



NASA Ames Research Center  
***Emergency and Abnormal Situations in  
Aviation Symposium***



June 10 -11, 2003  
San Jose, California



*“Dealing with Emergency/Abnormal Situations with New Security Guidelines”*

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Manager Human Factors  
Continental Airlines***

# THREAT & ERROR MANAGEMENT

## Emergency/Abnormal Situations & Security



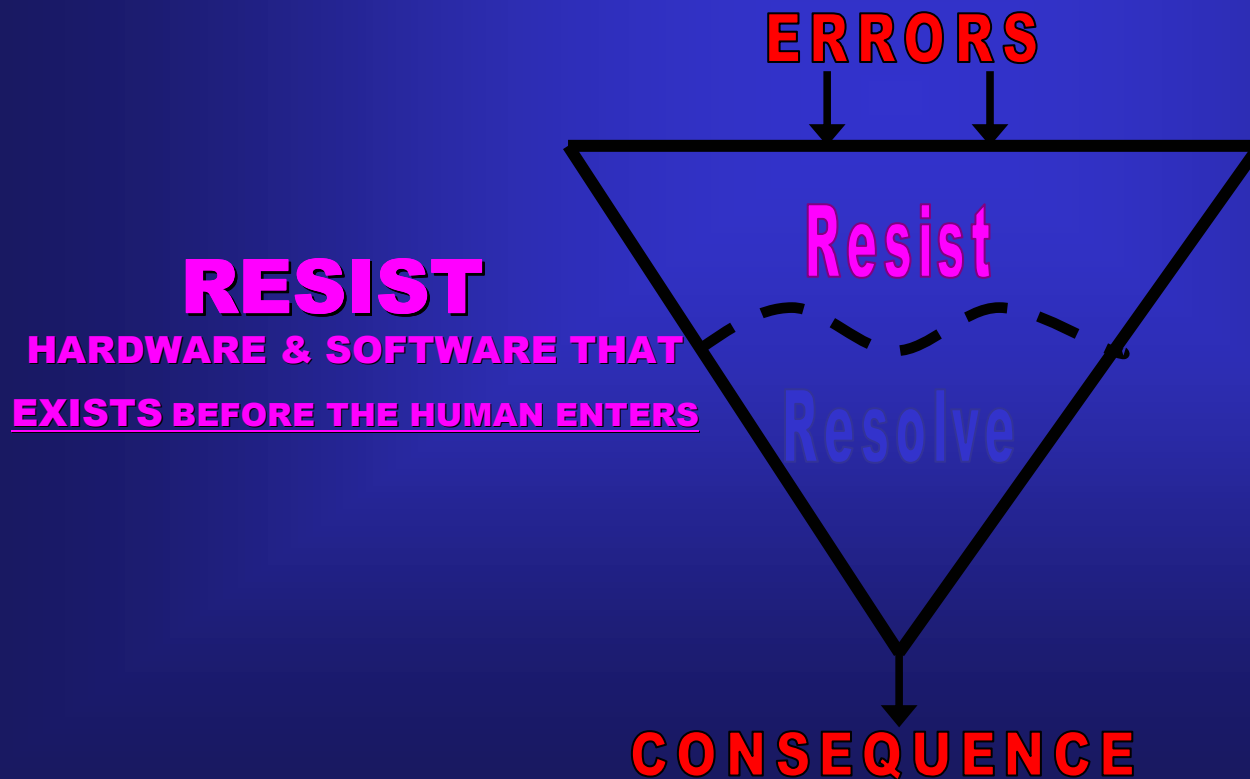
# Agenda

- Threat & Error Management (TEM)
  - “Error Management” developed from LOSA 1996 data
  - “TEM” developed from LOSA 2000 data
- Use TEM process to determine new strategies to manage emergency & abnormal situations with new security guidelines

# **LOSA 1996**

Error Management

# Error Management



# RESISTANCE

HARDWARE & SOFTWARE THAT EXISTS BEFORE  
THE HUMAN ENTERS

- GPWS

- TCAS

- TRAINING

- MANUALS

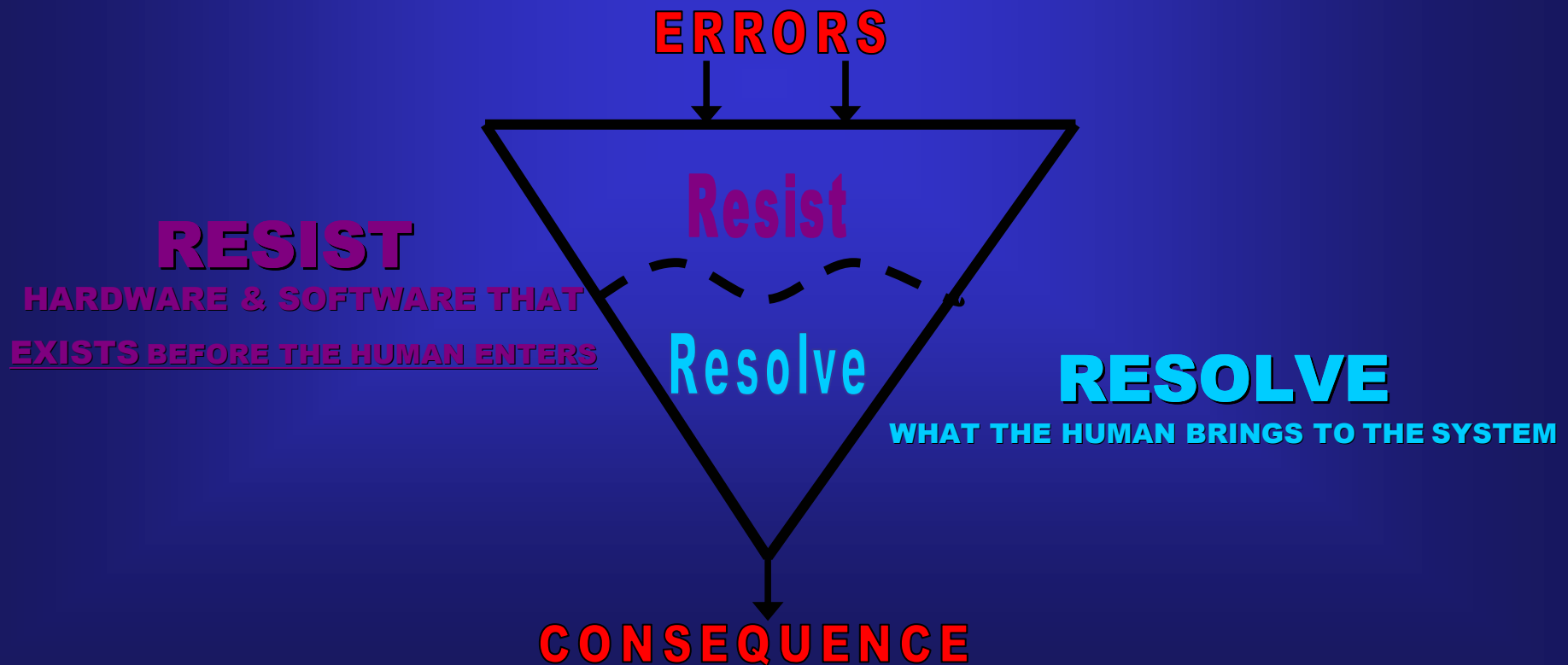
- SOP's

- CHECKLISTS

- AUTOMATION

- ATC

# Error Management



# RESOLVE

## WHAT THE HUMAN BRINGS TO THE SYSTEM

- **PROFICIENCY**
- **VIGILANCE**
- **ASSERTIVENESS**
- **MONITORING & CHALLENGING**
- **DECISION MAKING**
- **EXPERIENCE**
- **LEADERSHIP**
- **SIT. ASSESSMENT**
- **CHECKLIST DISCIPLINE**



# **LOSA 2000**

Threat & Error Management

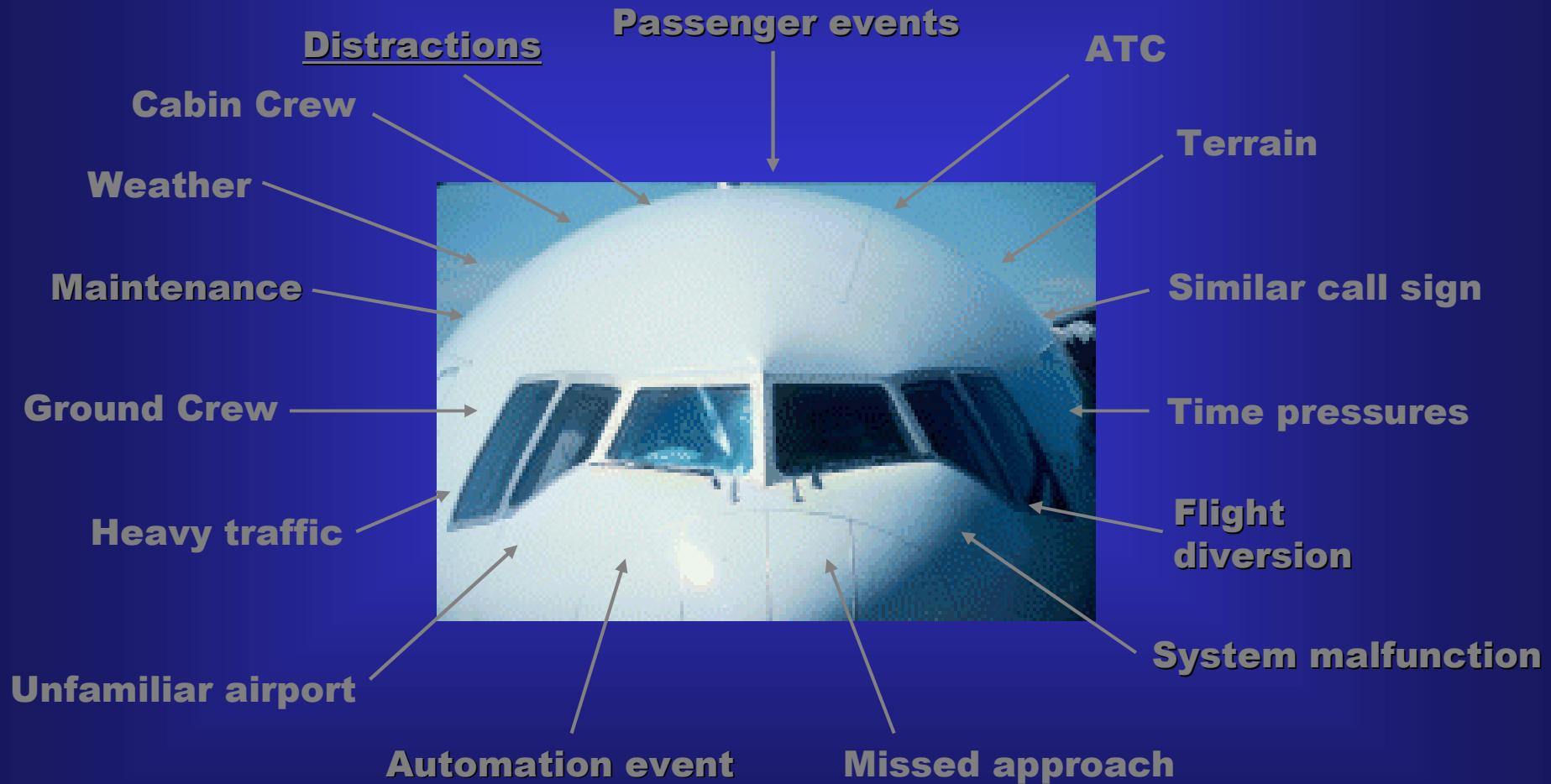
**LOSA data shows another area of vulnerability...**



**THREATS**

# THREATS

## Influences that can lead to crew error



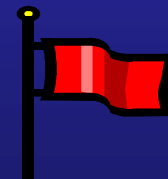
# THREATS

## Threats

- Do not equal errors
- Increase error potential

"A threat is anything that increases operation complexity that, if not managed properly, can decrease the safety margins."

- Threats = Red Flags



# Strategies

- Industry, corporate and personal countermeasures crews use to manage threats
  - Will reduce the number of hard errors
  - Will improve the error management process by increasing the awareness of potential errors and the proper countermeasures to be used

# Threat and Error Management



# Security Changes

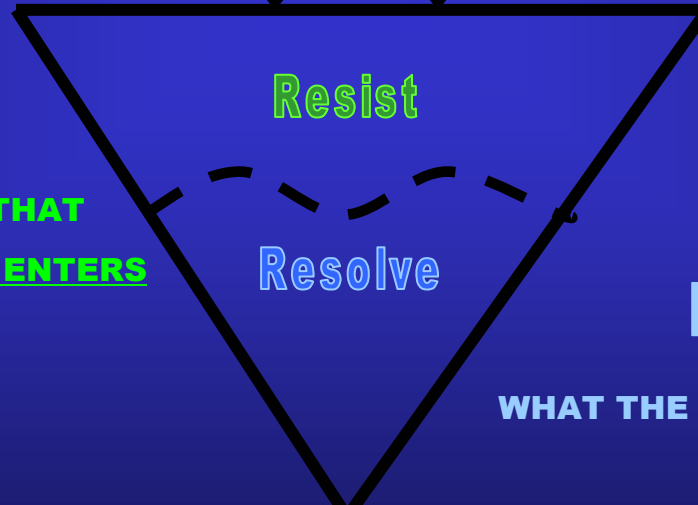
While many of these initiatives may provide enhanced security protection for crew and passengers alike, it is important that the human performance implications of any changes be carefully considered.

# Threat and Error Management

*Emerg/Abnormals*



ERRORS



**RESIST**  
HARDWARE & SOFTWARE THAT  
EXISTS BEFORE THE HUMAN ENTERS

**RESOLVE**

WHAT THE HUMAN BRINGS TO THE SYSTEM

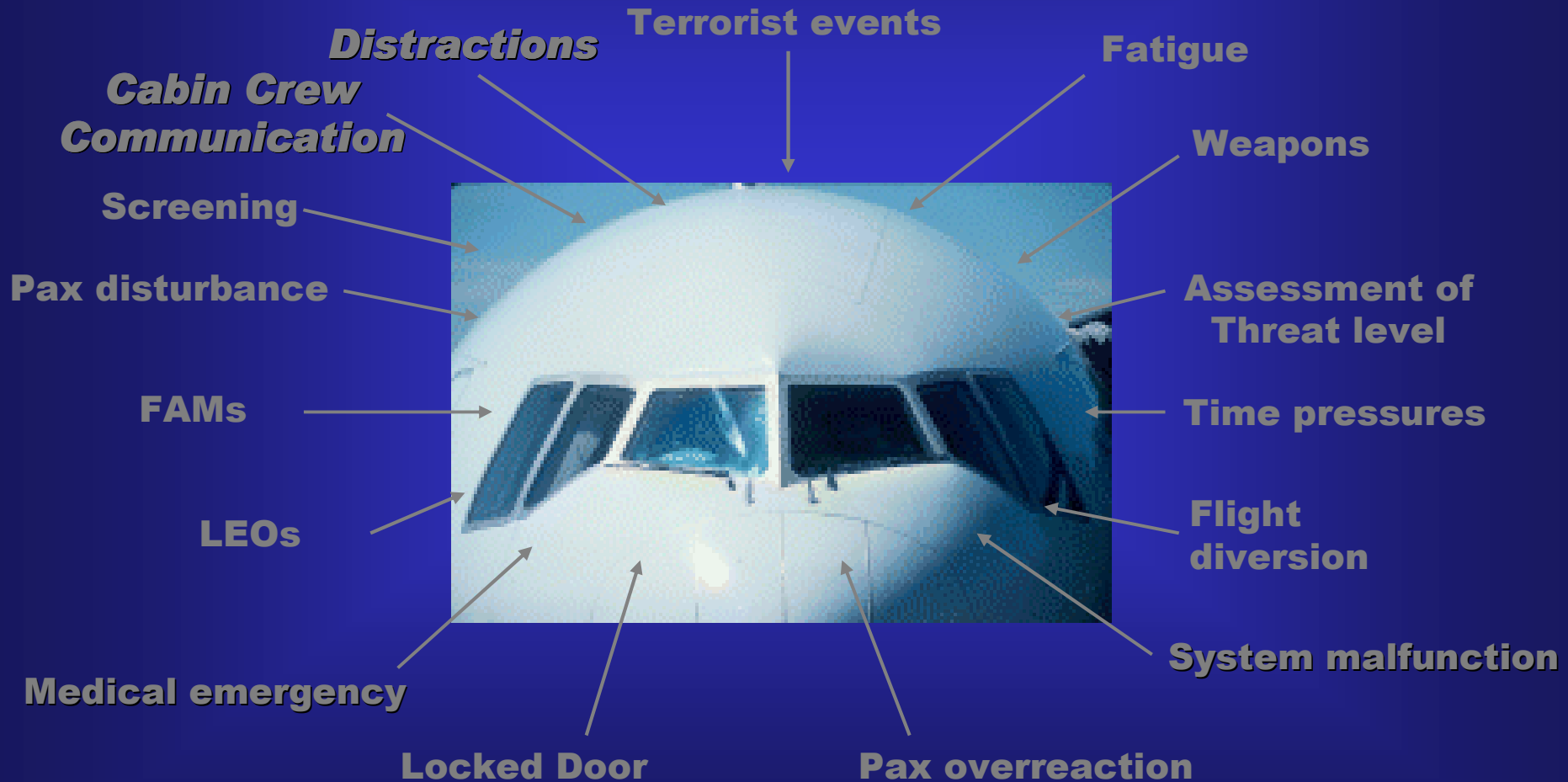
CONSEQUENCE

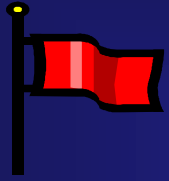


# SECURITY

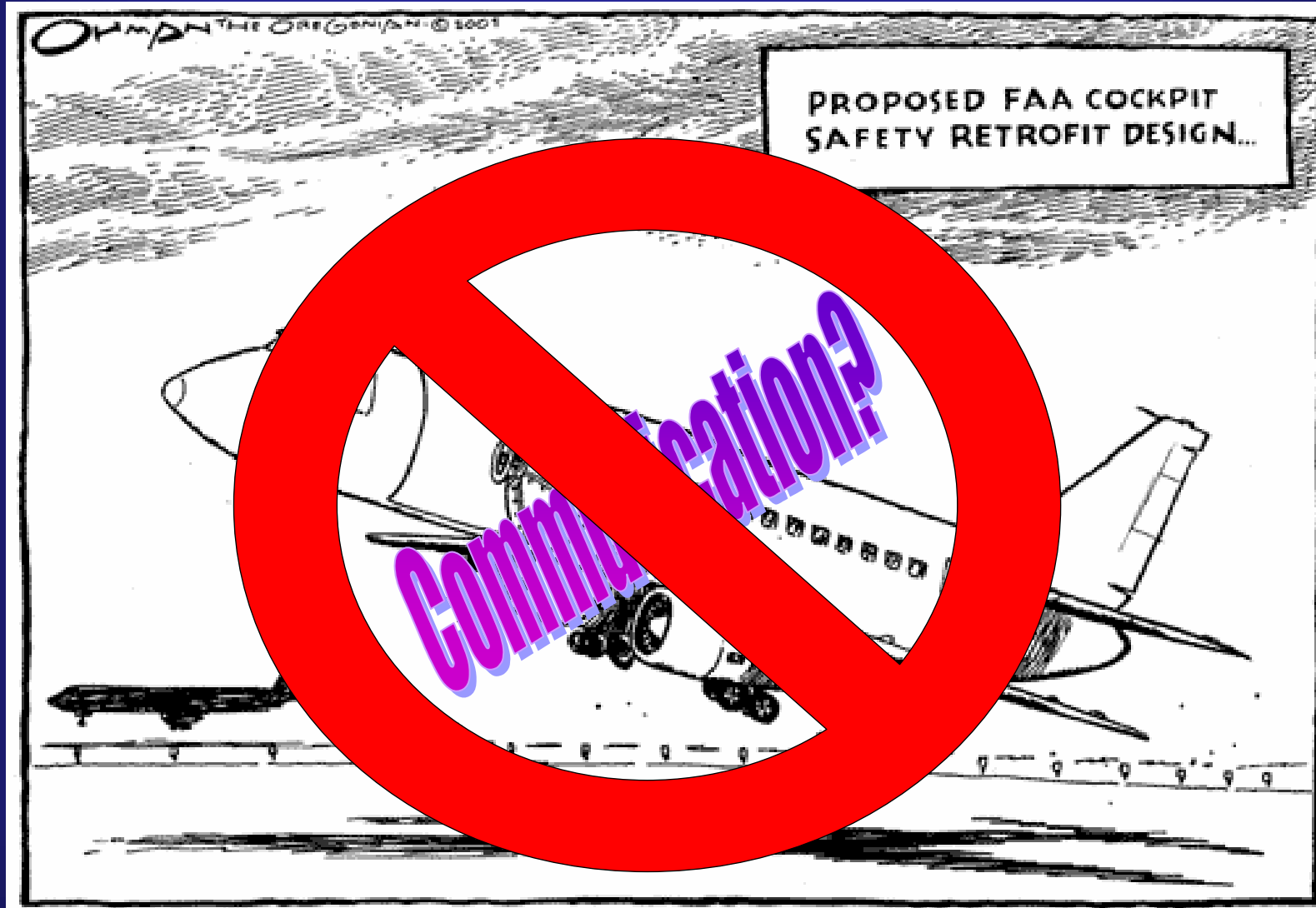
# THREATS

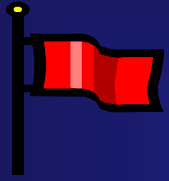
Influences that can lead to crew error





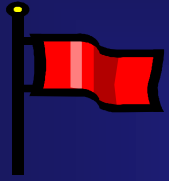
**Threat:** Locked cockpit doors & crew isolation





**Threat:** Locked cockpit doors & crew isolation

- **Communication during a disturbance**

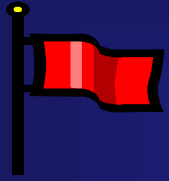


**Threat:** Locked cockpit doors & crew isolation

- Communication during a disturbance
- **Communication during a Medical Emergency**

# What Now?





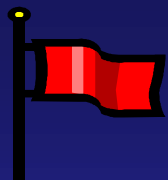
**Threat:** Locked cockpit doors & crew isolation

- Communication during a disturbance
- Communication during a Medical Emergency
- **Communication with Federal Air Marshals**

# FEDERAL AIR MARSHAL



**Threat and Error Management**



# THREATS

## Influences that can lead to FAM error





# STRATEGY:



# Elements of Briefing

**Shared mental model = Outline for Teamwork**

**Who should be there?**

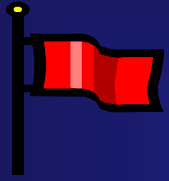
**What is briefed?**

**What can you omit?**

**GOAL**

**PLAN**

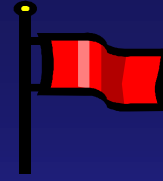
**INTENT**



**Threat:** Locked cockpit doors & crew isolation

- Communication during a disturbance
- Communication during a Medical Emergency
- Communication with Federal Air Marshals
- **Communication during other Emergency and Abnormal situations**

**What Have You Seen?**



**What *STRATEGIES* Will You Develop?**

# Managing Emergency & Abnormal Situations

*(in today's security environment)*

## The New "Safety Targets"

- How to properly assess the situation
  - Secured door
  - Video system
- Means for effective crew communication
  - Terminology
  - Technical knowledge
- New checklist formatting due to Security issues
  - Include crew coordination issues
  - New cautions & warnings
- Additional training
  - "Common sense"

# Summary

Use Threat & Error Management in Emergency & Abnormal Training to:

- Identify a list of human performance threats, as a result of the current security changes, and develop **STRATEGIES** to mitigate these **THREATS**.
- Focus on helping our crews better manage the risks associated with these changes.