

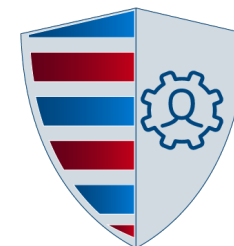
# Implementing STAMP at the world's largest airline

Stephen Palyok

# Implementing STAMP at the world's largest airline



**Safety Systems Design & Resilience**  
*Protecting the human through system design*



# History of American Airlines

*95 years strong*

**1927 – FC-2**  
*Mail Routes*



**1957 – Boeing 707**  
*Entered the Jet Age*



**2015 – Boeing 787**  
*Modern Widebody*



1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020



**1936 – DC-3**  
*Passenger Service*



**1988 – Airbus A300**  
*First Widebody*

”We have been doing this for almost 100 years, what can STAMP tell us that we don’t already know?”

# STAMP Roadmap

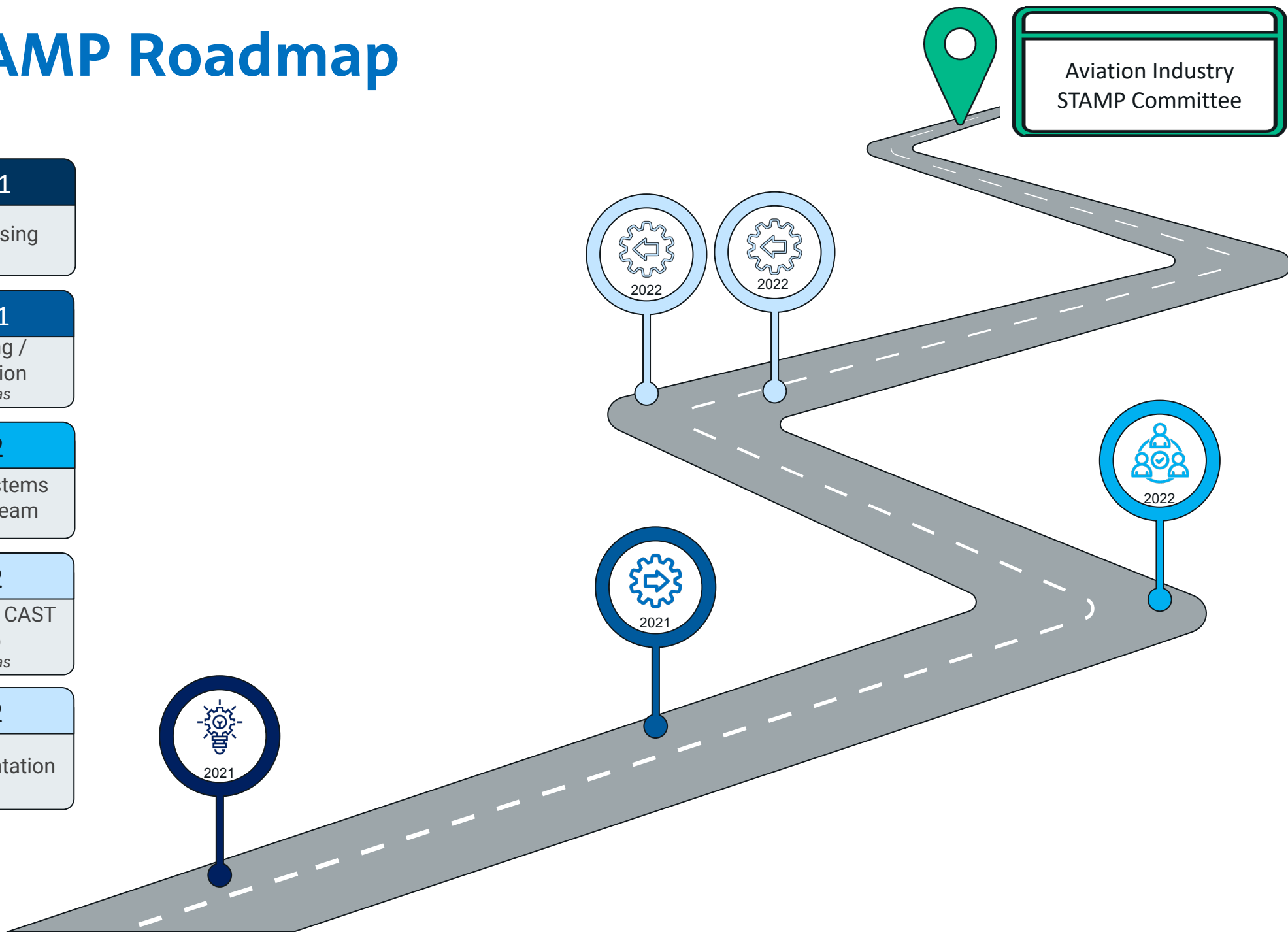
**10 - 2021**  
Inception of using STAMP

**11 - 2021**  
STPA Training / Implementation  
*By John Thomas*

**02-2022**  
Creation of Systems Engineering Team

**05-2022**  
CAST Training / CAST Workshop  
*By John Thomas*

**05-2022**  
CAST Implementation



# STAMP Program / Governance Structure



STAMP Safety Systems  
Engineering Team

Core team of Manager, Project  
Managers, Analysts



STAMP Safety Steering  
Committee

Safety Managing Directors



STAMP Executive  
Steering Committee

Company Executives, VPs, SVPs in  
operational departments. SMS  
accountable executives.



STAMP Project  
Business Sponsor(s)

Operational SVPs, VPs, Managing  
Directors



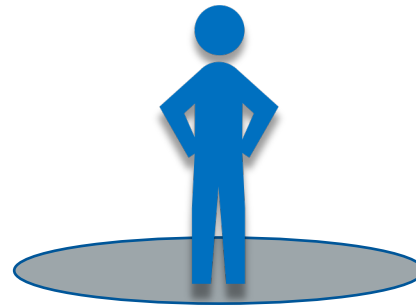
STAMP Project Group

Safety and Process Owners

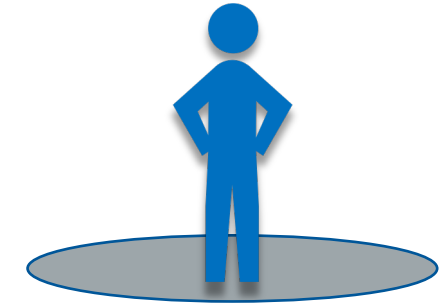
# Typical STPA/CAST Project Group



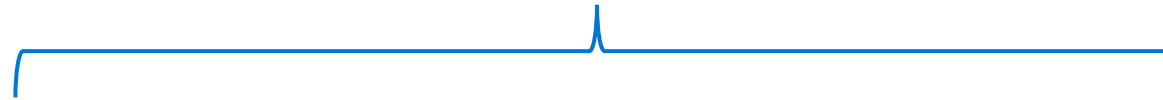
STAMP Facilitator



Process Owner(s)



Regulator



Baggage Operations



Customer Service



Pilots



Flight Attendants



Mechanics



Dispatch



Load Planning



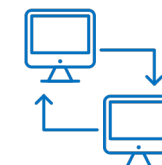
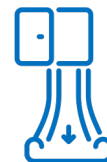
Security



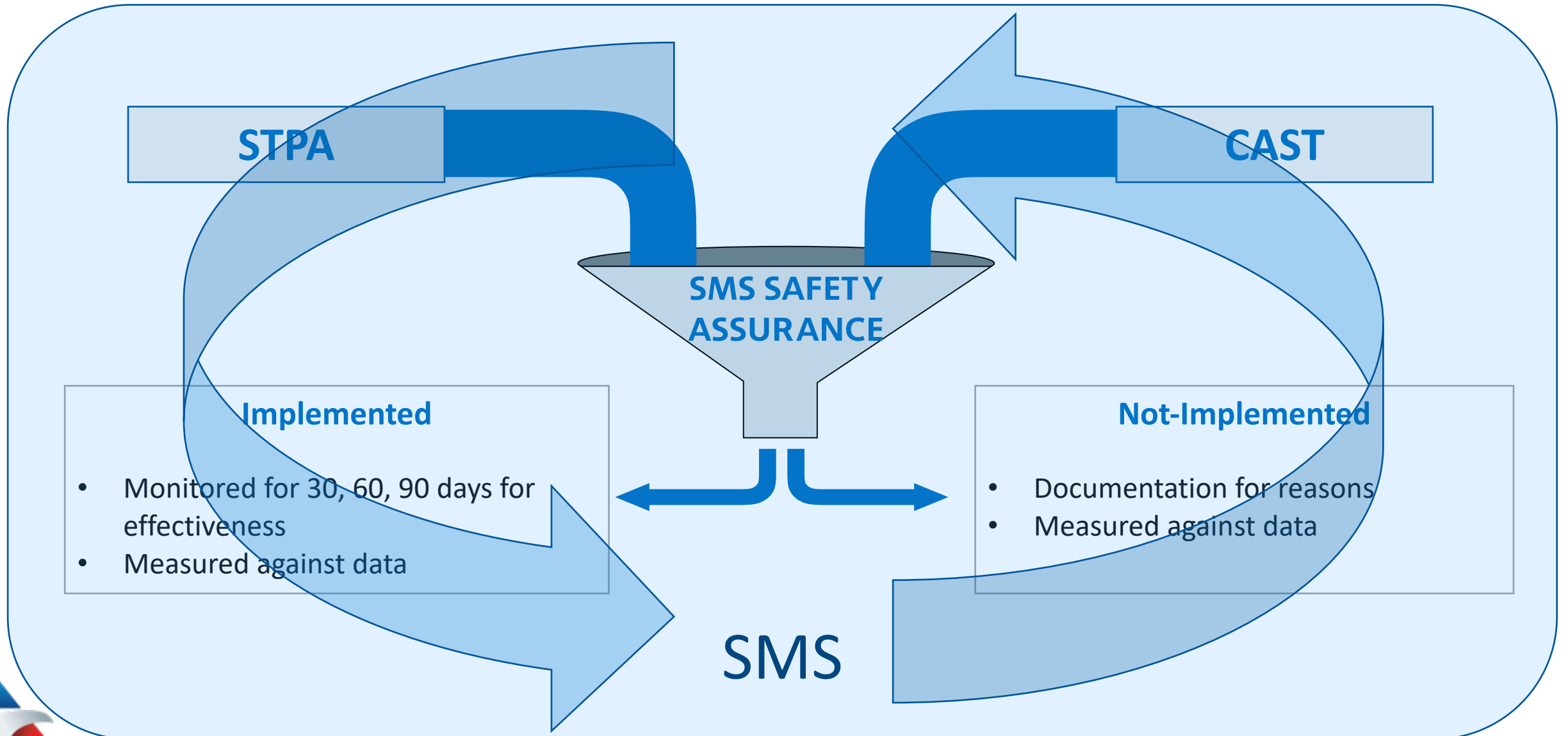
Business Partners



Engineering

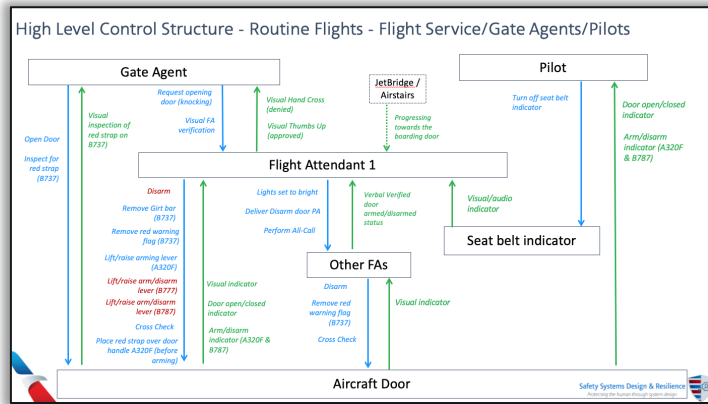


# STAMP Integrated Within SMS

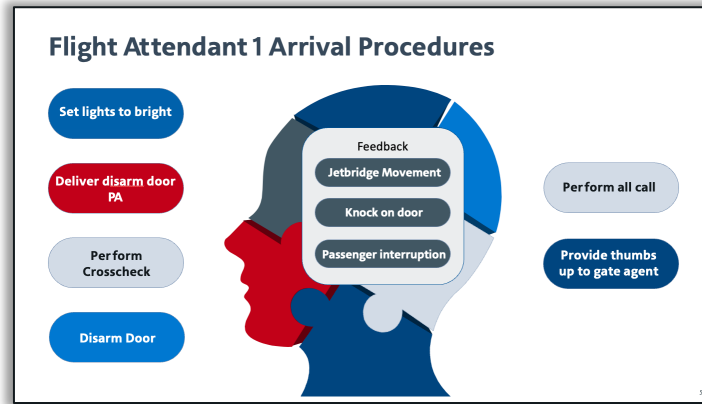




# CAST & STPA Output



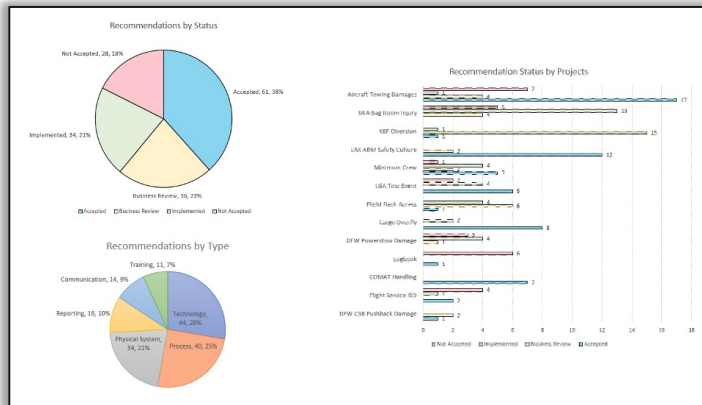
Work Template



Leadership Brief

Issue ID	Project Area	Priority	Severity	Recommendation	Recommendation Owner	Target Date	Status	Notes	Author
0104	Lighting	Low	4/5/20	Review current lighting for the boarding process to ensure uniformity in the use of these lights for the Boarding and Disarm process.	Action Operability	Initial team goal	Technology	01/01/2025 - Review current lighting for the boarding process to ensure uniformity in the use of these lights for the Boarding and Disarm process.	Implemented
0105	ESMRT Handling	Low	3/1/23	Confirm current status of ESMRT (ESMRT and ESMRT) and ensure ESMRT is always visible from ESMRT on the aircraft.	Task Ops	01/01/2025 - Confirm current status of ESMRT (ESMRT and ESMRT) and ensure ESMRT is always visible from ESMRT on the aircraft.	Technology	01/01/2025 - Confirm current status of ESMRT (ESMRT and ESMRT) and ensure ESMRT is always visible from ESMRT on the aircraft.	Review
0106	ESMRT Handling	Low	3/1/23	Additional review of ESMRT process in ESMRT areas.	Task Ops	01/01/2025 - Additional review of ESMRT process in ESMRT areas.	Technology	01/01/2025 - Additional review of ESMRT process in ESMRT areas.	Review
0107	Flight Service OS	High	5/5/23	Flight Service OS and Flight Service OS are not visible to the flight attendants in the cabin. Flight attendants are not aware of the status of the Flight Service OS and Flight Service OS.	Flight Service	None	None	01/01/2025 - Flight Service OS and Flight Service OS are not visible to the flight attendants in the cabin. Flight attendants are not aware of the status of the Flight Service OS and Flight Service OS.	Review
0108	Flight Service OS	High	5/5/23	Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Action Operability	Initial team goal	Process	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Implemented
0109	Flight Service OS	High	5/5/23	Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Task Ops	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Physical System	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Review
0110	Flight Service OS	High	5/5/23	Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Task Ops	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Physical System	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Review
0111	Flight Service OS	High	5/5/23	Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Task Ops	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Physical System	01/01/2025 - Review and update flight attendants' training materials to include the status of the Flight Service OS and Flight Service OS.	Review
0112	Lighting	Low	3/1/23	Review current lighting for the boarding process to ensure uniformity in the use of these lights for the Boarding and Disarm process.	Task Ops	01/01/2025 - Review current lighting for the boarding process to ensure uniformity in the use of these lights for the Boarding and Disarm process.	Physical System	01/01/2025 - Review current lighting for the boarding process to ensure uniformity in the use of these lights for the Boarding and Disarm process.	Review

Recommendations



Monitoring & Measure

## Flight Service Inadvertent Slide Deployments

### Causal Analysis Using System Theory (CAST)

American Airlines

This analysis was conducted in partnership with Flight Service, Flight Operations, Customer Care, and Interiors Engineering.

Safety Systems Design & Resilience  
Protecting the human through system design

Authors:  
Safety Systems Design & Resilience Team

Final Report



# RCA vs CAST

## RCA

Traditional industry method

### Conclusions:

- Primary Cause:
  - **FA1** failed to disarm the door before giving the clearance to the Gate Agent to open the door
- Contributing Factors:
  - **FA1** Personal event (e.g., family problem, car accident)
  - **FA1** Stress
  - **FA1** primarily works On Duty All Night trips
  - **FA1** also must commute from out of base station
  - **FA1** did not wait for FA3 to cross check
  - **FA1** gave the "thumbs up" to the gate agent without disarming the door, thereby creating the impression to the gate agent that the door was disarmed

### Corrective Action:

- Coaching & Counseling for **Flight Attendant**
- Mandatory re-training for **Flight Attendant**

## CAST

### Conclusions:

FA1 did not disarm door because:

- **Environment** filled with distractions during the FA1 critical tasks
- **Scheduling** assigned FA1 on aircraft with electronic arming/disarming lever prior to this flight
- **Door opening procedures** for Gate Agent and Flight Attendants did not align
- **Girt bar stoppers** color matched the color of the door and girt bar
- ETC

### System Improvement Recommendations:

- Replace the B737 girt bar stoppers with a higher visible color to provide contrast against the door/bar and better feedback for the flight attendant to see if the girt bar is correctly positioned in the slide container hooks in the slide container hooks
- Engineer a sensor on the B737 girt bar/door that provides an indicator to the flight attendant if the door is armed/disarmed. Consider a red/green light to show armed status.
- Add an "ARMED" placard on the bottom of the B737 slide apron that can only be seen when the girt bar is in the floor brackets.
- Establish dual-monitor and challenge for FA1 & FA3 B737 arrival procedures.
- ETC

Focused on "fixing" the Flight Attendant

Results shown are only excerpts, not the full conclusion

Focused on fixing the whole system

# Conclusion



Not everyone involved needs to be a STAMP expert, you just need at least one expert STAMP facilitator



CAST/STPA are tools that have been widely accepted and understood within our diverse and complex organization



STAMP helps reinforce resiliency within our systems



CAST leads to deeper insights compared to traditional industry methods



STPA has improved how we design current and future systems



Future STAMP Aviation Committee (looking for participants)



# Conclusion



*Stephen Palyok*  
***Stephen@aa.com***

Thank you, John Thomas for  
your support and training  
with American Airline's  
implementation of STAMP

[www.linkedin.com/in/stephenpalyok](http://www.linkedin.com/in/stephenpalyok)