

Situational Awareness aka 'the Bubble'

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<https://www.uscg.mil/auxiliary/training/tct/chap5.pdf>



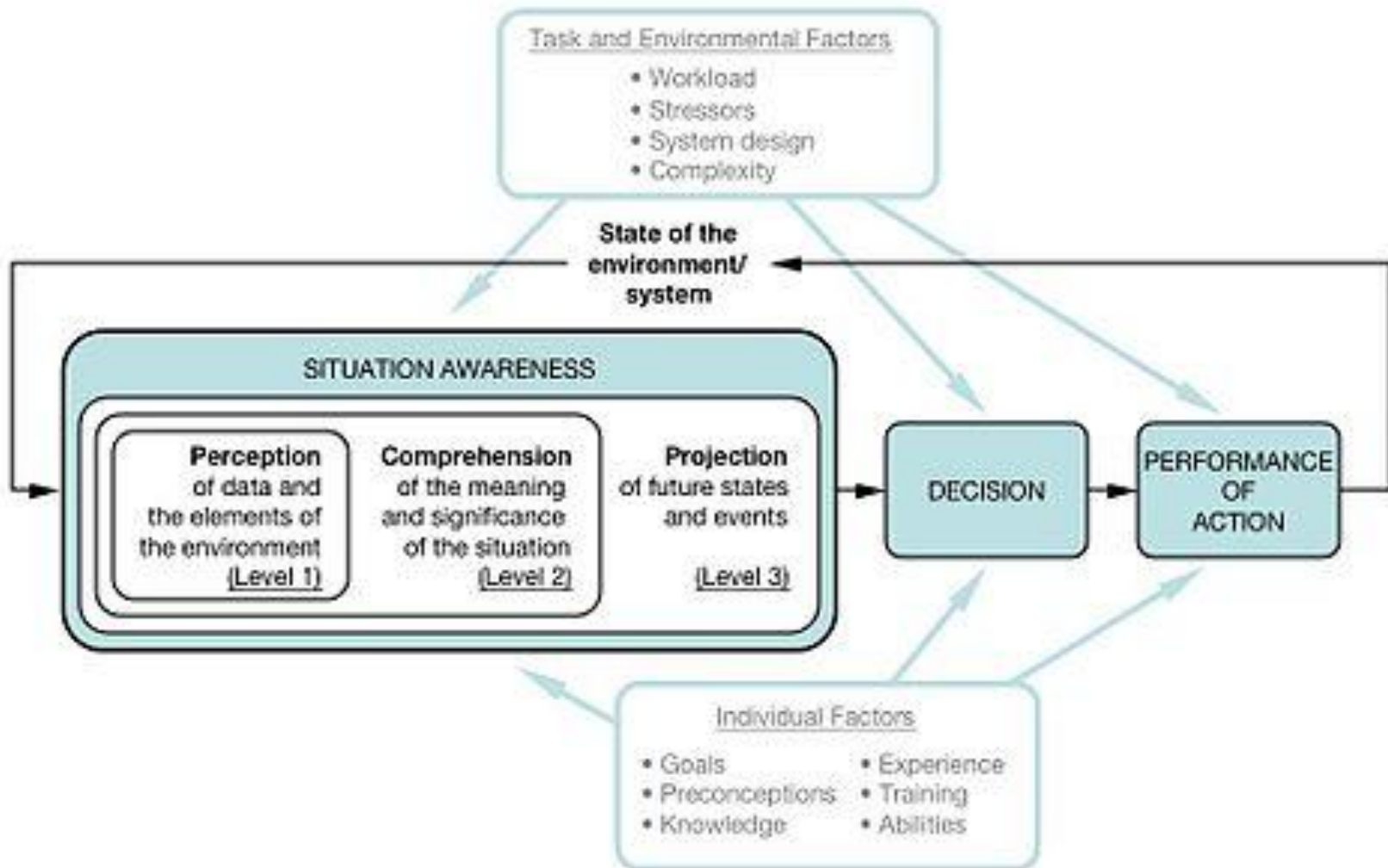
SITUATIONAL AWARENESS

Ever tried to shit bricks in a wetsuit?

USCG Perspective

- **Definition:** Situational Awareness is the ability to identify, process, and comprehend the critical elements of information about what is happening to the team with regards to the mission. More simply, it's knowing what is going on around you.
- **Consequences of Loss:** Coast Guard analysis of navigational mishaps for cutters and boats revealed that 40% were due to a loss of situational awareness.

The Endsley Model of SA



'In the Bubble'



**All Information, Status, and Cues
are in Agreement. Our Perceptions
and Comprehension Allow Us to
Make a Reliable Projections of
Future Events**

Example of 'In the Bubble'

- ILS Past FAF, Cleared to Land
- LOC and GS Centered
- Airspeed Locked On, Gear Down
- All B4 Landing Checklists Completed
- WX Indicates 500' Base with 3 sm Visibility
- 300' B4 our Decision Altitude (DA) Cloud Thins Where we can See Ground
- 200' B4 our DA we are VFR, Runway In Sight, Aligned
- Landing Seems Nearly 100% Assured

How Do We Get the Bubble?

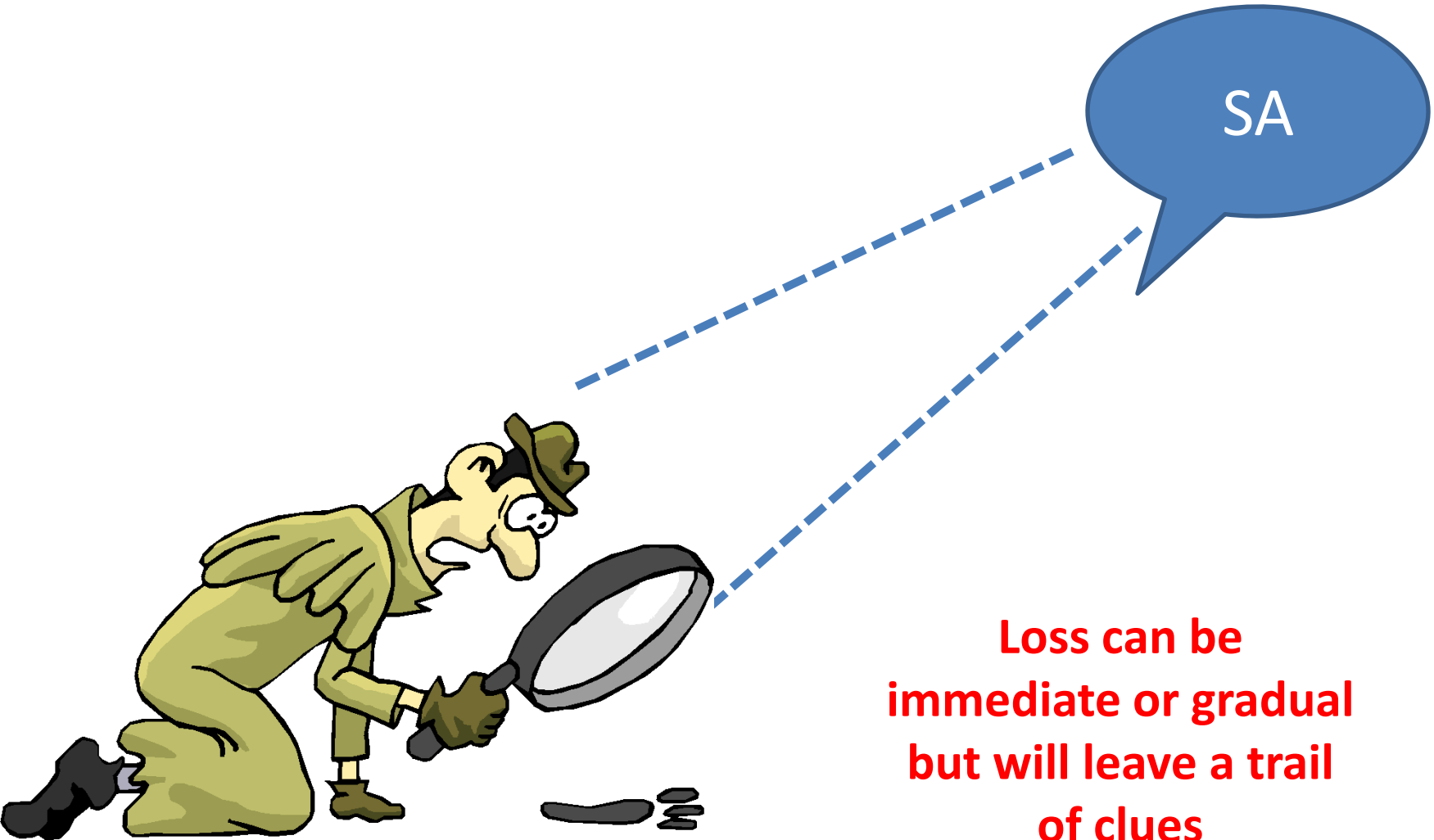
- **Planning**
 - Begins on Ground
 - Route, Approaches, Expected WX, NOTAMs
 - Chart Supplement and TPP Review
- **Practice**
 - Training
 - Avionics, Autopilot, System Backups
- **Proficiency**
 - Repetition
 - Projection

Let's Pontificate and Share a Bit

- As Pilots We Must be **Active** Participants in the 'NAS Team'
- Pilot A: Immediately Accepts an ATC Amended Clearance Without Evaluating Impacts to Time, Distance, Fuel, WX, or Aircraft Limitations, etc.
- Pilot B: Receives Amended Clearance; Evaluates; and Either Accepts or Negotiates with ATC



Losing the Bubble



**Loss can be
immediate or gradual
but will leave a trail
of clues**

Clues to Loss of SA

- **Confusion** – Gut feeling that things aren't right – very reliable since our subconscious will detect stimulus before we integrate
- **No One Looking for Hazards** – Proper assignment of tasks (e.g., monitoring autopilot)
- **Improper Procedures** – Prediction of outcomes become less certain (e.g. beginning turn before safe altitude on missed approach)

Clues to Loss of SA (cont.)

- **Violating Regulations** – Like improper procedures we are operating in an unknown area (e.g., descending below an MDA in IMC)
- **Fail to Meet Targets or Goals** – We must evaluate why we are not meeting them (e.g., above Glide Slope – might be clue as to wind shear or tailwind)
- **Unresolved Discrepancies** – Two or more pieces of information don't agree (e.g., GPS doesn't agree with VOR)

Clues to Loss of SA (cont.)

- **Ambiguity** – Similar to unresolved discrepancies, when information is unclear, confusing or missing (e.g., fail to understand amended clearance)
- **Fixation** – Preoccupied with one task and fails to detect other important information (Note: It might be outside the airplane, i.e., tower, ground or ATC becoming overwhelmed)

Maintaining the Bubble

- **Address Deviations** – Call them out (e.g., inability to hold altitude in turbulence)
- **Monitor Performance of Others** – Be alert for pilot, co-pilot, ATC, etc. errors or slips, speak up!
- **Provide Information** – E.g., compulsory reporting
- **Identify Problems** – Not only identify, but analyze if they will impact mission accomplishment

Maintaining the Bubble (cont.)

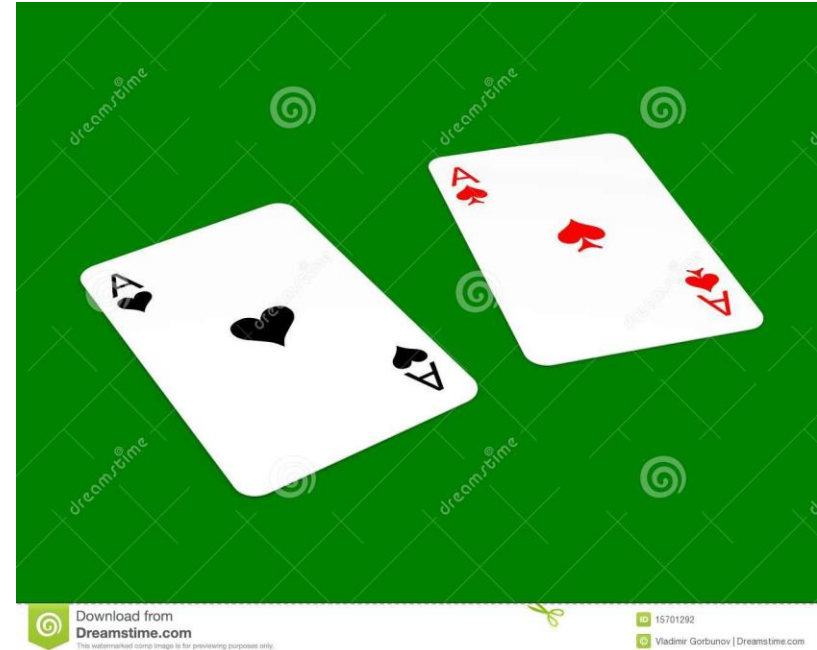
- **Know the Team's Job** – Understanding your and the rest of the participants in the NAS
- **Communicate Your Course of Action** – Keeps all team members informed
- **Be Aware of Upcoming Tasks and Continually Assess Your Readiness** – Flight regime is dynamic – must be ahead of the airplane

BARRIERS TO SITUATIONAL AWARENESS



Faulty Perception

- Perception is our mental picture of reality
- **Example:** On RV to an approach at a unfamiliar airport we think we are North of the final approach course – in reality we are South
 - Either our *past experience, expectations, or filters of information* have left us with a faulty picture of reality



Excessive Motivation

- Excessive motivation imposes expectations and filters which affect our ability to assess the situation.
- **Example:** John (a low time instrument pilot) is on an IFR flight with his boss (who is not a pilot) to go to an important meeting. During the flight the weather begins to degrade such that he will need to fly an ILS approach into an unfamiliar airport close to minimums

Complacency

- Assuming everything is under control reduces vigilance
- **Example:** Enroute at flight level 100, *George* (autopilot) is merrily keeping you on heading and altitude as you transit a thick stratus layer. You become engrossed in solving the latest NY Times crossword puzzle. Suddenly the engine sputters and quits.



Overload

- Overload – too many tasks, not enough time. Causes distraction, fixation, omission, increased errors, and high stress.
- **Example:** Getting vectored to final too high and tight



And you
thought
there was
stress
in your life

Fatigue

- Fatigue impacts vigilance. Ensure sufficient sleep and don't stretch your duty day.



Poor Communications

- Level and quality of communications directly effects situational awareness.



Humman Errorr



“If we learn from our mistakes, shouldn’t I try to make as many mistakes as possible?”

Human Error (cont.)

- Slips – Incorrectly sending information. Can be visual or auditory.
- **Example:** Tower operator tells you left hand turn out. Typically you get a right hand turn out from this runway and respond; 'Cessna 1234, right turn out on course.' Compounding this slip is if the tower doesn't correct you. Now there are two slips.

Mistakes

- Mistakes are failures in planning, data entry, or allocation of time.
- **Example:** Failure to plan for headwind resulting in low fuel before planned arrival at destination



Errors

- Errors are flawed execution; they are incorrect actions based on correct or incorrect information
- **Example:** Flying alternate missed approach procedure instead of primary published missed approach.

Situational Awareness – Recovery 101

- **Confess** – Admit to yourself you need help
 - **Difficult to do, but is necessary to ask for help**
- **Share and Ask for Help** – ATC, Co-Pilot, Instructor, FSS, Passengers
 - **Get the team involved**
- **Prioritize** – Aviate, Navigate, Communicate
 - **Fly the plane, fly the plane, fly the plane**
- **Be Specific**
 - Know how and when to use:
 - **Unable**
 - **Priority**
 - **Mayday**

Situational Awareness – Recovery 101 (cont.)

- **Buy Some Time:**
 - **Slow Down**
 - **Request Radar Vectors**
 - **Request Holding Pattern**

Summary of Situational Awareness

- Dynamic
- Hard to Maintain
- Easy to Lose

Finally,
Highly Dependent on Judgment,
Guess I'll Go Get Some of That!