Cockpit Secure

INNOVATION

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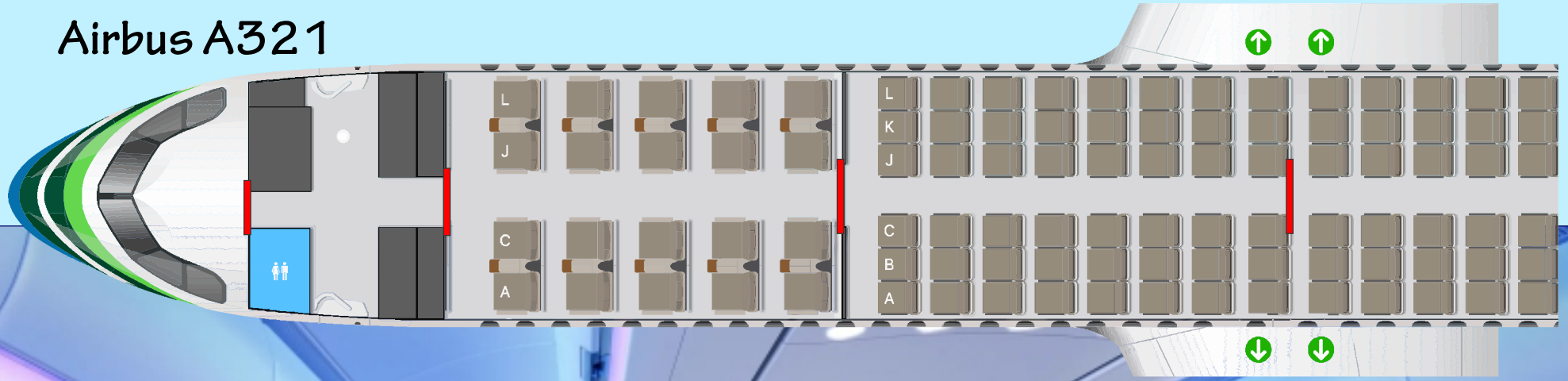
Airbus A321



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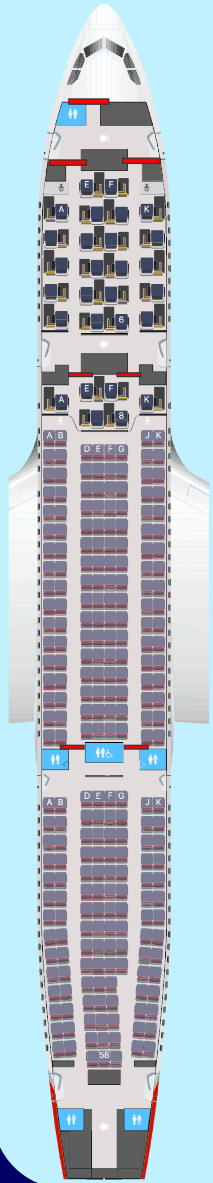
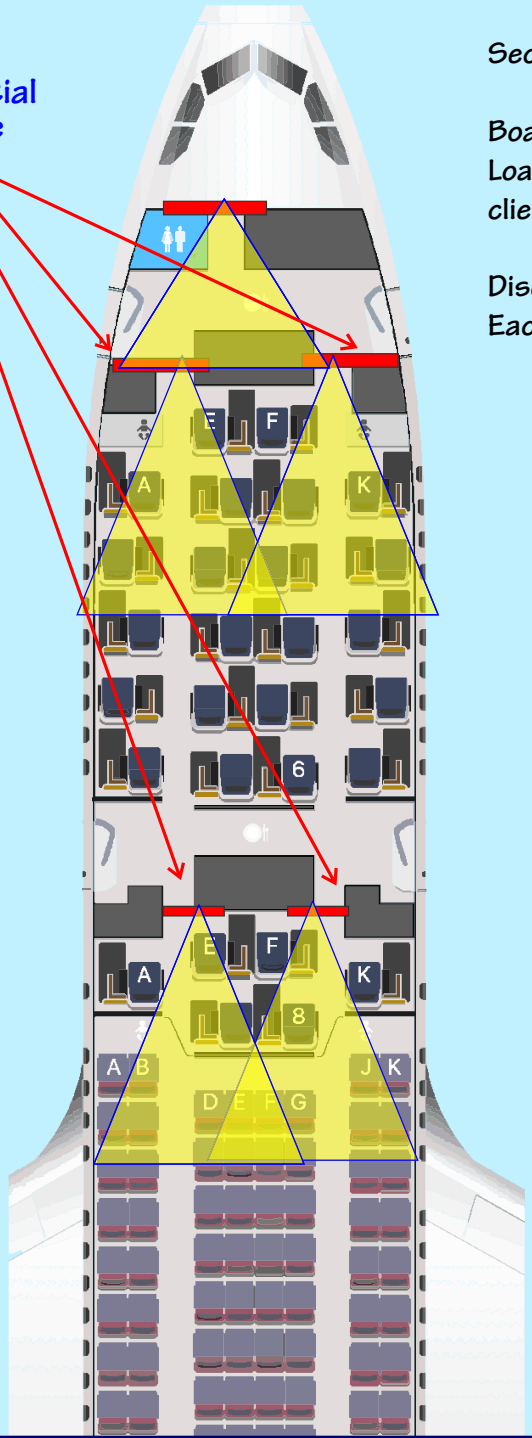
Typical A320 Layout



Potential Secure Doors

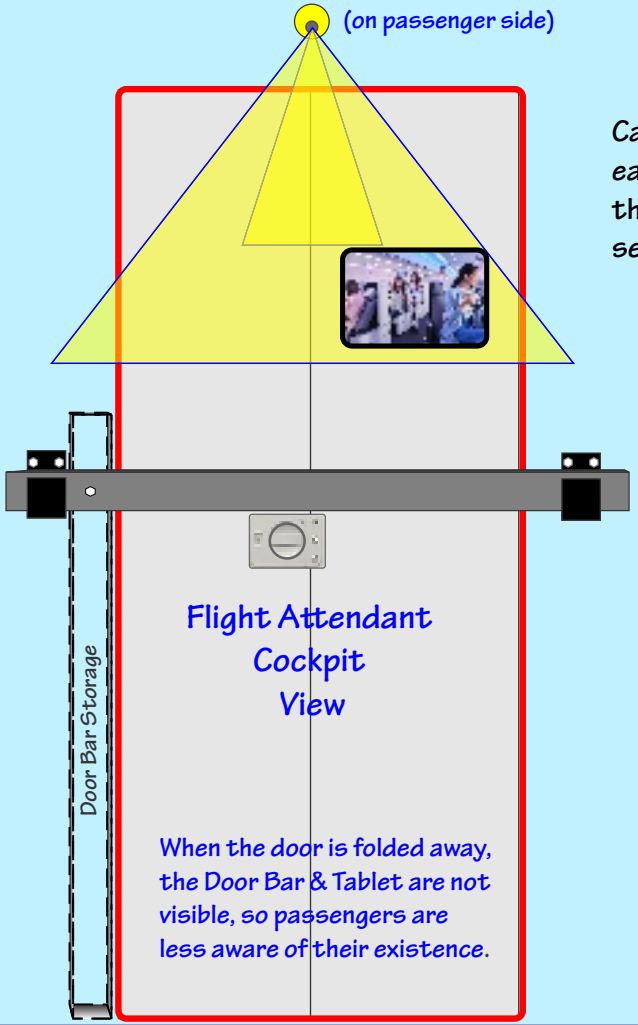


Secure doors that compartmentalize major areas of the aircraft have many benefits.

Boarding.
Loading the rear economy seats becomes simplified as the doors can be closed to other clients and opened by flight attendants when required.

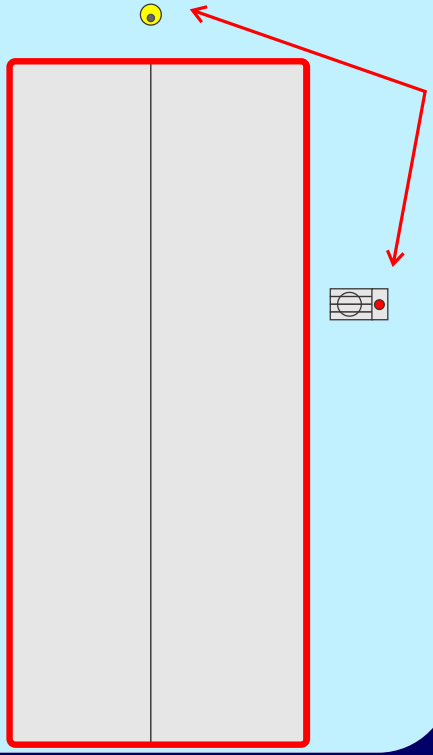
Disembarkation.
Each compartment can be cleared before another is opened, to make for orderly deplaning.

Camera
(on passenger side)



Tablet Style Screen acting as an Electronic Window

Cameras are placed to face the rear of each compartment and are viewed from the screen installed on the front of each secured compartment.



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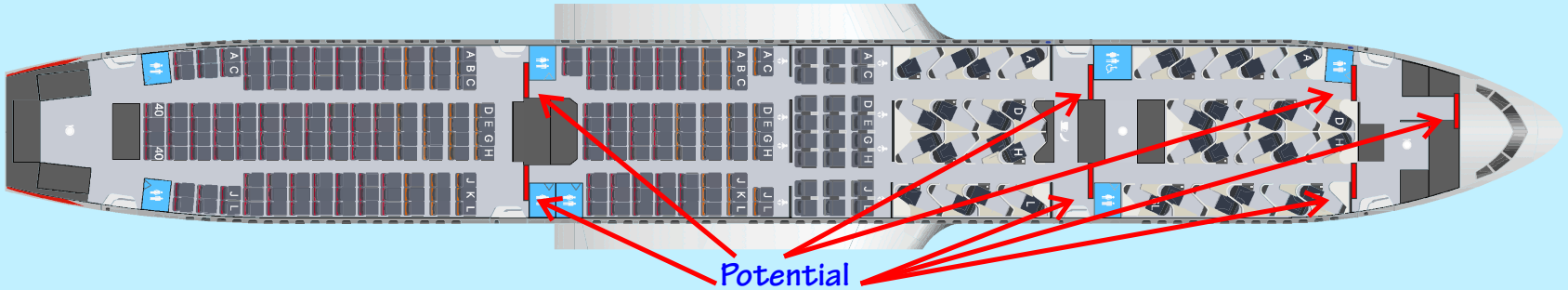
Perhaps consideration should be given to future planning of aircraft layouts to make space available to secure each compartment, if and when the need arises. Perhaps the rear galley can also be used as a restraint area if the need arises.

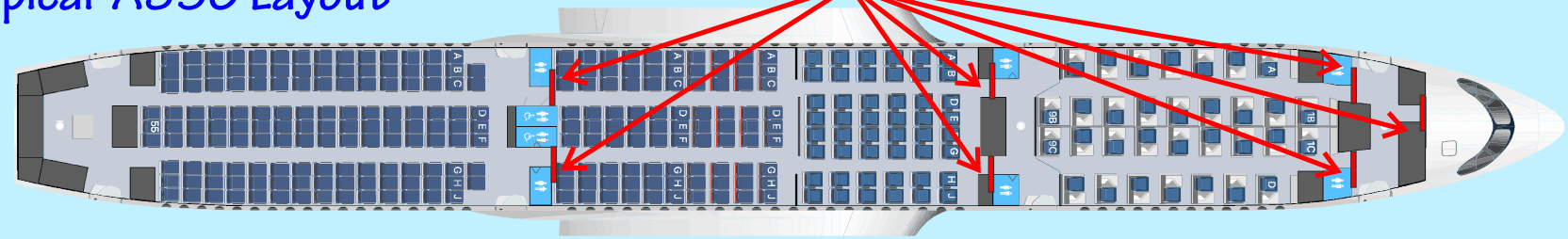
Cameras that record passenger areas can be installed immediately and can provide valuable information as required. Similar to cameras that are regularly installed in elevators and other public spaces, the data can be held for a specific time and then overwritten, or stored for data mining.

Facial recognition software is already being used for boarding passes and ticketing, so the issue of public acceptance has already been addressed.

Typical B777 Layout



Typical A350 Layout



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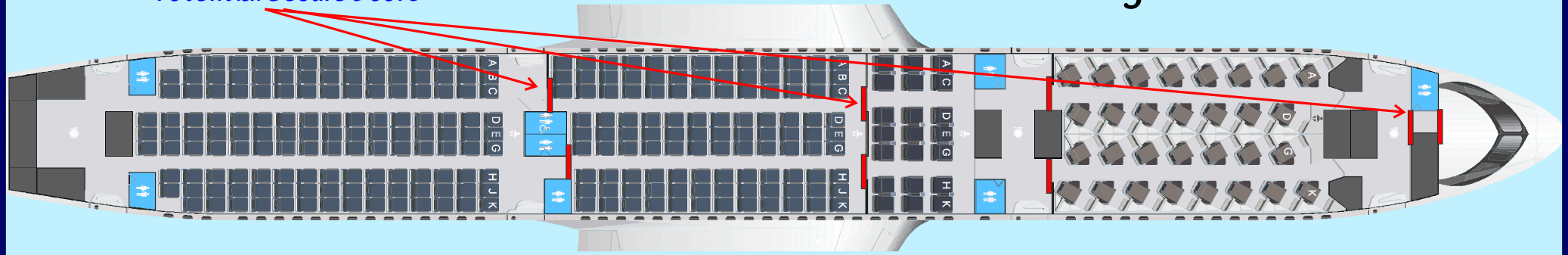
Potential Secure Doors

Boeing 787-9



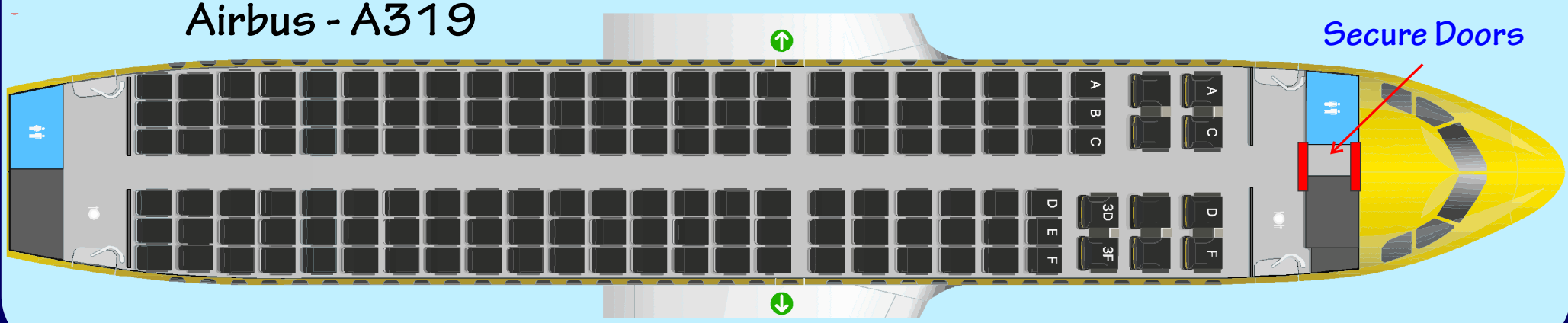
Implementation needs testing and approvals and over a period of time, more barriers maybe placed throughout the body of the aircraft. By testing the concept, the best materials and layout can be considered early and at least have the infrastructure in place to allow rapid fitting and deployment as required.

If strengthened slide tracks, hinge plates and lock placement was considered early, future rollouts could be 'security ready' if the particular airline / country regulated further security measures.

In all cases, we recommend the use of 'Cabin Cameras' that record the whole duration of the flight, are accessible only to flight crew within the plane, and have data stored locally and uploaded via satellite link where practical.

Airbus - A319

Secure Doors



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737 Cutaway

Attaching the secure door frame directly to the superstructure creates an impenetrable barrier.

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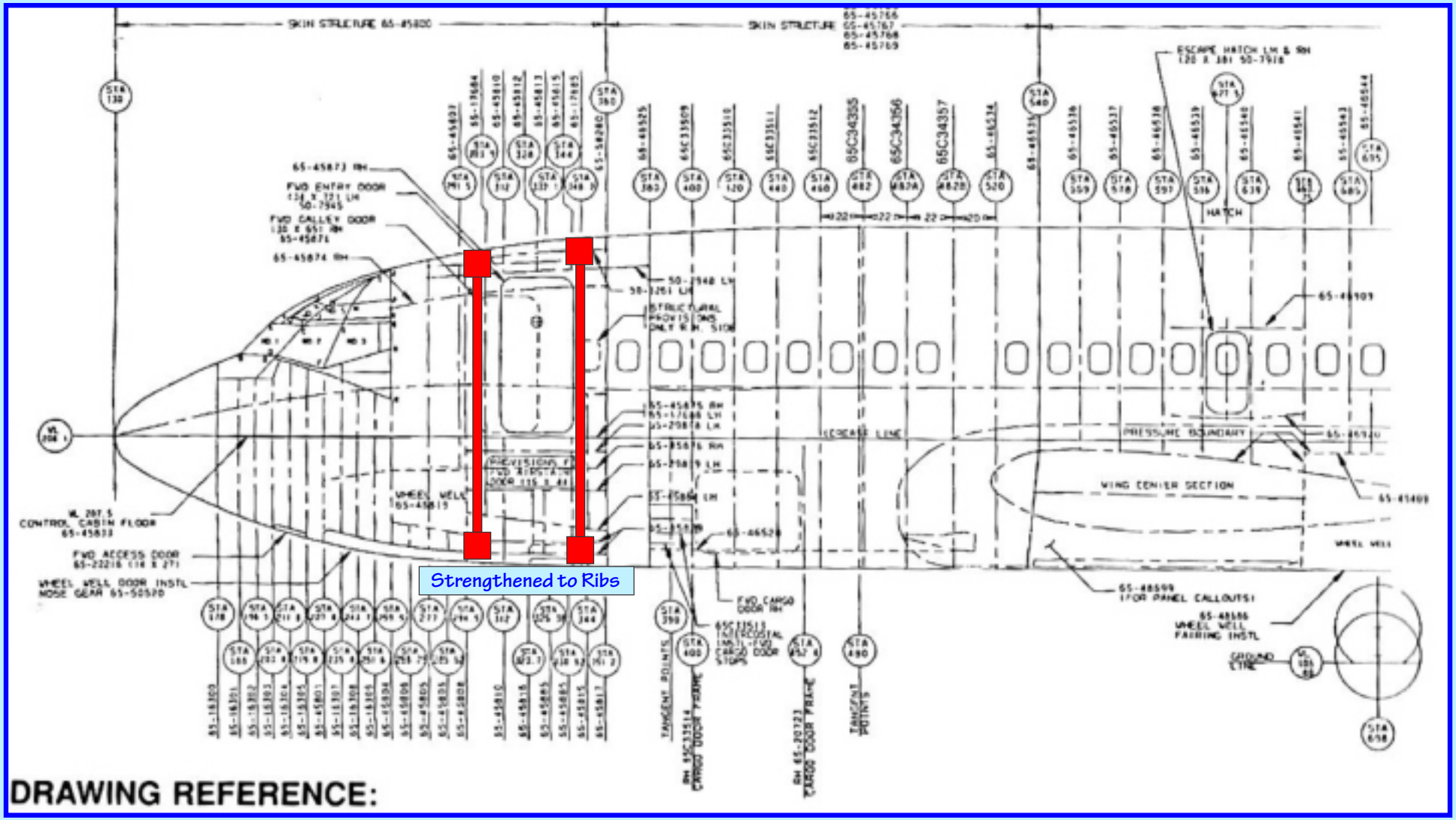
By integrating the security door's framework into the ribbed super structure of the aircraft during the manufacturing process, the integrity of each secure compartment within the aircraft will withstand any manual force to open it.

True security needs to be built in as a primary component of the manufacture, not simply added later as an afterthought.



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How to Hijack an Airplane in 3 Seconds

Aug 16 2011, 9:00 AM

https://web.archive.org/web/20110912160216/https://www.theatlantic.com/national/archive/2011/08/how-to-hijack-an-airplane-in-3-seconds/243631/

Ten years after 9/11, airline cockpits are vulnerable every time a pilot takes a bathroom break. So why isn't the FAA making secondary barriers a requirement?

One-one thousand. Two-one thousand. Three-one thousand.

And just like that, it can happen: From the front row of a passenger airplane, a group of hijackers leap from their seats and race toward the cockpit, leaving flight attendants, galley carts, and other improvisational means of defense in their wake. The reinforced cockpit door, opened just a few moments earlier to allow one of the pilots to use the lavatory, slams shut behind them, sealing off all hopes of regaining control of the aircraft.

All in a matter of three seconds.

It's a scenario the Federal Aviation Administration has been aware of for years and one that has prompted many in the airline industry to push for installed physical secondary barriers (IPSBs) -- retractable, fence-like devices set up between the cabin and the cockpit -- as well as more comprehensive, industry-wide security procedures on all passenger aircraft.

“We're in a race against time, frankly, because there is going to be another attack," said Capt. Ed Folsom, a United Airlines pilot who has played an active role in the development of the secondary barrier system since 2002. "I'm no rocket scientist, so if I can see the vulnerability, so can everyone else."

The primary concern: door transitions, or times when the cockpit door is opened and closed during a flight. Although most transitions are over before passengers even realize they're happening, Folsom and others, including Capt. Rob Powers, said they believe airplanes are not as secure as they can and should be during these brief exchanges.

"Just like in medieval times, the castle is secure until you open the drawbridge," said Powers, a commercial airline pilot and former chairman of the Air Line Pilots Association's National Security Committee. "If you don't have a moat or something else around to add a second layer of security, then you have some vulnerabilities. When the door's open, it's just a hole."

Post-9/11 FAA regulations do permit flight crews to open and close cockpit doors during flights, but only when it is necessary to do so. Typically, this means meeting pilots' physiological needs -- for example, lavatory use and food and beverage service -- though airline officials said pilots may need to exit the cockpit if mechanical problems arise during a flight.

Currently, each airline has its own FAA-approved procedures that specify how crews should go about opening and closing the cockpit door mid-flight. While the FAA doesn't specify how long or how many times the door can be opened per flight, FAA officials said it is assumed crews will do it as quickly and minimally as possible, usually for under five seconds.

But numerous passenger complaints, obtained from the Transportation Security Administration through a Freedom of Information Act request, suggest this isn't always the case.

On April 28, 2007, a passenger flying from Dallas/Fort Worth International Airport to San Diego filed a complaint saying that the cockpit door was open for five minutes mid-flight, according to TSA records.

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More recently, on May 3, 2010, a passenger flying between Columbus, Ohio, and St. Louis said the cockpit door was opened a minimum of five times during the flight.

"Once that door comes open, you're vulnerable to another attack like 9/11," said Capt. Paul Onorato, a commercial airline pilot and former president of the Coalition of Airline Pilots Associations.

In recent years, according to Onorato, the coalition has set up scenarios where a handful of would-be terrorists are seated in the first few rows of an airplane. These scenarios have shown that terrorists are able to "blow past" both a flight attendant and galley cart and get into the cockpit within three seconds.

What's more, Folsom added that the drills, while grim, likely offer a best-case scenario.

"We looked at some highly trained individuals playing the role of flight attendants and crew members and even they couldn't prevent a breach of the flight deck," Folsom said. "If they can't do it, then little 57-year-old, 40 percent body fat Susie isn't going to do it."

Secondary barriers, supporters say, would give crews more time -- approximately five seconds -- to react to threats. Prior to opening the cockpit door, flight crews would deploy the barrier, temporarily securing the space directly in front of the cockpit door.

“It's not an impenetrable barrier," Powers said of the device. "If somebody attempted to breach it, that would, one, give everyone an indication of that individual's intent and, two, delay them long enough so one of the flight attendants could shut the flight deck door."

Despite the barriers' perceived benefits, the FAA has yet to mandate them, largely because of the cost of the devices -- about $5,000 to $10,000 per barrier.

"Right now, we don't see a need for it," FAA spokeswoman Alison Duquette said, adding that the post-9/11 security measures the FAA and TSA currently have in place, such as improved screening technologies and increased air marshals, have been sufficient.

This doesn't mean the FAA has dismissed the barriers altogether. In 2008, the administration petitioned to establish a committee that includes representatives from the FAA, airlines, and airline trade associations. Folsom, a co-chairman of the committee, said the group is currently working on a report that will outline minimum performance criteria, installation instructions, and other issues for secondary barriers. Folsom said the committee is on track to complete the report this September, around the 10th anniversary of 9/11.

Although a federal mandate for secondary barriers is nowhere in sight, United Airlines, which designed the devices in-house in 2002, has continued to develop and install them on its fleet voluntarily, a move Duquette says the FAA fully supports.

Meanwhile, in 2007, Northwest (now Delta) began a one-year test program of the barriers on the airline's 747s. But after receiving negative feedback from crews, the airline decided not to move forward with widespread installation.

According to Wolfgang Koch, a Northwest pilot at the time, the barriers created noise in pilots' sleeping quarters and made meal and beverage service to the cockpit difficult, as flight attendants were expected to close the barrier while their hands were full. Additionally, the airline estimated that the cost of the barrier would be closer to $100,000 over the life of the airplane.

As a result, Northwest decided not to move forward with the barriers. But Koch maintains that while that particular design wasn't ideal for the 747, the value of the device was clear.

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"Some things are feel-good products and other things are substantial products. A secondary barrier is a substantial product," he said, adding that he believes Northwest gave up on the devices too quickly.

In the meantime, U.S. Rep. Steve Israel (D-NY), a longtime advocate of secondary barriers, reintroduced a bill in April calling for mandatory installation of the devices on commercial aircraft.

"Ten years ago terrorists exploited airline security vulnerabilities to murder thousands of people on 9/11. Since then we've made significant improvements, but there is still more we must do," Israel said in an e-mail. "Without secondary cockpit barriers, the door is literally wide-open whenever the crew members leave the cockpit to use the restroom, change positions during a long flight, or conduct visual inspections. A secondary barrier protects pilots and passengers for a fraction of the installation costs of an in-flight entertainment center," which costs around $ 1 million.

While Folsom said he supports Israel's bill, he stressed that he is not pushing for mandated barriers -- at least not yet. He said it is far more important that airlines see the necessity of the barriers, opting to install them voluntarily as United has done.

Also important, Folsom said, is getting airlines to understand that the secondary barrier devices themselves are only a part of the larger combination of equipment, people, and procedures that, collectively, protect the cockpit.

"If we put the barriers on and the companies are reluctant, you're not going to have ongoing training, and without proper training, it's not going to be effective," Folsom said. "This system requires active participation, so it's really important that we lead and educate and sell the industry on the value of this."

Eventually, Folsom said he hopes to show airlines that barriers, while more expensive initially, are actually more cost effective than other equivalent means of protecting the cockpit, such as extensive defense training for flight crews.

Currently, the FAA does not mandate flight attendants' defense training. Instead, the training is optional, and flight attendants must go to training facilities on their own time, paying all of the expenses incurred, said Candace Kolander of the Association of Flight Attendants.

A 2007 survey revealed that, on average, flight attendants receive between five minutes and one hour of defense training per year, according to Kolander.

"We don't believe that we're at a level yet that is sufficient for us," she said.

Folsom said that after 9/11, defending the plane essentially became part of flight crews' job description. But he stressed that training alone won't protect the cockpit.

“It's absurd to think that flight attendants are going to be able to defend against multiple highly trained attackers," he said. "They're going to roll right past them into the flight deck. There is no level of training they could receive that's going to be effective in and of itself."

If terrorists do get inside the flight deck, the reinforced cockpit door, which Folsom called a "kneejerk reaction" on the part of the government after 9/11, could end up working against the flight crew, making it impossible to regain control of the aircraft.

Despite the threats, not everyone in the aviation industry believes secondary barriers are essential to airline security.

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The International Air Transport Association (IATA), an industry trade group representing 230 airlines in 115 countries, said it is confident in current security measures but supports further research on the topic of airline security.

"What we don't want to do is rush toward any measure based on a 'one size fits all' paradigm," said Anthony Concil, IATA's director of corporate communications. "Aircraft differ in type, construction, and use and to suggest that any single measure is the answer would be incorrect."

Recently, IATA has drawn criticism from some members of the secondary barrier committee. From the beginning, said Folsom, IATA "has made it clear to us that they do not think secondary barriers are a necessary enhancement to aviation sector security." Folsom called IATA's support of further research on the barriers "a politically correct way to say they want to kill the initiative." At a recent meeting, says Folsom, IATA pulled out of the committee altogether and asked that all reference to its participation be deleted. (IATA declined to comment when asked about its withdrawal from the committee.)

Ultimately, Folsom said he believes any pushback on secondary barriers stems from denial.

"People don't want to admit that there's a threat out there. They have forgotten the horror of 9/11. It's like a coping mechanism," he said.

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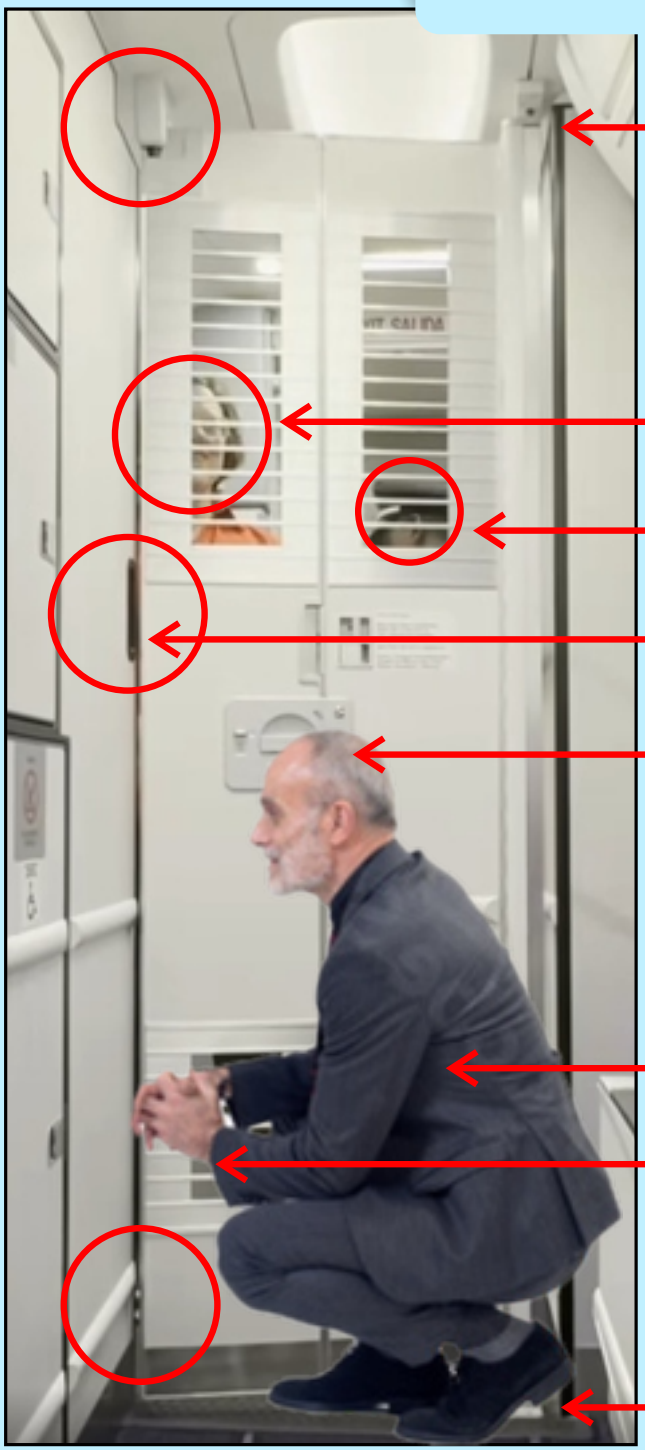
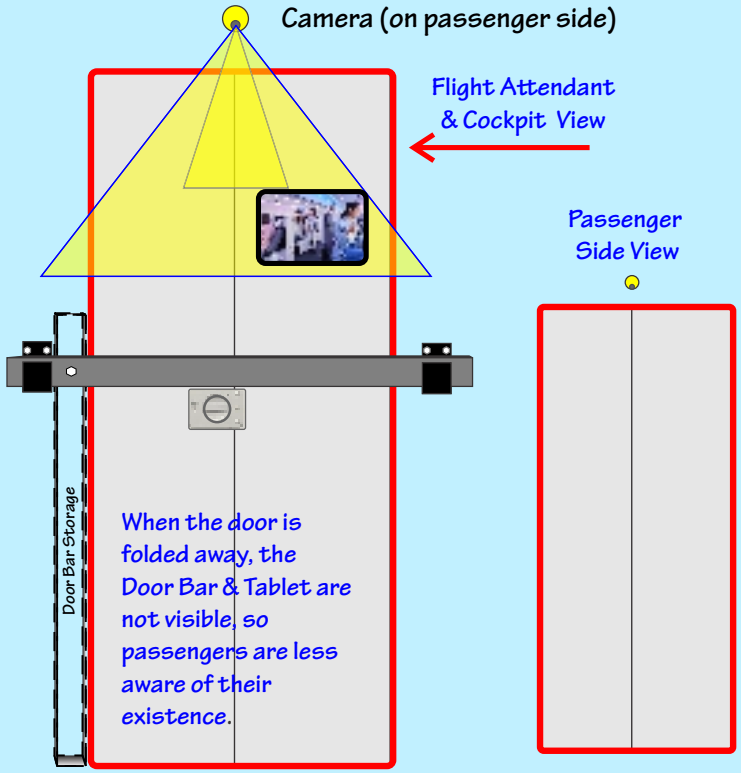


Southwest Airlines
Boeing 737 Max 8

It is possible for a passenger to crawl below the Flight Attendant's view to manipulate the door, while still seeing through the lower louver slats to watch for Cockpit or Flight Attendants.

Proposed System



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1 Camera (on passenger side)

Supported by Superstructure

Tablet Style Screen acting as an Electronic Window

Cameras are placed to face the rear of each compartment and are viewed from the screen installed on the front of each secured compartment.

2

4

3

6

Supported by Superstructure

Passenger Side View

5 Door Bar Storage

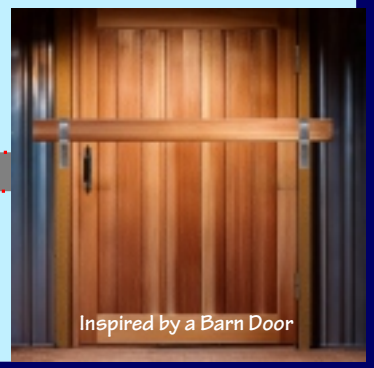
Flight Attendant Cockpit View

7

Note: There is no opening, no see-thru and no hinge or latch showing on the passengers side. Just a simple Call Button & Speaker

When the door is folded away, the Door Bar & Tablet are not visible, so passengers are less aware of their existence.

Supported by Superstructure



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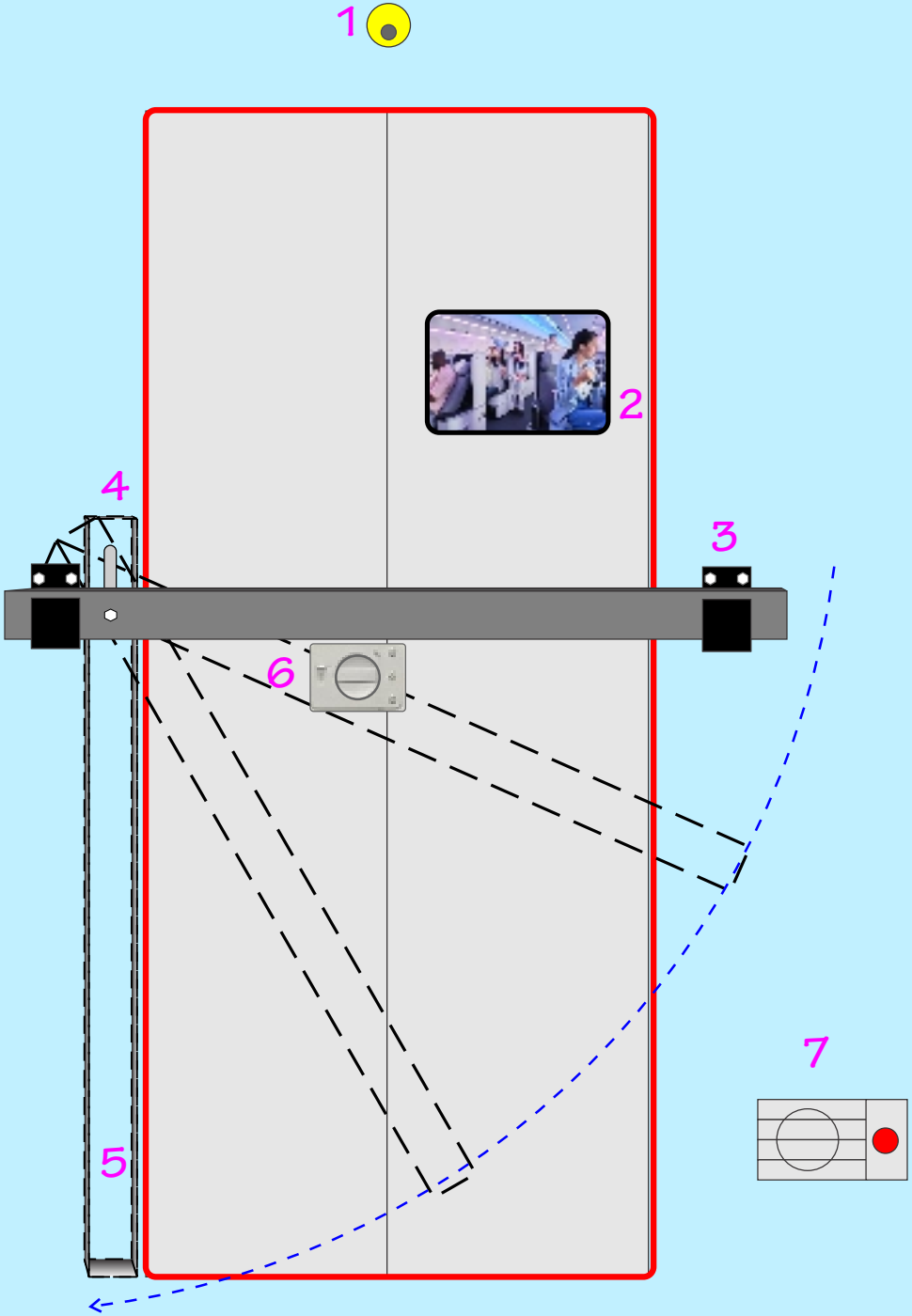

Procedure

Check camera 1 in Viewport 2

Speak to passenger via Viewport 2

Passenger has to Push to Talk, Intercom 7

Lift Door Bar straight up 4”

Pull Door Bar toward attendant 2”

Swivel Door Bar through 90°

Clip Door Bar at position 4 and 5

Operate manual door lock at 6

Fold door open toward stowed Door Bar

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DoorBlock Barrier Retrofit

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Simply close the bifold door and drop the DoorBlock into the holes that are situated on either side of the bifolds to stop any movement of the doors.

Alteration to the Aircraft: Two holes in the floor
No alteration to the doors.