Federal Air Marshal Service
U.S. Department of Homeland Security
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Transportation Security Administration

February 12, 2016

MEMORANDUM FOR: Peter Neffenger
Administrator
Transportation Security Administration

THROUGH: Roderick Allison
Acting Deputy Administrator
Transportation Security Administration

THROUGH: Colleen Callahan
Acting Assistant Administrator / Director Office of Law Enforcement / Federal Air Marshal Service ("OLE-FAMS")

THROUGH: Eric Sarandrea
Acting Deputy Assistant Administrator / Deputy Director OLE-FAMS

THROUGH: Dwain Troutt
Regional Director OLE-FAMS

THROUGH: Brian Belcher
Supervisory Air Marshal in Charge
Washington Field Office

THROUGH: Ryan McCormick
Deputy Supervisory Air Marshal in Charge
Washington Field Office

THROUGH: Conrad Raines
Assistant Supervisory Air Marshal in Charge
Washington Field Office

THROUGH: Todd E. Schumacher
Supervisory Federal Air Marshal
Washington Field Office

FROM: Robert J. MacLean
Federal Air Marshal
Washington Field Office

SUBJECT: Suggestion for customized aircraft Galley Carts that telescope and transform into Installed Physical Secondary Barriers in order to eliminate a vulnerable flight deck during pilot food, beverage, lavatory, and crew-change Door Transitions

Sent via email from Robert.J.MacLean@ole.tsa.dhs.gov to Todd.E.Schumacher@ole.tsa.dhs.gov

To Whom It May Concern:

My inflight security enhancement proposal of specially customized Galley Carts, that transform into forward galley area Installed Physical Secondary Barriers ("IPSB"), will not only save on Federal Air Marshals ("FAM") deployment costs, but will **100% eliminate** the danger to aircraft flight decks — also known as cockpits — during inflight flight deck entry or exit Door Transitions ("DT"). The dividend would also substantiate allowing more FAMs to conduct improvised explosive device prevention, counterterrorism, and insider-threat search activities in our bus stations, train stations, and airports.

Background:

An IPSB is relatively inexpensive and **absolutely necessary** physical security measure. IPSBs are 100% effective in eliminating attackers from breaching flight decks while their entrance doors are opened during flight, a DT. An IPSB is necessary during the time a flight deck door needs to be open while a flight attendant serves the pilots sustenance inside the flight deck, when pilots switch with other pilots to crew-rest inside the cabin, or when a pilot uses the lavatory. Very few aircraft currently have IPSBs.

When I was based in the Federal Air Marshal Service ("FAMS") Los Angeles Field Office until 2005, I noticed that United Airlines was installing IPSBs on most of its coast-to-coast B757 Premium Service flights. I was disturbed to discover that United Airlines' practice stopped soon after 2005 and most of the other U.S. carriers never installed IPSBs. Although I have yet to see any on the flights I have flown since my May 3, 2015 reinstatement, FAMs have informed me that American Airlines installed a very small number of IPSBs.

The current method of a flight attendant rolling out a standard GC into the forward galley entrance, long before the flight deck door is opened, is ridiculous. This charade signals to everyone in the cabin that the flight deck is about to be fully unsecured.

In order to carry out a plan to dive into the flight deck during one of many DTs that happen on longer flights, a would-be attacker does not need a group-organized plan, to find co-conspirators, or to smuggle weapons — he just needs to wait for the right opportunity of many.

The current mainstream method used by carriers: flight attendant behind a Galley Cart on wheels

As a terrible alternative to IPSBs, a flight attendant will roll out a common 3.5' x 1' food/beverage Galley Cart ("GC") in order to attempt blocking the flight deck from a suicide-attack. An athletic, trained, and charged-up suicidal attacker will sprint and simply push the GC aside or leap over it, get passed the unbeknownst and off-guard pilot and flight attendant, and execute deadly chaos inside a flight deck.

The scenario would look like a National Football League Pro Bowl fullback getting the football from the one-yard-line in order to make a winning touchdown against a high school defense holding tackle-dummies.

This method only attempts to block a third of the front galley entry from the cabin.

Here is a video dramatization of such an attack:

https://www.youtube.com/watch?v=NAvN-QyPRtU

This video shows an outward-opening flight deck door. Outward-opening flight deck doors are significantly safer than extremely dangerous inward-opening doors that most, if not all, single-aisle Airbus aircraft have.

INWARD-opening flight deck doors — without Installed Physical Security Barriers — are extremely dangerous

Here is an excerpt from a Mission Report (Control No. 2015-336-003) I submitted to the Agency on December 4, 2015 about the grave danger of inward-opening flight deck doors with IPSBs:

> It is much easier for suicidal-killer attackers to break down a one-inch single latch-locked inward opening flight deck door because only a thin piece of metal is impeding them as opposed to a steel jam surrounding the outward-opening door along with a latch and deadbolts. On September 11, 2001, the passengers on United Airlines flight No. 93 were able to force open the flight deck door similar to [my November 30, 2015 mission flight]. [My November 30, 2015 mission

flight's flight] deck door is extremely vulnerable in the case of diving attackers seizing the opportunity when pilots swing it in during flight. A flight deck door that opens and swings into the flight deck is instantly vulnerable to a rushing attacker due to the fact the flight deck can be instantly breached the split second it gets unlocked as the pilot cannot see into the cabin or hear the flight attendants warning the pilot of an imminent attack. An inward-opening door allows an attacker to violently knock back a standing pilot in the flight deck. The blow from the inward-opening door will make the pilot fall onto the aircraft's steering and thrust instruments resulting in a catastrophic event. Even if the pilot recovers from the door striking him, the attacker will already be inside the flight deck causing mayhem. At least with a flight deck door that opens OUTWARD into the cabin, the pilot only needs to open it a few inches in order to peak into the cabin or hear about a warning of an oncoming attacker, and quickly shut it. Even if the attacker makes it into the forward galley area, before having the ability to reach a hand or a probing item (i.e. a cane or telescoping luggage handle) just an inch inside the flight deck to jam it from ever being locked again, the flight attendant(s) can block the attacker and push the door locked-shut with the assistance of the brute force. An unlocked inward flight deck door is absolutely ineffective when hit with moderate force from a suicidal-killer.

PROBLEM: the danger associated with the total lack of Installed Physical Secondary Barriers to protect flight deck Door Transitions was detailed in a study involving managerial Federal Air Marshals

The September 28, 2011 Radio Technical Commission for Aeronautics Special Committee 221 study ("2011 RTCA") — involving five managerial Federal Air Marshals ("FAMs") — concluded that the method to protect the unsecured flight deck using a flight attendant and a common beverage/food GC can easily be defeated by a well prepared suicidal-attacker. Later in this proposal, there will be more detailed information about the 2011 RTCA.

The following managerial FAMs were involved in the 2011 RTCA study:

- Edward Bradford, Assistant Supervisory Air Marshal in Charge, Transportation Security Operations Center
- Krystal Brown, currently FAMS-OLE Headquarters
- Rose Transcredi
- Lowell Dimoff, Supervisory Air Marshal in Charge, TSA Training Center, Atlantic City, New Jersey
- Jose Jimenez, Acting Supervisory Federal Air Marshal, Washington Field Office

The few existing IPSBs — such as the ones I have seen on United Airlines — are clunky, over-engineered, over-fortified, expensive, and potentially dangerous. The patented FDSB being promoted by the Airline Pilots Association ("ALPA") costs $5,000 to $12,000 a unit.[1]

The IPSB being promoted by ("ALPA-IPSB") has its wall-mounted retractable mechanism and material stowed along the side of the front galley entrance and horizontally stretches over to the other side of the entrance into a long vertical female lock assembly. While stowed, the ALPA-IPSB is anchored to a vertical and flimsy partition, closet, or galley equipment made of plastic or thin metal. Stowing the ALPA-IPSB into the side of the access area is hazardous as it could come unanchored after an impact and obstruct passenger egress during emergency.

Another downfall of the ALPA-IPSB is it allows attackers to see through it therefore gaining the advantage to observe the process occurring in the front galley. This gives attackers the opportunity to prepare, charge, enter the flight deck, and destroy the aircraft.

The patent for the ALPA-IPSB boasts it can withstand "brute force attacks":

> *[0030] Together with the latch system, the secondary barrier also would require structural strength to prevent brute force attacks.*

http://www.google.com/patents/US20060000946

This is an overabundance that not only makes it costly, but heavy, causing a dangerous potential to come lose. A pilot only needs **five seconds** to rapidly get into the flight deck, close, and lock its door. Any concern of "brute force attacks" must be addressed with the **flight deck door** — not the IPSB.

Another problem with ALPA-IPSBs is the potential of them needing repair caused by routine use or air turbulence. In order to repair the ALPA-IPSBs, an aircraft may have to be taken out of service and a specialized repairperson or team has to travel to and board the grounded aircraft.

I expressed my concern and suggested a significantly improved IPSB — and alternative to the ALPA-IPSBs — in my November 19, 2015 "SUBJECT: Aircraft ceiling-mounted vertical retractable flight deck secondary barrier system suggestion" memorandum I sent through proper channels to Transportation Security Administration ("TSA") Administrator Peter Neffenger. In my November 19, 2015 memorandum to Administrator Neffenger, I suggested a different type of IPSB that is mounted above the ceiling of the cabin and extracts **similar to a common roll-up window shade**.

Very recently, I discovered a **REDACTED** 2011 RTCA Special Committee 221 study report on the public's desperate need for IPSBs involving representatives of the corporate

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[1] *Secondary Barriers: A necessary security element on passenger aircraft*
http://www.alpa.org/advocacy/secondary-barriers

airline industry, the pilots and flight attendants unions, and five FAMs sponsored by our Agency. I was disturbed that the Federal Law Enforcement Officers Association ("FLEOA") was not invited to participate in the 2011 RTCA study. I am the Washington Field Office Representative and the National Whistleblower Liaison for FLEOA.

On January 7, 2015, I sent my direct supervisor an email titled, "SUBJECT: RTCA report on secondary barriers" requesting an UNREDACTED Sensitive Security Information ("SSI") designated 2011 RTCA report. In my email I wrote:

> I have a need to know as flying Federal Air Marshal (FAM), as a FAM Team Leader on a January 10, 2015 flight mission to the Arabian Peninsula, and any other upcoming missions as a FAM Team Leader.

I have not yet received any formal or informal response from my chain of command.

On February 2, 2016, I followed the instructions in the redacted 2011 RTCA report on how to obtain the unredacted version:

Appendix B; B-2 of this report specifically states:

> FAA Flight Standard Division, AFS-007, will manage the SSI document. AFS-007 and TSA will determine if the requestor has met the need to know standards for SSI information related to the SC-221 Committee's work.

On February 10, 2016, Aviation Safety Inspector Bill Petrak of the Aviation Special Activities and Security Division (AFS-1000) contacted me and asked that I email Nouri Larbi of the TSA. I have sent requests to Mr. Larbi on February 10, 2016 and on February 12, 2016.

Given the fact portions of the RTCA study's results were designated as SSI, there exists a significant likelihood that the absence of IPSBs on aircraft is a specific danger and an exceptional threat to public safety.

If the current flight attendant/GC DT method was not dangerous, there would be no need to designate it as SSI.

Excerpts from the 2011 RTCA study:

Appendix B:

> The implications of our work were significant — the result of this analysis has the potential to significantly impact commercial aviation security. In addition, some of what we learned was going to be classified as sensitive security information (SSI). This is what made the work of RTCA SC-221 unique.
>
> * * *

After consultation with the TSA and FAA, the committee elected to implement the following measures: After it became clear that SC-221 would be handling potentially security sensitive information, committee leadership took steps to limit access of information to the public.

* * *

The committee set up a standard for 'need to know' for the committee. Unless an interested participant registered as an official member of SC-221, they were not allowed to access the website or the controlled documents.

Appendix A:

Alternate method: Alternate Method(s) are those combinations of personnel, equipment [i.e. flight attendant with a common galley cart] and procedures employed in lieu of an Installed Physical Secondary Barrier (IPSB) system to secure the flight deck whilst the flight deck door is in transition.

Appendix D:

What We Know: Effectiveness of the [galley cart and personnel] means, as tested, was unsatisfactory and require further enhancement to raise effectiveness to an acceptable level.

* * *

Previous testing has established the speed at which a physically fit individual can run in the cabin of an aircraft. This was confirmed on October 14, 2010 by two 52 year old males onboard this 777-200. Therefore any physically fit individual seated in any seat depicted below (within 26 feet of the flight deck door) can reach the flight deck door before it can be closed unless there is some procedure/equipment employed to impede their progress.

PAGE 27:

4) Blocking crewmember (s):
a) Blocking crewmember without additional equipment:
In the test described in section 2.1.5, using highly trained attackers and defenders, the percentage of time the flight deck door was breached is SSI. SSI referenced in this document can be requested by contacting the FAA's Flight Standards Office (AFS-007). Based on these test results, the committee determined that using blocking crewmembers without additional equipment did not produce satisfactory results.

Appendix D:

A significant threat to flight crew and airborne law enforcement personnel

> responsible for preventing unauthorized access to the flight deck is posed by a team of highly-trained, potentially armed, athletic individuals intent on using deadly force to defeat all security measures preventing their ability to infiltrate the flight deck. Current intelligence indicates that the probability of such an attack is high enough to warrant evaluation of current procedures and equipment designed to thwart such an attack when the flight deck door is opened during normal flight operations, as well as proposed improvements to the same.

PAGE 18:

> Physical differences can also play a role in reaction time. There are human physical differences between men and women, which can affect the response to a security incident. A December 2009 FAA report1 notes that 79% of flight attendants are female with an average height of 5 feet 5 inches, 155 pounds, and 45.9 average age. Females tend to be smaller than males possibly limiting their strength compared to a man. Smaller framed individuals are more easily pushed out of the way. Additionally, men tend to have slightly thicker and longer limbs than women allowing for increased strength and range of motion in certain situations. These physical differences may result in women presenting a less effective barrier.

PAGE 25:

> The results of the committee's evaluation of existing operating procedures [using a galley cart ("GC")] were SSI.

PAGE 27:

> Based on data collected by the committee, an unimpeded attacker who is within a certain distance (SSI) to the flight deck can reach the flight deck door before the crewmembers can close and secure the door.

PAGE 29:

> It is unreasonable to expect passengers to consistently and effectively intervene in an abrupt and violent attack on the flight deck. They are likely to be hindered by many of the same issues as flight attendants, particularly the discrepancy between their own lack of training or physical capabilities and the presumably highly-trained, motivated, athletic attacker.

It is abundantly clear the SSI-redacted 2011 RTCA study's finding were disturbing.

The University of Newcastle and Ohio State University report

The University of Newcastle and Ohio State University ("UON/OSU") drafted and submitted to the U.S. House of Representatives Committee on Homeland Security /

Subcommittee on Transportation Security's February 16, 2012 "Last Line of Defense: the Federal Air Marshal Service 10 Years After 9/11" hearing an equally disturbing report of the specific danger to aircraft without IPSBs. The UON/OSU report is titled, "Cost-Benefit Analysis of Aviation Security: Installed Physical Secondary Barriers (IPSB), Federal Air Marshal Service (FAMS), Federal Flight Deck Officer (FFDO) Program," by Mark G. Stewart and John Mueller; Research Report No. 281.12.2011; December 2011; ISBN No. 9780 9871 1435 8

Excerpts from the UON/OSU:

PAGE 12:

> In addition, if a door-transition attack (by highly trained, armed, and athletic attackers) can take place in seconds, it is not at all clear that **air marshals could act fast enough** to waylay the attempt.*(emphasis added)*

PAGE 16:

> 4.3.1 [Installed Physical Secondary Barriers] IPSB only (no FAMS or [armed pilots])
>
> If an IPSB is installed, and if we assume it is equally effective as hardened cockpit doors at preventing a hijacking at 75%, the probability a hijacking will be foiled, deterred or disrupted with all the security measures in place except for FFDOs and FAMS increases to
>
> Pr(hijacking foiled)=1−(1−0.1)11(1−0.05)(1−0.10)(1−0.01)(1−0.75)(1−0.75)=98.3% (4)
>
> The additional risk reduction in this case by IPSB is ΔR=98.3-93.4=5.1%.
>
> Risk reduction is an uncertain variable. Using the figures above, the best case scenario is that IPSB are 100% effective in eliminating this remaining risk then the best case risk reduction is ΔR=6.6%. If IPSB is half as effective as assumed above (37.5%), risk reduction is reduced to 2.5%. If passengers and crew are deemed to have zero likelihood of deterring or foiling hijackers, then risk reduction is increased to 5.8%. If detection rates for the 11 TSA layers of pre-boarding security are halved to only 5%, then risk reduction increases to 9.0%. If the hardened cockpit door is half as effective as assumed above (37.5%), then risk reduction increases to 12.5%. Lower and upper bound risk reductions is thus taken as 2.5% and 12.5%, respectively.

My recent observations while conducting inflight Federal Air Marshal operations

While conducting FAM operations on a coast-to-coast January 16, 2016 flight, I observed a dangerous DT: A flight attendant allowed a passenger to stand immediately in front of

the front galley during an entire DT. During this DT, the flight attendant turned her back to the cabin while the pilot was passing through the flight deck entrance. Not only were both crewmembers unacceptably slow performing the DT, but also they were clearly apathetic to the hazardous situation.

In a recent discussion with a FAM who begged me never to use his name, told me he has often watched DTs happen without a single flight attendant or a GC. He specifically mentioned he was on the second floor of a B747 flight from Narita, Japan to Manila, Philippines and watched a DT without the assistance of a flight attendant or physical barrier like a GC.

EVERY SINGLE Federal Air Marshal and Supervisory Federal Air Marshal who I have polled agrees with my concern of the exceptional danger to public safety without Installed Physical Secondary Barriers, but they all stated they were either apathetic in the mission or afraid of retaliation

With the exception of one, all of the FAMs I have approached — for their opinion on the dire need to IPSBs — told me they no longer cared about their mission to protect the aircraft and its passengers, or they fear retaliation for expressing their concern. One highly experienced FAM told me, “Better you than me. I have a mortgage to pay and a family to feed. I cannot risk years of unemployment like you did.”

Another FAM opined that the airlines do not only want to pay for IPSBs, but they are concerned about frightening passengers when they are engaged.

There was one FAM who was initially against IPSBs. He was concerned about the potential of the crew failing to notice a passenger inside a lavatory inside the forward galley. After I asked him if he would change his mind if a fool-proof method was in place to prevent such a situation — such as an IPSB-retraction locking mechanism triggered when someone is in one or more of the forward lavatories — he quickly became in favor of IPSBs.

Confidential survey of flying Federal Air Marshals should be immediately conducted

If federal government senior executives are still not convinced that IPSBs are absolutely necessary, a confidential survey should be taken of flying FAMs to get their feedback. Such a survey is needed because most are too afraid of expressing their opinion and suffering retaliation.

PROBLEM: two transitioning crewmembers involved in a single Door Transition triples the danger

Although I understand the need to always have two crew members inside a flight deck in the case a pilot suddenly loses the ability to control the aircraft, I have learned that certain air carriers have this dangerous policy: When a DT is required, the flight deck door is unlocked and stays open the entire duration while one crew member exists and another one enters. This method triples the time and opportunity for a suicidal-attacker to breach the flight deck.

SOLUTION to two transitioning crewmembers involved in a single Door Transition triples the danger: ONLY ONE crewmember should transition during a single Door Transition — not two

The danger of a suicidal-attacker exploiting the considerable opportunity to breach the flight deck while two crewmembers are involved in a single DT far outweigh a pilot **instantaneously** losing his ability to control the aircraft. It is not plausible that a pilot and/or his fellow pilot will not know the condition of each other's health before deciding to make a potentially dangerous DT. I have high confidence that pilots know their health status and will not take hazardous risks.

The flight deck door should be open and closed as quickly as possible during DTs.

SOLUTION: My modified Galley Cart Installed Physical Secondary Barrier

I propose a specially modified GC on wheels that transforms into an IPSB and can be attached into the entry between the main cabin the forward galley by two flight attendants. This modified GC would significantly reduce modifying the aircraft cabin for an IPSB.

Such a modified GC would function similar to a first class or bulk-head table tray that folds up and slides into a small compartment under and inside the armrest.

My proposed GC-IPSB has projectile-proof steel, polymer, carbon fiber, and/or clear Plexiglas extendable vertical and/or horizontal telescoping appendages ("EA"). Once my GC-IPSB has been rolled out of its storage space typical of one for common food/drink GCs, my GC-IPSB's steel engagers lock into relatively shallow edge-bores/faceplates permanently installed into the cabin's floors and/or walls.

Significant future cost-savings due to unnecessary downtime for aircraft and their GC-IPSB repairs and replacements

In the case my GC-IPSB malfunctions and needs replacement after landing, it can be simply rolled off the by one person and be replaced with a nearby functioning GC-IPSB, so there is never costly downtime for the aircraft.

Clear Plexiglas extendable appendages would allow view of the cabin from the front galley

I would prefer that a potential suicidal-attacker in the cabin not have the ability to see into the front galley when pilots perform door transitions. A suicidal-attacker's concern of the unknown behind a IPSB is an advantage in favor of a secured flight deck. So my preference would be to have my GC-IPSB's EAs be opaque with common residential home front door peep-holes. I suggested the same in my November 19, 2015 memorandum to Administrator Neffenger.

If the EAs must be transparent: they can be made of projectile-proof Plexiglas.

Once my GC-IPSB is fixed into the cabin's edge-bores/faceplates, a flight attendant can extract and lock into place the telescoping EAs in order to fill the space an attacker could dive through.

My GC-IPSB does not need to be substantive in order to stop brute force — like the ALPA-FDSB — it just needs to buy a pilot **five seconds** to quickly get back into the flight deck and lock the door.

Current primary flight deck door improvement program

It was disclosed to me by a fellow employee that there currently is an effort to spend resources to improve on the primary doors to the flight decks. This employee is concerned because his office was tasked with this project when he believed the installation of IPSBs should be a priority before anything.

Conclusion

The immediate installation of IPSBs would not only justify deploying more FAMs to proactively search for human traffickers, insider threats, lone-wolf attackers, trained terrorists, and smuggled improvised explosive devices, but they would eliminate the danger of DTs.

IPSBs need to be installed as soon as possible on all aircraft, starting with single aisle Airbus aircraft. The first aircraft installations must happen on single aisle Airbus aircraft with inward-opening flight deck doors.

Thank you for your time, effort, and consideration.

Transforming galley cart IPSB proposal

MacLean, Robert

Sent: Friday, February 12, 2016 10:00 AM
To: Schumacher, Todd E. [Todd.E.Schumacher@ole.tsa.dhs.gov]
Importance: High
Attachments: MacLean transforming galle~1.pdf (477 KB)

PDF ATTACHED

Dear Supervisory Federal Air Marshal Todd Schumacher,

I respectfully request that you please submit my corrected transforming galley cart Installed Physical Secondary Barrier proposal up through the proper channels. This is an urgent matter that affects public safety.

Thank you for your time and effort.

Respectfully submitted,
Robert MacLean

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Staff No. 438
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Robert.J.MacLean@ole.tsa.dhs.gov

Read: Transforming galley cart IPSB proposal

Schumacher, Todd E.

Sent: Friday, February 12, 2016 10:00 AM
To: MacLean, Robert
Importance: High

Your message

To: Schumacher, Todd E.
Subject: Transforming galley cart IPSB proposal
Sent: Friday, February 12, 2016 10:00:28 AM (UTC-05:00) Eastern Time (US & Canada)

was read on Friday, February 12, 2016 10:00:38 AM (UTC-05:00) Eastern Time (US & Canada).