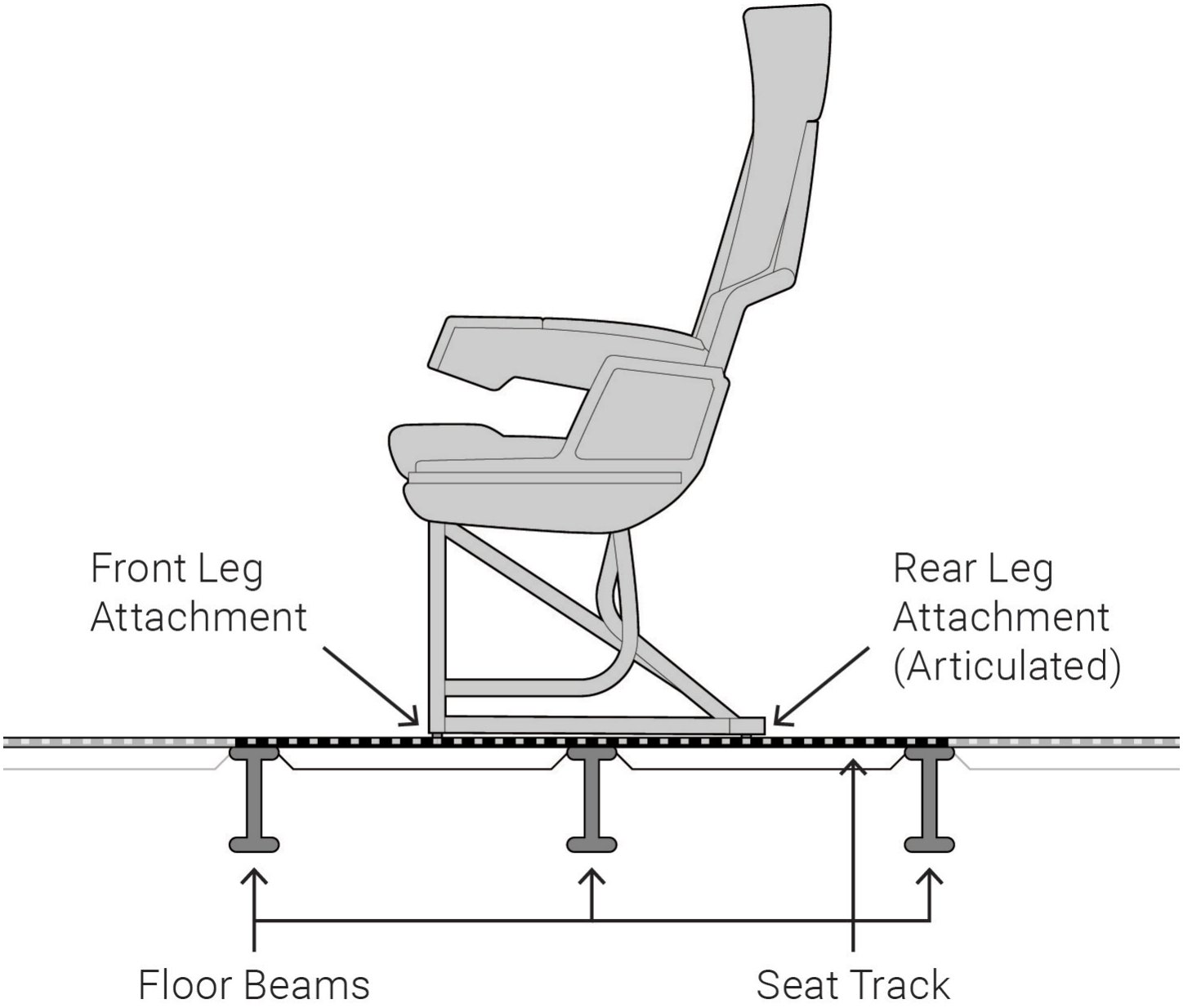


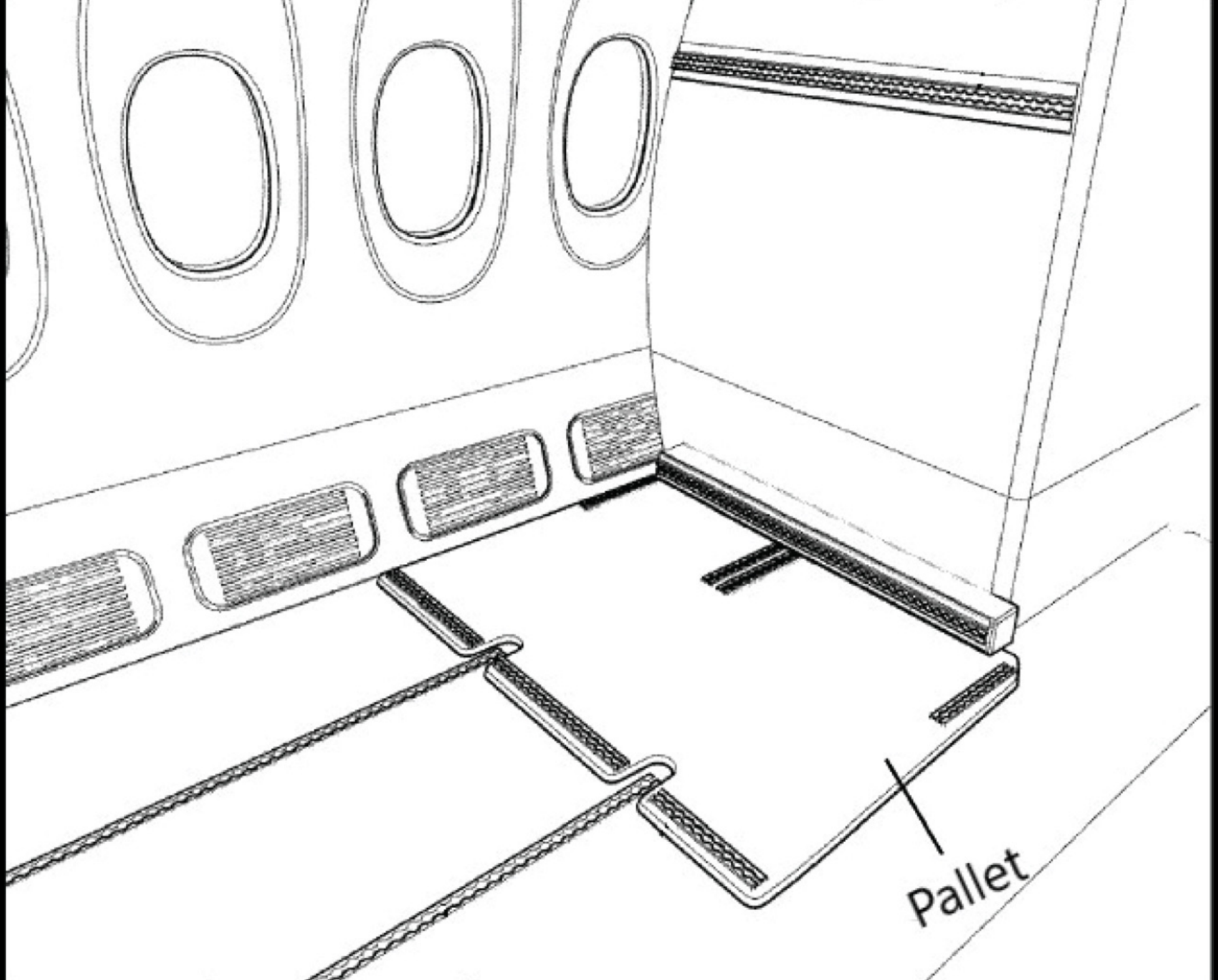
Of the 185 models with test data,
83% require an angle corridor distance of 36 in. or less
and only 9 models (< 5%) require more than 38 in.

Testing data were obtained from Beneficial Designs, Inc. and Ammer Consulting, LLC; these data did not include scooters.


36 in
closet
G2
30 in
60 in
36 in
15 in


closet
60 in
30 in


Front Leg
Attachment
Rear Leg
Attachment
(Articulated)
Floor Beams
Seat Track


Pallet

Powered Wheelchair Specifications

Maximum **Weight**

Unoccupied powered wheelchair

Average **321.40 lb**

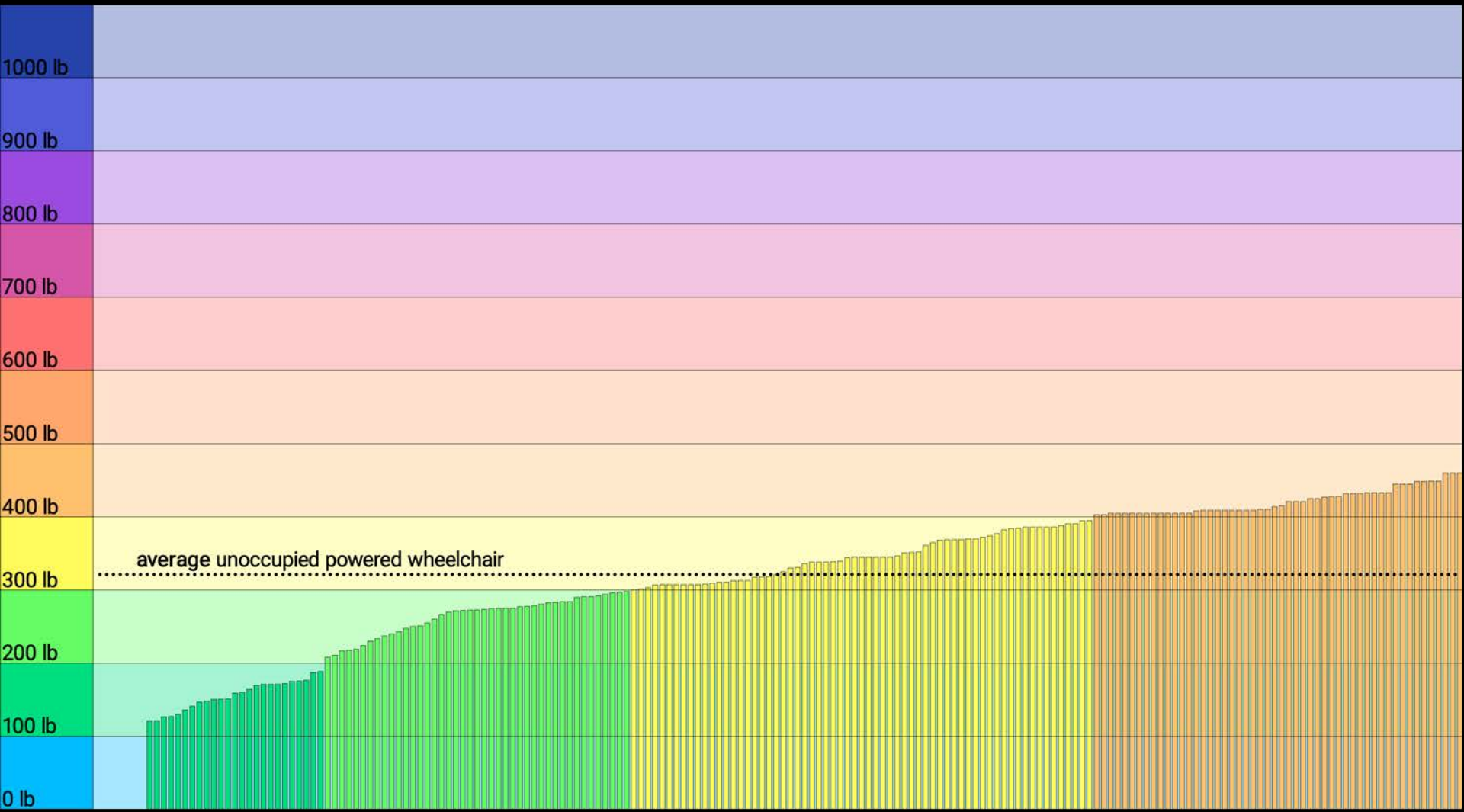
Occupied powered wheelchair

Average **623.46 lb**

Testing data were obtained from Beneficial Designs, Inc. and Ammer Consulting, LLC; these data did not include scooters.

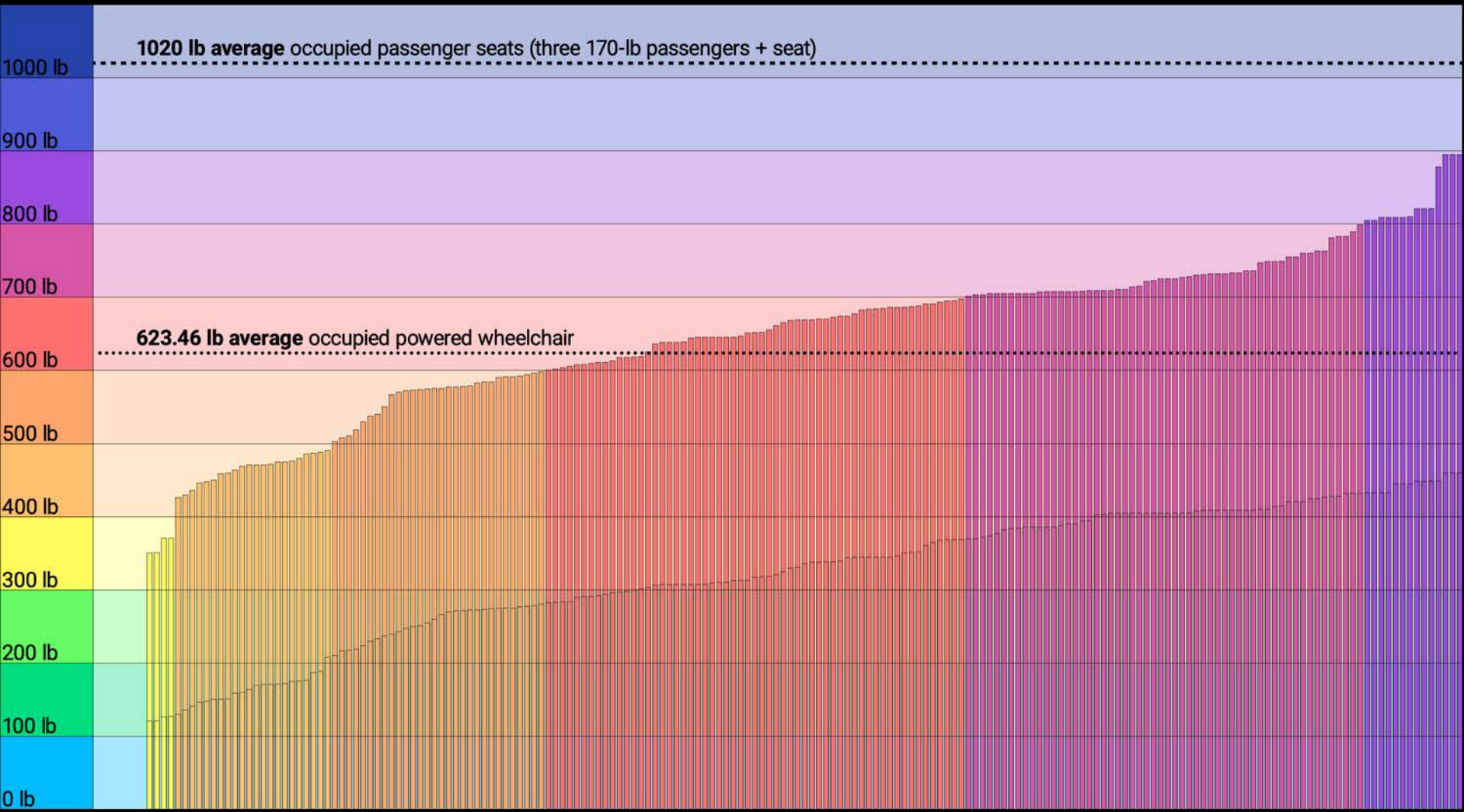
Powered Wheelchair Specifications

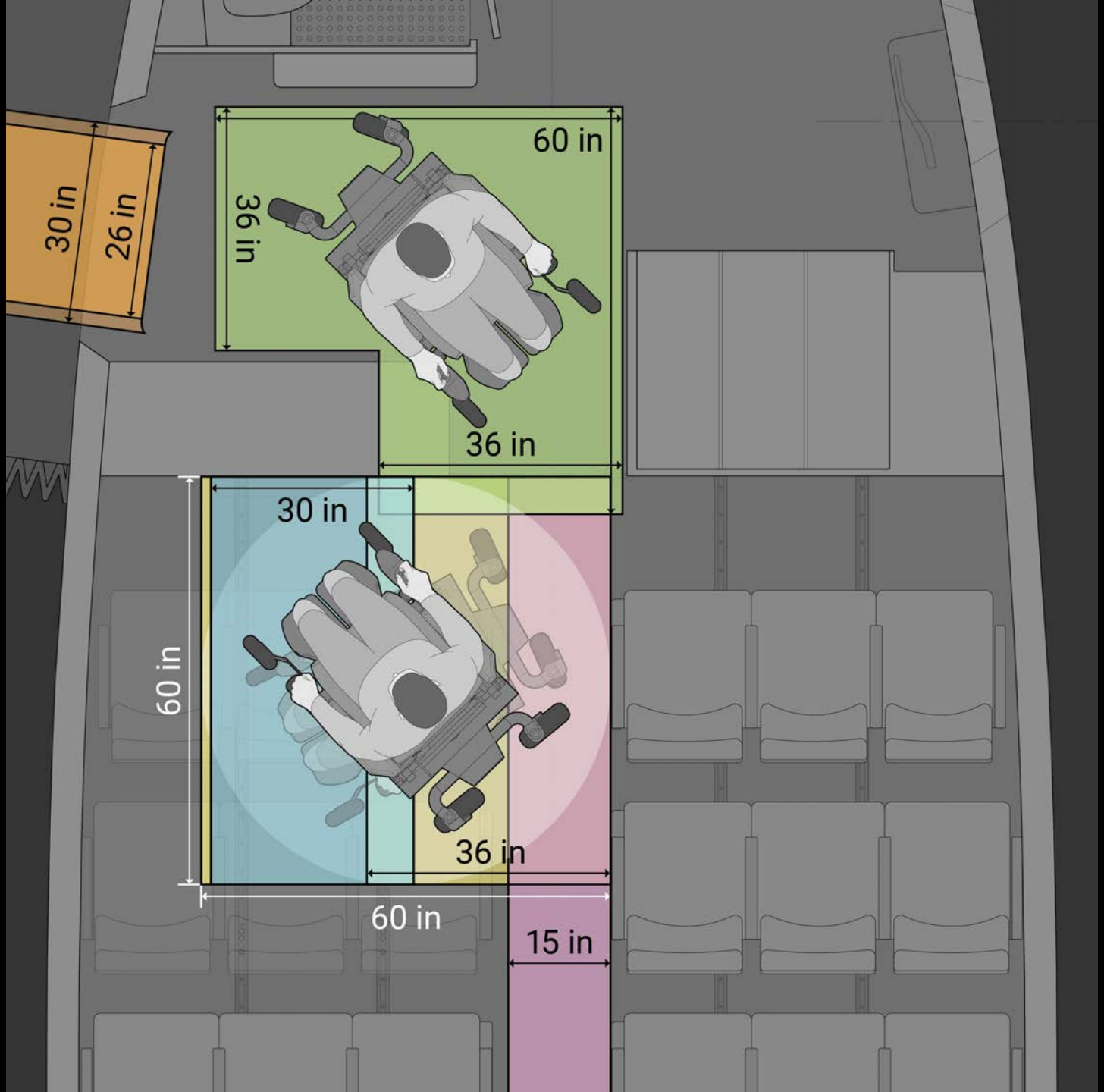
Maximum Weight **Unoccupied**

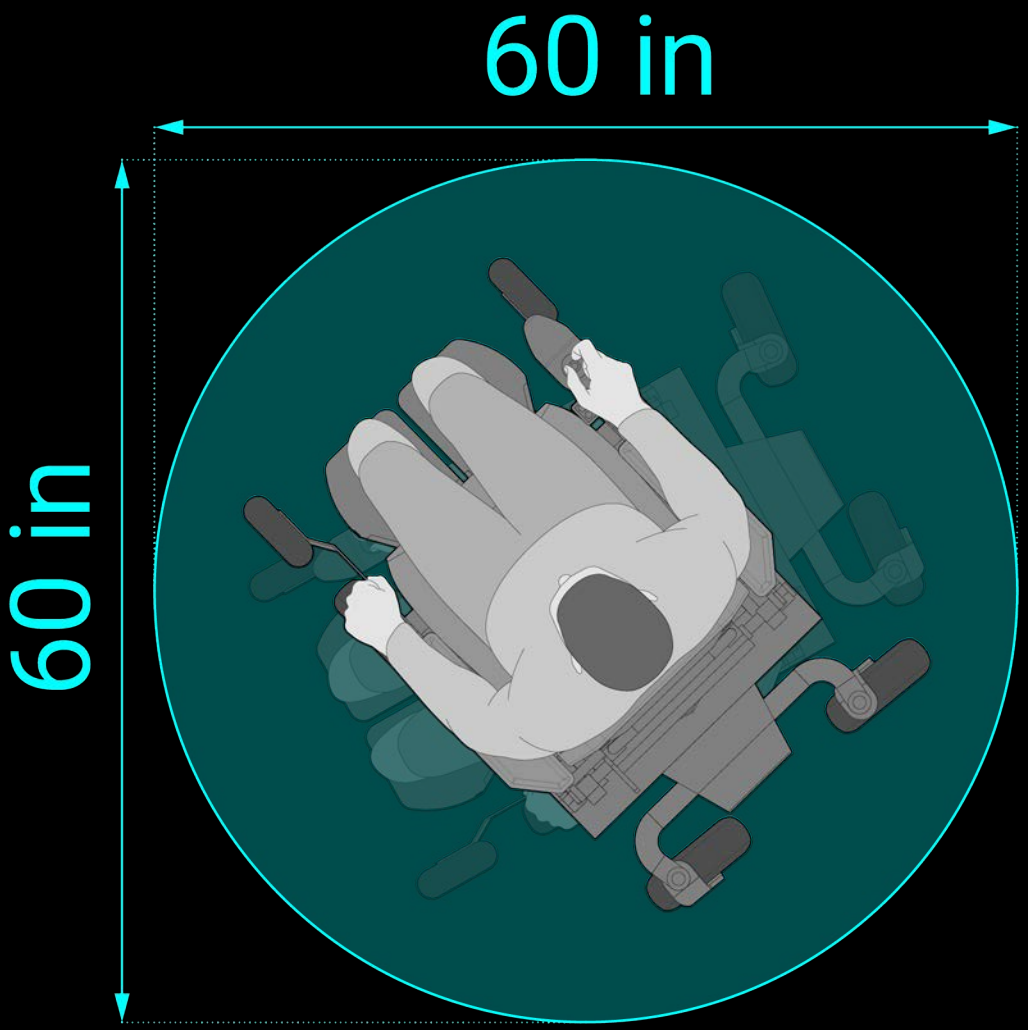


Powered Wheelchair Specifications

Maximum Weight **Occupied**



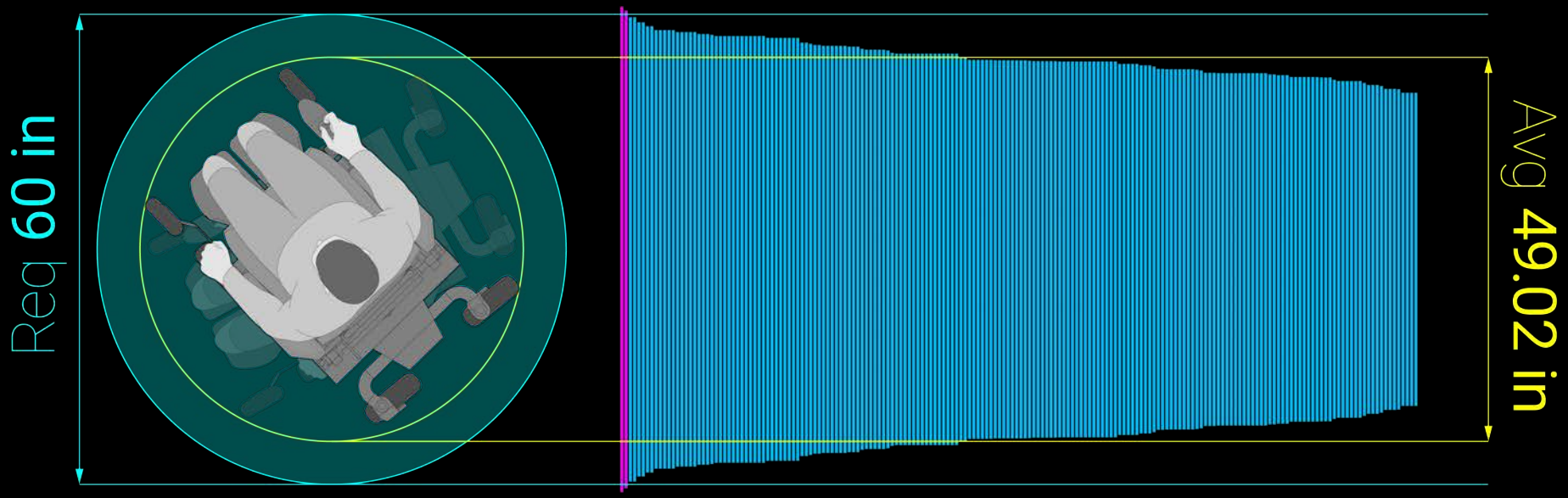

30 in
26 in
60 in
36 in
36 in
30 in
60 in
36 in
60 in
15 in


60 in
60 in

Powered Wheelchair Specifications

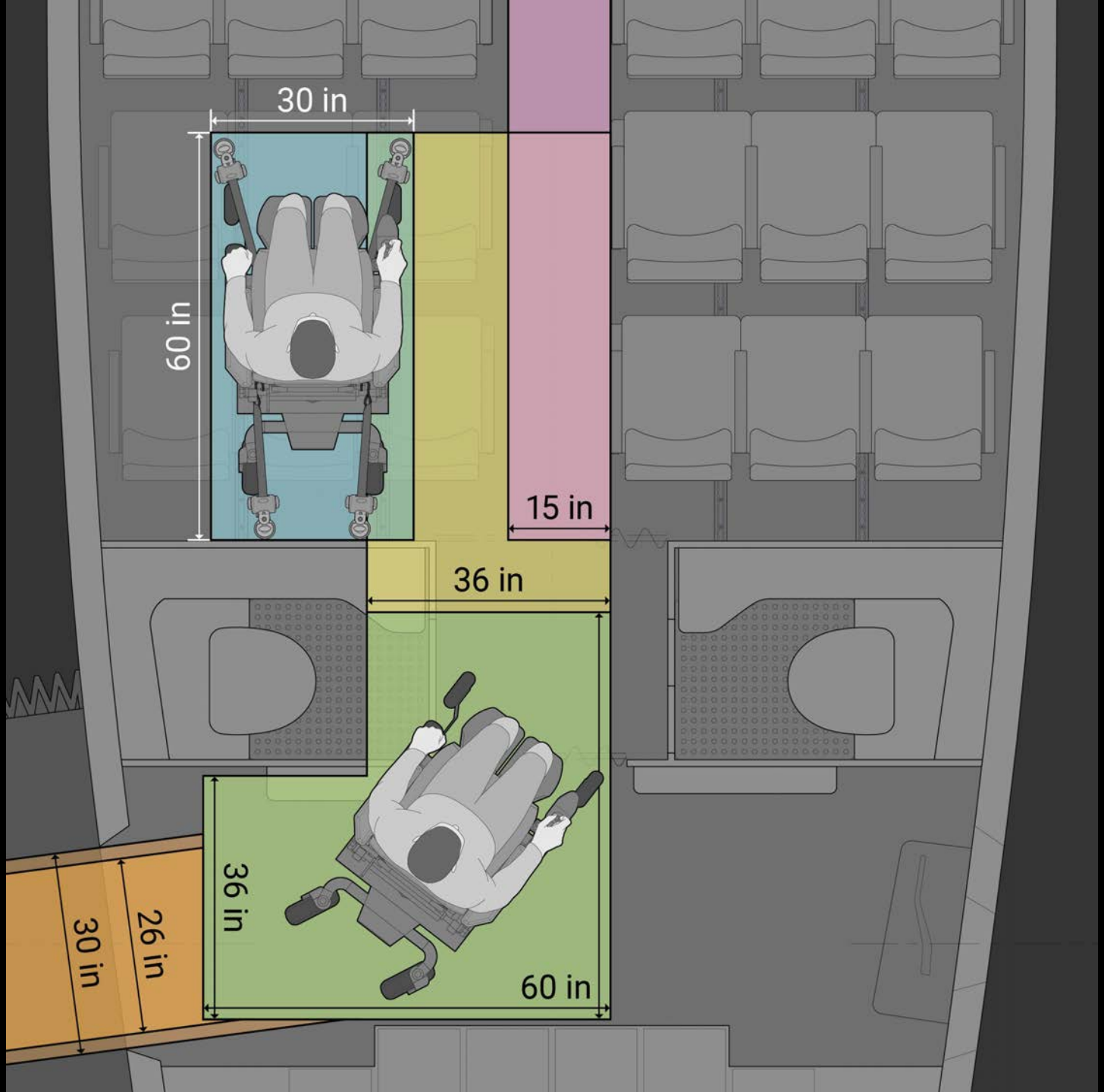
Maximum **Pivot Width**

Distance required to turn the WC 180°



Only 2 models (1%) exceed 60 in.

Testing data were obtained from Beneficial Designs, Inc. and Ammer Consulting, LLC; these data did not include scooters.


30 in
60 in
15 in
36 in
36 in
60 in
30 in
26 in

beneficial designs

designing beyond the norm to meet the needs of all people

www.beneficialdesigns.com

peter@beneficialdesigns.com

775 783 8822 voice

775 783 8823 fax

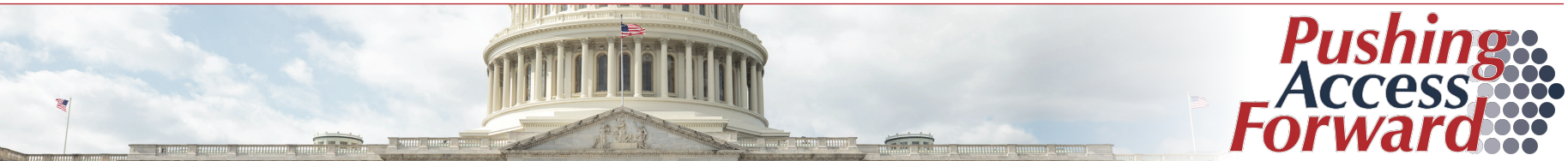
Next Steps

Lee Page

Air Carrier Access Amendments Act (ACAAA)

Congress must pass legislation that:

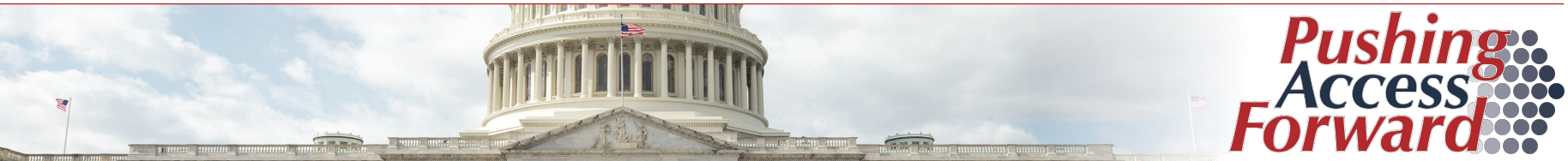
- Establishes a private right of action and increases administrative enforcement;
- Establishes a set of physical standards of access that new airplanes have to meet; and
- Requires airlines to remove access barriers on existing airplanes if readily achievable.



Proposed Physical Standards

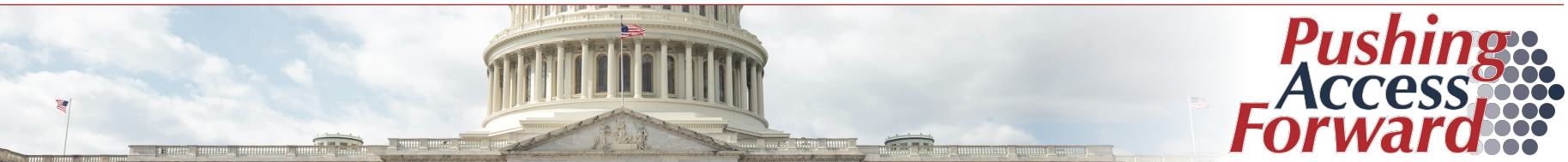
New standards of access would include:

- Safe and effective boarding and deplaning
- Seating accommodations
- Lavatories
- Visual announcements
- Stowage of assistive devices



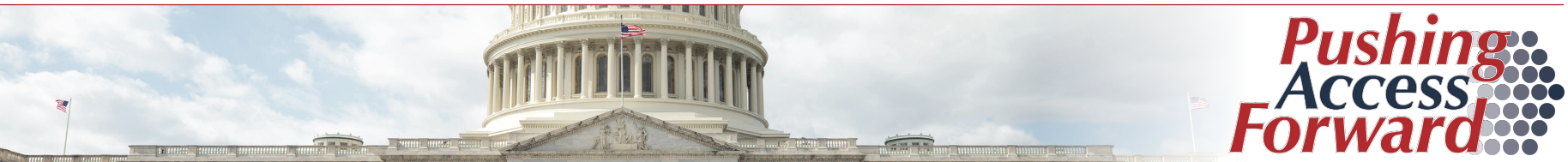
ACAAA Status

- H.R. 1696 – introduced by Rep. Jim Langevin (D-RI) has 17 cosponsors
- S. 642 – introduced by Sen. Tammy Baldwin (D-WI) has 6 cosponsors
- PVAction Force Petition: https://www.votervoice.net/PVA/campaigns/81519/respond



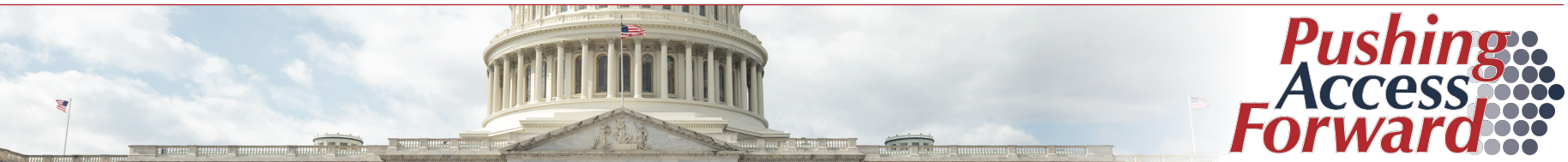
Navigating Air Travel Today

- PVA Air Travel Resources: pva.org/airtravel
  - ACAA Rights
  - Travel Tips
  - Complaint Tips
- PVA Animation video: wheelchair user experience in air travel



Pushing Access Forward

Questions

Contact Information:

- Lee Page, Paralyzed Veterans of America, Leep@pva.org
- Heather Ansley, Paralyzed Veterans of America, Heathera@pva.org