Implementing STAMP at the world’s largest airline

Stephen Palyok
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HELLO
MY NAME IS

Stephen Palyok
Manager, Safety Systems Engineering
American Airlines

Safety Systems Design & Resilience
Protecting the human through system design
History of American Airlines
95 years strong

1927 – FC-2
Mail Routes

1936 – DC-3
Passenger Service

1957 – Boeing 707
Entered the Jet Age

1988 – Airbus A300
First Widebody

2015 – Boeing 787
Modern Widebody

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

Photo Credit – FC-2, DC-3 on Wikipedia. Boeing 707, AA. Boeing 777-300 Swisse, PlaneSpotters.net
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

2021

2022
Aviation Industry STAMP Committee

2021

2022
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 Owners(s)
- Regulator

- Baggage Operations
- Customer Service
- Pilots
- Flight Attendants
- Mechanics
- Dispatch
- Load Planning
- Security
- Business Partners
- Engineering
STAMP Integrated Within SMS

- **Implemented**
  - Monitored for 30, 60, 90 days for effectiveness
  - Measured against data

- **Not-Implemented**
  - Documentation for reasons
  - Measured against data
CAST & STPA Output

Work Template

Leadership Brief

Recommendations

Monitoring & Measure

Final Report

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
RCA vs CAST

**RCA**

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

Focused on fixing the whole system

Results shown are only excerpts, not the full conclusion.
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 reinforces 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)
Thank you, John Thomas for your support and training with American Airline’s implementation of STAMP