

# Definition of Situational Awareness

- The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future (Endsley 1998).

# *What is Situational Awareness ?*

*The perception of elements in the environment,  
within a volume of time and space,*

*The comprehension of their meaning*

*The projection of their status in the near future*

*What happened ?*

*Where am I ?*

*What is happening ?*

*What could happen ?*

# SA Components

- Attention,
- Perception,
- Information Processing,
- Memory
- Decision Making

# Elements of SA

<b>Geographical SA</b>	own aircraft other aircraft terrain features airports cities waypoints navigation fixes position relative to designated features path to desired location runway and taxiway assignments path to desired location climb/descent points
<b>Spatial/Temporal SA</b>	attitude altitude heading velocity vertical velocity flight path actual values relative to assigned projected flight path projected landing time
<b>System SA</b>	system status functioning and settings radio altimeter transponders flight modes and automation deviations from correct settings ATC communications present fuel impact of degradations and settings on performance time and distance available on fuel
<b>Environmental SA</b>	weather formations and movement temperature icing ceilings fog turbulence, winds sun visibility IFR/VFR conditions areas to avoid flight safety projected weather conditions

# Levels Of SA (M.Endsley)

Errors result from:

1. Perception - Failure to correctly perceive the situation
2. Comprehension - Failure to comprehend situation
3. Projection - Failure to project the situation into the future

# Levels Of SA

1. perception,
2. comprehension
3. projection

Level 1 SA: failure to correctly perceive the situation	A: Data not available B: Data difficult to detect/perceive C: Failure to scan or observe data 1. omission 2. attentional narrowing/distraction 3. high taskload D: Misperception of data E: Memory failure
Level 2 SA: Failure to comprehend situation	A: Lack of/poor mental model B: Use of incorrect mental model C: Over-reliance on default values in model D: Memory failure E: Other
Level 3 SA: Failure to project situation into the future	A: Lack of/poor mental model B: Other
General	Failure to maintain multiple goals Habitual schema

# Good Situational Awareness - 1

- Predetermine crew roles for high-workload phases of flight
- Develop a plan and assign responsibilities for handling problems and distractions
- Solicit input from all crew members, including cabin, ATC, maintenance, dispatch, etc
- Rotate attention from plane to path to people – don't fixate

# Good Situational Awareness - 2

- Monitor and evaluate current status relative to your plan
- Project ahead and consider contingencies
- Focus on the details and scan the big picture
- Create visual and/or aural reminders of interrupted tasks
- Watch for clues of degraded SA
- Speak up when you see SA breaking down

(Bovier, 1997)



# Stress

- Physical (noise, vibration, heat, cold, fatigue, etc.)
- Social/ psychological (fear, anxiety, uncertainty, mental load, time pressure, perceived time pressure, consequences of events, etc.).

# How do you know if you've lost SA?

- **Ambiguous information**

- Do you have information from two or more sources that do not agree?

- **Confusion**

- Are you uncertain or uneasy about a situation?

- **Primary duties**

- Are all crew focused on non-flying duties?

- **See and avoid**

- Is there too much heads-down time with nobody looking outside for conflicting traffic?

- **Compliance**

- Is there non-compliance with aircraft performance limitations, minima etc?

- **Standard Operating Procedures (SOPs)**

- Are established SOPs not being followed by everyone?

# How do you know if you've lost SA?

- **Fixation**

- Are you focused on any one task to the exclusion of others?

- **Communication**

- Have you heard or made any vague or incomplete statements?

- **Contradictions**

- Have you failed to resolve any discrepancies or contradictory information?

- **Navigation**

- Have you failed to meet an expected checkpoint on the flight plan?