

# Flight Test Situational Awareness



# Objectives

- Understand the definition and importance of

## **Situational Awareness (SA)**

- Know the symptoms of lost SA

- Analyze case studies for indications

- Explain the steps for recovery

- Generalize the methods for:

## **Improving/ Getting SA**

# What is Situational Awareness ?

- The accurate perception of what is going on with you, the aircraft, and the surrounding world, both now and in the near future.

## Why is it Important ?

- Critical for internal scheduling & prediction

- Kern, 'Redefining Airmanship'

# Level 1: Perception

- **Must be able to perceive a relevant clue**
  - Breakdowns in Level 1 SA – “Input errors”
    - Incorrect data (bad oil pressure gauge/faulty light)
    - Misinterpreted information (mistaking one cue for another)
    - Misprioritized information (fails to see importance of cue or event)
- **Enemies of Level 1 SA:**
  - Channelized attention, distraction, task saturation

# Level 2: Comprehension

- **Ability to attach appropriate significance to an event**
  - Self-knowledge
  - Systems knowledge
  - Environmental knowledge
- Helpful tools: "hangar fly," "cross talk"
- **Enemies of Level 2:**
  - Inexperience, complacency, lack of respect for situation or environment, distraction

# Level 3: Projection

- **Anticipatory Capability**
  - “See” the implication of an event on future courses of action
  - Always look for the new reality
- **Enemies of Level 3:**
  - Task saturation, poor workload management skills

# Why do we lose SA?

- Fixation
- Poor pacing
- Emotional Jetlag
- Broken habit patterns
- New situations
- Physiological problems
- **Distraction (Poor Culture of Discipline)**

# Essential Components of Good SA

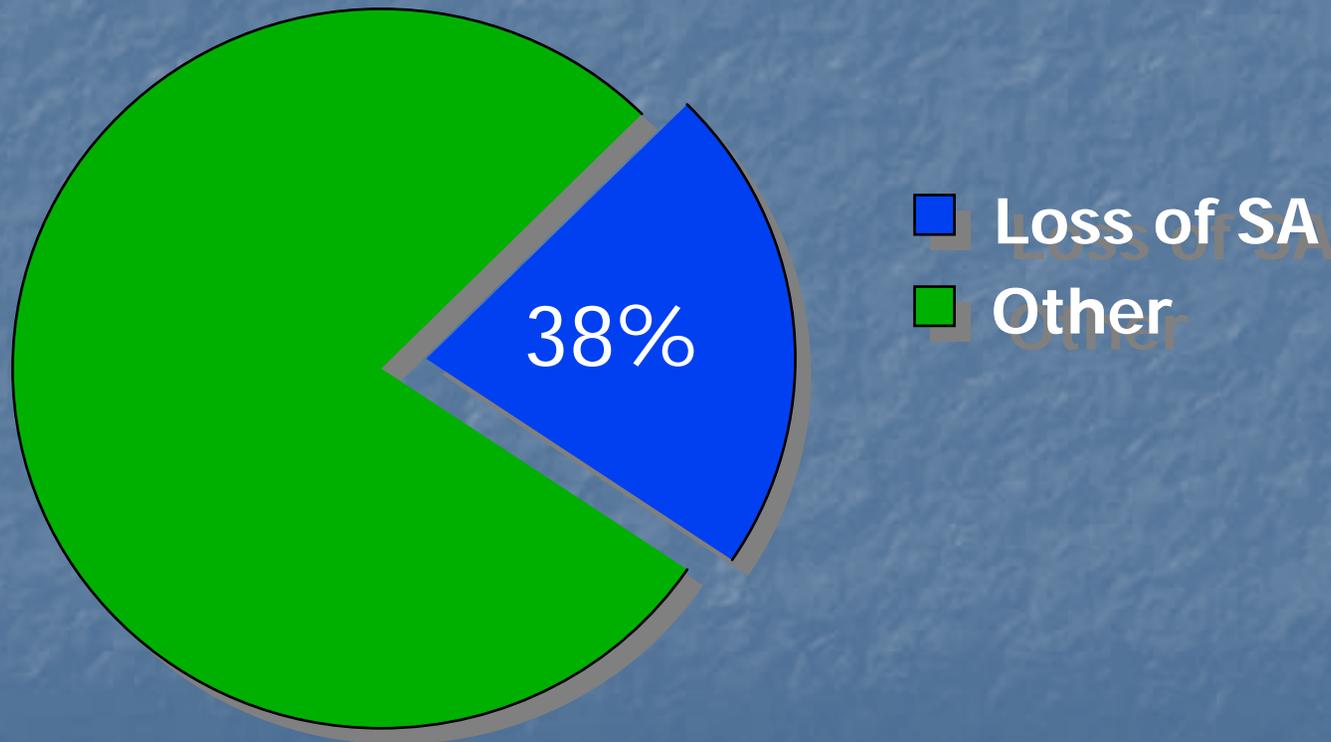
- Culture of Discipline : Self/ Judgment/ Action
- Need to Build "**Excess Workload Capacity**"  
Case Study: X-22 Accident and Me !!
- Ability to Think under Stress  
..... And to remain Disciplined even in "dull"  
Flight Test moments!!

# Case Study: The X-22A and Me !



**Loss of Individual SA**

# Situational Awareness is Important !



# Recognizing Lost SA

- Fixation
- Complacency
- Euphoria
- Uncertainty
- Common distraction
- Communication problems
- Failing to meet targets
- Unresolved timing error
- Behind the aircraft

**Verbalize ANY of these symptoms immediately and conduct thorough cross check to validate flight parameters**

# "The Pinch"

- A feeling of uncertainty in the cockpit when something doesn't look, sound or feel right.
- **Requires action: *verbalize immediately !!***  
*..... ACT !!*
- ***IT CAN HAPPEN TO YOU – not just to  
"THEM"***

# Loss of TEAM SA

- The X-31 Case:

***Team Lessons To Be Learned***

# HOW DID WE GO FROM THIS:



# TO THIS ?



# **SAFETY ISSUES (PROCESS)**

- **SYSTEM SAFETY ANALYSIS**
  - Severity/Probability Confusion
  - Lack of attention to Reversion Modes as Pilot Safety Net
- **BREAKDOWN IN COMMUNICATION OF SAFETY CRITICAL INFO**
  - Pitot Heat Status

# SAFETY ISSUES (EXECUTION)

- Schedule
- WX
- Airspeed / AOA Conflict
- Pitot Heat
- Hot Mike / Chase (B2 Fix)
- Flutter Box
- Control Room Interaction
- Alternate Cockpit Airspeed
- Pilot R3 Safety Net



# LESSONS TO BE LEARNED

- If you Do Not Understand or it Does Not Make Sense:
  - 1) SPEAK UP ! (reject Engineer Mind Set)
  - 2) STOP THE TESTS AND THINK !
- Communicate to all test players
- In the Face of the Unexpected:
  - Know the Quick System Path to Safety
- There is No Substitute for Good Flight Test Judgment
- Accidents Do Not Just Happen to “THEM”  
..... They Happen to “YOU”

# Immediate Action Steps / Regaining Lost SA

- SAFE ESCAPE
- VERBALIZE IMMEDIATELY
  - "What's going on here?"
- Stabilize conditions and buy time
- Project thinking forward
- Resolve inconsistencies

■ **PASS IT ON!**

# Preventing Loss of SA

- Build **“Excess Workload Capacity”**
  - Culture of Discipline
- Contingency thinking - “what if?”
- Reward assertiveness (CRM)
- Define monitoring responsibilities
  - Overlap as required
- **Stay Mission Oriented**

**Often, dumb questions can  
save your life.**

Sometimes they just embarrass  
you.

**No one ever died of  
Embarrassment !**

**Take a Break**