Introduction to Scenario-Based Training

September 2007

What is Scenario-Based Training?

- SBT is a training *system*.
  - It uses a highly structured script of real world *experiences* to meet flight training objectives in an *operational environment*.

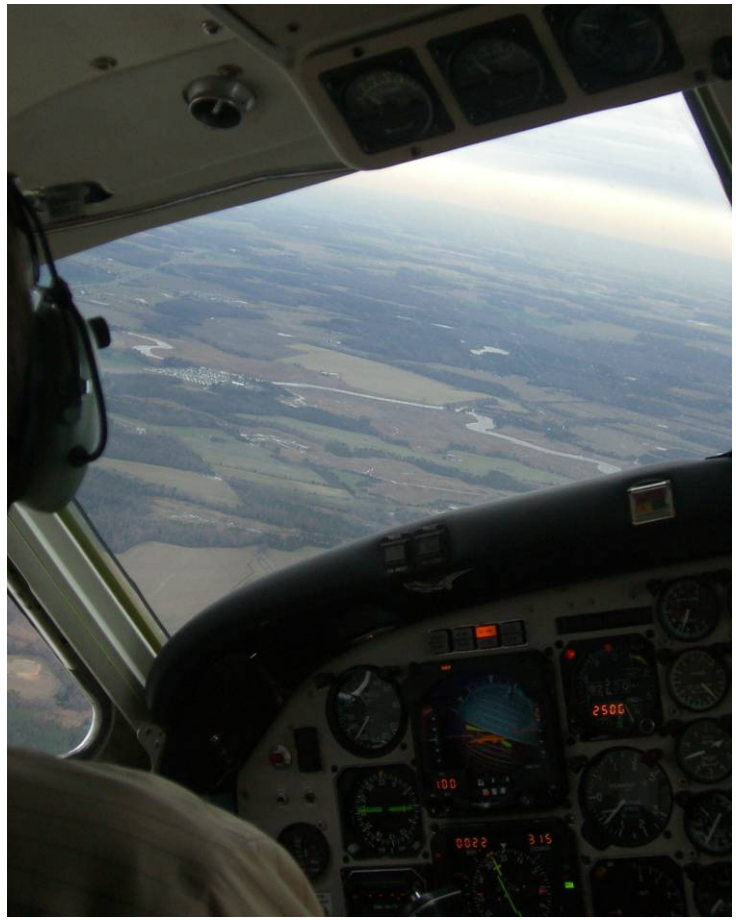
- System – concept is integrated throughout training.
- Experiences – new and different experiences are important.
- Operational environment – the real thing.

What is Scenario-Based Training?

- Think of learning to play the piano:
  - Learning to play notes on a scale is the foundation…
  - …but playing a song requires constant rearrangement.

What is Scenario-Based Training?

- Flight training is very similar:
  - Learning to fly maneuvers to checkride (PTS) standards is the foundation…
  - …but operating safely in the real world requires flying those maneuvers in context, and with consequences if the mission cannot be completed.



Why Use Scenario-Based Training?

- SBT teaches traditional PTS tasks in the context of missions and scenarios that mimic the kind of real life flying pilots at all levels will actually do. For example:
  - For cross-country flight training, have the pilot plan a family flying vacation that he or she might actually take.
  - Rather than teaching “turns around a point,” fly over a landmark to teach skills needed for aerial photography.

Why Use Scenario-Based Training?

- The real world training context leads to an important benefit of SBT:
  - It requires pilots to develop the habit of considering consider all aspects of the flight as it progresses, and to make realistic contingency plans to deal with unexpected events.

Why Use Scenario-Based Training?

- The FAA strongly advocates SBT:
  - The instrument PTS requires the examiner to incorporate required TASKS into scenarios that allow evaluation of the applicant's risk management and decision-making skills.

Why Use Scenario-Based Training?

- Future PTS for other certificates and ratings will likely include objectives and standards for:
  - Aeronautical Decision Making (ADM)
  - Risk Management (RM)
  - Task Management (TM)
  - Situational Awareness (SA)
  - Automation Management (AM)
  - Single-Pilot Resource Management (SRM)

- These terms all imply that the pilot can take off, fly somewhere, manage all aspects of the flight, and land safely at the destination.

Why Use Scenario-Based Training?

- Draft PTS revisions for **ADM** include the following:

The applicant should:

•Use a sound decision making process, such as the DECIDE model, 3P model, or similar process when making critical decisions that will have an effect on the outcome of the flight.

•Be able to explain the factors and alternative courses of action that were considered while making the decision.

•Recognize and explain any hazardous attitudes that may have influenced any decision.

Why Use Scenario-Based Training?

- Draft PTS revisions for **ADM** include the following:

The applicant should:

•Decide and execute an appropriate course of action to properly handle any situation that arises that may cause a change in the original flight plan in such a way that leads to a safe and successful conclusion of the flight.

•Explain how the elements of Risk Management, CFIT Awareness, overall Situational Awareness, use of Automation, and Task Management influenced the decisions made and the resulting course of action.

Why Use Scenario-Based Training?

- Draft PTS revisions for **Risk Management** include the following:

The applicant should:

•Explain the four fundamental risk elements associated with the flight being conducted in the given scenario and how each one was assessed.

•Use a tool, such as the PAVE checklist to help assess the four risk elements

•Use a personal checklist, such as the “I’M SAFE” checklist, to determine personal risks.

Why Use Scenario-Based Training?

- Draft PTS revisions for **Risk Management** include the following:

The applicant should:

•Use weather reports and forecasts to determine weather risks associated with the flight.

•Explain how to recognize risks and how mitigate those risks throughout the flight.

•Use a tool such as the “5-P” model to assess the risks associated with each of the 5 factors.

•Explain how risks are likely to change as the flight progresses and options for mitigating those risks.

Why Use Scenario-Based Training?

- Draft PTS revisions for **Task Management** include the following:

The applicant should:

•Explain how to prioritize tasks in such a way to minimize distractions while flying the airplane.

•Complete tasks in a timely manner considering the phase of flight without causing a distraction from flying.

•Execute all checklists and procedures in a manner that does not increase workload at critical times, such as intercepting the final approach course.

Why Use Scenario-Based Training?

- Draft PTS revisions for **Situational Awareness** include the following:

The applicant should:

•Explain the SA concept and factors which may reduce awareness.

•Explain risks associated with becoming fixated on a problem to the exclusion of other aspects of the flight.

•Explain current situation at any time during the flight in such a way that displays an accurate assessment of current and future status of the flight, including weather, terrain, traffic, ATC, fuel and airplane.

•Use navigation, traffic, terrain, weather displays and other features of installed technology to maintain an accurate awareness of the current situation and any reasonably anticipated changes.

Why Use Scenario-Based Training?

- Draft PTS revisions for **CFIT** include the following:

The applicant should:

•Use current charts and procedures during planning to be aware of potential hazards along the route and plans the intended flight path to avoid unnecessary risks associated with terrain and obstacles.

•Explain the terrain display, TAWS and/or GPWS as installed in the airplane.

•Use the terrain, TAWS and/or GPWS of the navigation displays to maintain awareness and avoid terrain and obstacles.

Why Use Scenario-Based Training?

- Draft PTS revisions for **CFIT** include the following:

The applicant should:

•Plan departures and arrivals to avoid terrain and obstacles.

•Consider time of day, meteorological conditions, and aircraft performance to avoid terrain and obstacles. (i.e.: How would takeoff profile differ at night?)

•Monitor plan and alter flight as necessary to avoid situations that have terrain or obstruction implications.

•Plan any course diversion, for whatever reason, in such a way to ensure proper terrain / obstruction clearance to the new destination.

Why Use Scenario-Based Training?

- Draft PTS revisions for **Automation Management** include:

The applicant should:

•Explain how to recognize current autopilot/FMS mode of operation.

•Explain how to recognize anticipated and unanticipated mode or status changes of the autopilot/FMS.

•State at any time during the flight the current mode or status, and what the next anticipated mode or status will be.

•Use the autopilot/FMS to reduce workload as appropriate for the phase of flight, during emergency or abnormal operations.

•Recognize unanticipated mode changes in a timely manner and promptly return the automation to the correct mode.

Why Use Scenario-Based Training?

- Back to the piano analogy:
  - Is flying more like a piano recital, perfecting a known arrangement;

    or

  - Is it more like taking requests at a party, where we are expected to accommodate and competently play whatever the guests want to hear right now?

Why Use Scenario-Based Training?

- Today's pilot needs the skills that SBT helps you teach most effectively! Consider these examples:

  - A pilot learns to fly in a 1978 C-172, then wishes to rent a 1998 C-172 with autopilot and GPS. Is he equipped to handle the technology?

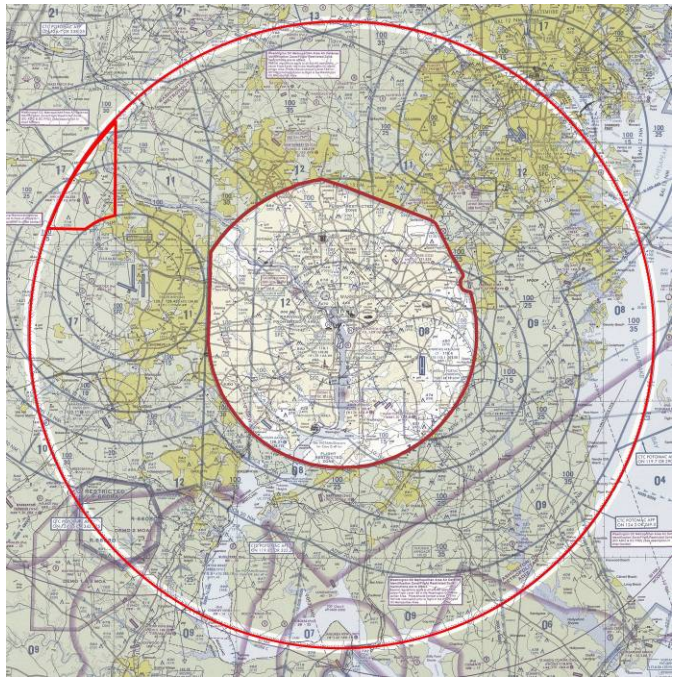
  - A pilot learns to fly in Kentucky; then moves to Southern California. Is she equipped to handle the differences?

  - A pilot learns first in a C-182 then upgrades to a SR-22. Will you teach just the numbers, or will you include SBT sessions on how, and when, to use the ballistic parachute?

Why Use Scenario-Based Training?

•SBT will help you give your customers the ability to:

- Identify and analyze new situations – new aircraft, new geography, new airspace.
- Develop alternatives and select the alternative most appropriate for the current flight.
- Evaluate the decision, while flying and managing airspace, weather, aircraft control, navigation, and communication.



How Do I Conduct Scenario-Based Training?

- SBT requires a different approach. The "unfamiliar" might initially be "uncomfortable," and it can sometimes take a little longer. BUT:
  - The results are well worth the effort.
  - SBT makes training more interesting for both you and your clients.
  - SBT lets you be creative!

How Do I Conduct Scenario-Based Training?

- Key differences between SBT and traditional training:
  - •Developing more comprehensive lesson plans
  - •Creating a real-world context for maneuvers
  - •Providing opportunities for decision-making during training.
  - •Emphasizing objectives and completion standards:

What do you really want the pilot to learn from this particular session?

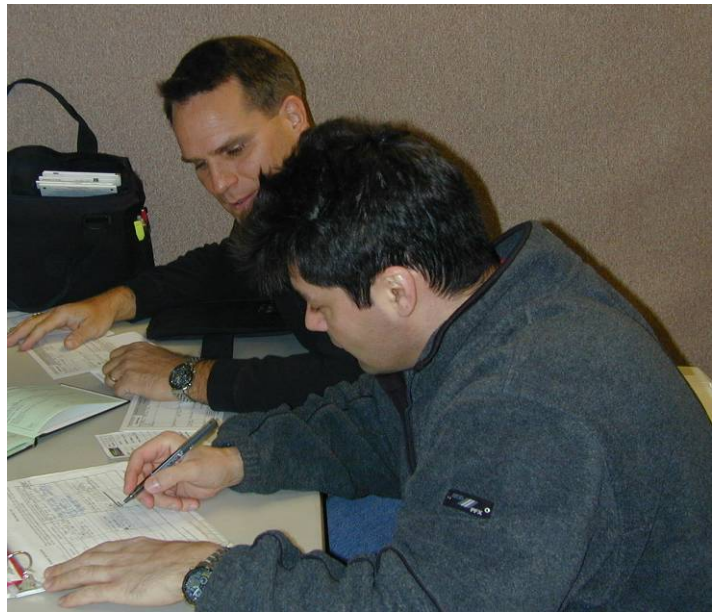
How Do I Conduct Scenario-Based Training?

Instructor Preparation:

- Develop scenarios and consequences that are *realistic*, as well as *relevant* to the kind of flying your customer will be doing. :
  - Fly to a nearby airport (no more “practice area”).
  - Find a realistic reason for the flight (ballgame, Angel Flight).
- Organize the maneuvers to be taught / reviewed along the way.
- Plan how to use time and available technology most effectively.
- List objectives and completion standards.
- Record the client’s decisions during a flight for discussion during the post-flight debriefing.

How Do I Conduct Scenario-Based Training?

Preflight Action with Customer:



- •Review homework assignment.
- •Preview the entire flight.
- •Discuss objectives / completion standards.
- •Ask questions:
  - •How will you get there?
  - •What information/equipment do you need?
  - •What hazards must you consider?
- •Address any customer questions or concerns.

How Do I Conduct Scenario-Based Training?

Preflight Action with Customer:

IMPORTANT: Let the customer make decisions!

- For example: "What altitude have you chosen? How did you decide? Could we go higher? Lower?

- Did the pilot use all necessary tools and resources to make an appropriate choice?

  - Current weather briefing
  - Terrain awareness
  - Regulations (VFR cloud clearance, airspace constraints)

How Do I Conduct Scenario-Based Training?

Preflight Action with Customer:

Risk Management:

•Use the Preflight Risk Checklist before *every single flight.*

•Pilots must understand how different factors affect a safe flight.

•Only by comparing scores from flight to flight can the pilot see the effects of different risk elements.

•Consistency forms this critical habit.

How Do I Conduct Scenario-Based Training?

Inflight Action

- Let the customer do the work! Unless safety of flight is at risk:
  - Keep your hands in your lap.
  - You should not talk on the radio.
  - You should not “help.”
  - You should not dial in radio, handle flaps, or trim.
- Ask questions, and lead the pilot to discover options/possibilities.
  - Let the pilot carry out decisions unless safety of flight is at risk.
  - Record pilot decisions & actions during the flight.
- Look for, and exploit, “teachable moments” that arise during the flight, but stay focused on lesson objectives.

How Do I Conduct Scenario-Based Training?

Inflight Action

- Look for an overall progression toward greater pilot independence:
  - Landing with instructor assistance on Flight 1 is expected and appropriate…
  - …but if you are considering a first solo, the pilot should be able to land with no coaching or assistance from you.

How Do I Conduct Scenario-Based Training?

Postflight Action

- Traditional model is “sage on the stage:”
  - Instructor does all the talking.
  - Student passively listens.
  - Instructor issues grades.
- Effective SBT uses “collaborative critique.”
  - Start by asking pilot to verbally replay the flight, and reflect on her actions, performance, and decisions.
  - This method develops self-awareness, and gives the instructor a clearer picture of the pilot’s judgment ability.

How Do I Conduct Scenario-Based Training?

Postflight Action: Assessment ("grading") for

Single Pilot Resource Management :

- **Explain** (similar to rote)
- **Practice** (similar to application)
- **Perform** (similar to understanding)
- **Manage/Decide** (similar to correlation)

- Any grade can be "passing," depending on phase of training:

  An ability to explain landings is fine for Flight 3…but not for a pilot nearing the first solo!

How Do I Conduct Scenario-Based Training?

Postflight Action: Assessment ("grading") for Maneuvers:

DESCRIBE: Pilot can describe the physical characteristics/cognitive elements of the maneuver / scenario activity, but requires your assistance to execute the maneuver successfully.

EXPLAIN: Pilot can explain the underlying concepts, principles, and procedures, but still requires your assistance to execute the maneuver successfully.

PRACTICE: Pilot can plan and execute the scenario / maneuvers, while you provide coaching and assistance to correct deviations and errors.

PERFORM: Pilot can plan and execute the scenario / maneuvers without your assistance or coaching. The pilot identifies and corrects errors and deviations.

Where Can I Learn More?

FAA
http://www2.faa.gov/education_research/training/fits/

Arlynn McMahon
www.aerotech.net

Note: This presentation is largely based on materials developed by Arlynn McMahon of Aero-Tech, Inc. Our sincere thanks to Ms. McMahon and Aero-Tech, Inc. for making these materials available to the general aviation training community.