Summary of all PPC Missions as of July, 2018

Welcome. This document includes all of the lesson plans for the 30 missions available to pilots in training (P-I-T's) at the Pilot Proficiency Center (PPC). We have made several improvements to the simulation training initiative and are as follows:

Missions | Scenarios | Exercises | Bundles

Beginning this year all simulation sorties available at the Pilot Proficiency Center (PPC) are classified as Missions. Missions are then further classified as as either Exercises or Scenarios. Select combinations of Missions have been grouped together thematically as Bundles. The primary reason for this change is to be more consistent with the traditional classification used with the Lockheed Prepar3d simulator software and Redbird's Navigator platform.

Scenarios are missions that require judgment skills in order to complete. They typically begin and terminate on the ground, and tend to run longer than other Missions. Exercises are skill building missions focused on a specific practice; e.g., approaches, crosswind landings, etc. These are usually shorter in duration than and end-to-end Scenario flight and can be used repetitively.

Competency Bundles are essentially prepackaged collections of existing Exercises and Scenarios that have been grouped together based on subject matter. As an example one of the Bundles is the "IFR Approach Medley" which consists of four exercises that offer an array of instrument approaches.

GPS Approaches

All of the Redbird AATD's at the PPC are capable of flying RNAV (GPS) approaches, including WAAS. Each lesson plan refers to opportunities for the option.

Experimental Transition Training

We've added three Exercises to the Mission menu this year that focus on training for pilots transitioning from certified to experimental aircraft.

Debriefing with CloudAhoy

Our goal for AirVenture/PPC 2018 is to have the instructor debrief the Redbird flight using the CloudAhoy app immediately after the flight. In order to keep the flow at the PPC this debrief should be done in a couple of minutes, and for that end we optimized the initial layout of the debrief screen, on an iPad.

When the debrief of the flight starts the initial layout is displayed automatically. Each Mission has a CloudAhoy tag, which is used to determine the initial layout for the Mission. There are a total of 6 tags which imply 6 possible initial layouts: One initial layout will be used for all the IFR scenarios and five initial layouts will be used for the VFR scenarios. Each of the Missions were flown and recorded by Greg Jolda for a base line from which to calculate a relative score.

Mission Improvements

Lesson plans highlight improvements made to Missions from previous years with blue text.

MISSION: VFR #01 EXERCISE

"GETTING NIGHT CURRENT"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to experience a nighttime takeoff into a "black hole". It also reinforces the need for situational awareness even when flying in the traffic pattern.

INSTRUCTOR NOTES:

- This mission starts with the airplane situated at the end of runway 07 at KPVC. If time permits, allow the P-I-T to fly the scenario twice.
- Consider showing the pilot how to use the "OBS" button on the GPS and then turning the course indicator to 074° (the actual runway heading) to aid situational awareness, as well as XTK information.
- Alternatively consider loading and activating "VECTORS TO FINAL" for either the ILS or GPS approach to Rwy 07 to demonstrate how instruments can enhance situation awareness in VFR flight.

TRAINING ELEMENTS:

- The need to establish a proper instrument scan as soon as outside references are lost.
- Maintaining awareness of headings, altitudes, airspeeds and configurations.
- Maintaining situational awareness of position in relationship to the runway.
- Using IFR tools for VFR flight.

- Failure to establish an instrument scan when visual references are lost.
- Improper scan / fixation.
- Improper headings on traffic pattern legs.
- Failing to maintain TPA.
- Poor timing of turns.
- Failing to configure for landing (checklist usage).
- Waiting too long to initiate / failing to initiate go-around.
- Failing to clean up flaps in a go-around.

MISSION: VFR #02 SCENARIO

"SUMMER CAMPING at JOHNSON CREEK"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to experience the importance of proper leaning for a high-density altitude takeoff as well as the consequences of not leaning properly. In addition to proper leaning, proper configuration is critical to a successful takeoff. The P-I-T will then have to conduct a canyon turn for a return and landing with the possibility of the need for a go-around at the last moment because of opposing traffic.

INSTRUCTOR NOTES: Without proper leaning this scenario will be impossible to accomplish. Allow the P-I-T to conduct their pre-takeoff checklist without assistance to see if they know how to lean for best power, as well as demonstrate understanding of the adverse effect of using flaps for takeoff. If they do not understand how to lean for best power then certainly provide guidance. When it comes to conducting a 180° turn to return to the airport the slower the airspeed, the smaller the radius of the turn. This scenario is entirely possible provided the P-I-T understands all of the elements.

TRAINING ELEMENTS:

- High-density altitude, soft field takeoff.
- Proper leaning techniques to obtain best power.
- How the use of flaps in a high DA environment will degrade climb performance.
- 180° reversal in canyon (slower the airspeed, tighter the radius).
- Soft field landing.
- Potential go-around as diversion (proper leaning and configuration)

- Improper leaning technique/ failing to obtain maximum power.
- Taking off with 10° of flaps deployed.
- Trying to effect a canyon turn with a wingover.
- Attempting a 180° turn in a tight canyon at normal cruise speed,
- Setting mixture to full rich as part of landing checklist.
- Failing to clean up flaps in a go-around.

MISSION: VFR #03 SCENARIO

"SHENANDOAH SORTIE"

THE OBJECTIVE: There are just way too many fatal accidents as a result of a pilot inadvertently flying into IMC conditions. The conditions that lead to this happening are typically lowering ceilings and decreasing visibility. This scenario creates exactly those conditions. The objective is for the pilot to recognize the deteriorating conditions and conducting a 180° turn while still in VMC conditions. If the pilot waits until they are already in IMC conditions and conducts a 180° turn there is a good chance they will have a CFIT encounter.

INSTRUCTOR NOTES: The scenario has the pilot flying from Front Royal, VA to New Market, VA through a valley surrounded by mountains. With deteriorating weather there is also a strong wind from the Northwest. Soon the mountaintops will be obscured. If the pilot continues they will have to descend, eventually running out of options and having to go IMC to keep from flying in to the ground. If they continue, the weather will end up zero/ zero before they get to New Market.

The scenario begins with the aircraft at KFRR. The P-I-T has the option of never leaving Front Royal based on what they know, or don't.

If they opt to make a 180° turn after entering IMC (which is typically done to the left by most pilots) the strong Northwest wind could blow them into a CFIT with a mountain ridge. If the pilot is using good SRM they will call Potomac Approach on 120.45, which is already loaded, for assistance in getting back to VFR conditions.

In a perfect world the scenario will teach the pilot that the best time for the 180° turn is BEFORE they go IMC. If they do go IMC then the best strategy is to: 1. Get on the gauges and get control; 2. Climb; 3. Call for help: 4. When, if they turn use no more than a 10° bank.

The mission ends when: either the pilot turns back before encountering IMC conditions; climbs, calls for help and get's back to VMC conditions; or crashes.

TRAINING ELEMENTS:

- ADM making the decision to turn around before encountering IMC conditions.
- SRM using all available help (Autopilot, ATC).
- Situational awareness Where is the terrain? Where is the wind? What is the weather doing?
- Basic attitude flying: straight and level; turns; climbs; descents.
- Proper scanning techniques.
- Communication skills.

- Failing to reverse course while still VMC.
- Making a180° turn shortly after entering IMC.
- Not accounting for wind when making turn.
- Banking too steeply in the 180° turn, (This is where many pilots loose control in the real world.)
- Not making use of all available resources.
- Improper / poor instrument scanning techniques.
- Improper power settings, pitch attitudes, bank angles.

MISSION: VFR #04 **EXERCISE**

"FISK ARRIVAL at KOSH"

THE OBJECTIVE: This exercise is perfect for the pilot that is new to flying an ATD. It starts airborne at 1800' on the published FISK VFR Arrival 6.5 miles SE of KOSH and just outside FISK where they can follow the NOTAM'd arrival to a right downwind for landing on Runway 27 at Oshkosh.

INSTRUCTOR NOTES: The exercise provides an excellent opportunity for the pilot to get familiar and comfortable with the controllability/ maneuverability of the Redbird C172. You can suggest to the pilot that they "play" with the airplane, flying anything from S-turns over the tracks leading to OSH, 180° turns at banks anywhere from shallow to steep, some slow flight and/or stalls and recoveries. In other words give them some time to get used to the sights, sounds, and feel of flying the ATD.

By the time they get to the downwind leg for Runway 27 they should have already developed some sense of how the ATD flies. For their first landing just allow them to get it on the runway with some sense of control. Ideally there will be enough runway left for them to do a touch and go, remaining in the pattern for a second landing. On this second landing, if their ATD control demonstrated the requisite skill, suggest that they land on either the orange or green circle. Ideally, the pilot will now feel ready to move on to their other selected scenarios(s).

- Getting familiar with the controllability/maneuverability of the Redbird C-172 ATD.
- Recognizing that "force feedback" in the controls will not replicate the control feel of a "real" airplane.
- The importance of the use of trim to successfully fly the ATD.
- Understanding the importance of the integrated visual elements necessary to fly the ATD.
- Overcoming the "this doesn't fly anything like MY 172" reaction (AKA "suspend the disbelief").

• A stabilized final approach in the ATD is no different than one in a "real" airplane. If it is "on spot", (meaning that the chosen aim point on the runway is not moving up or down in the window) and on speed (meaning that the proper approach speed for a given configuration is maintained) it will land just beyond the aim point.

- Over-controlling. It might require that you the CFI will have to "stabilize" the controls, holding some pressure on the controls, to keep the pilot-in-training from over-reacting to every little departure from stabilized flight
- Fixating on the instruments (more so in the G1000 panel than the legacy panel ATD).
- White knuckles on the controls, preventing the P-I-T from being able to properly trim the ATD.
- Failure to pick an aim point on the runway for glide slope guidance.
- Improper techniques for maintaining glide slope and airspeed on final approach.

MISSION: VFR #05 **EXERCISE**

"PLENTY OF SPICE at SPICEWOOD"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to practice cross wind landing skills during the descent, flare and rollout to a narrow runway with minimal visual cues.

INSTRUCTOR NOTES: From a left base the P-I-T must transition to the extended runway centerline in a crab or side slip and fly a proper descent profile without a VASI or PAPI. Additionally, the airport sits on a bluff, giving the pilot the illusion of being high on the approach. To fly this scenario competently, the pilot must pick an aim point and manage the glide path by eye while also landing on the centerline in a left crosswind.

TRAINING ELEMENTS:

- Anticipating the wind effect in the base-to-final turn
- The potential for a stall/spin loss of control
- Establishing a slip or a crab to track the extended centerline during the descent
- Flying to an aim point: the spot in the windshield that does not move
- Managing a proper glide path where there is a strong visual allusion that will tend to make the pilot think they are too high
- Using pitch and power in coordination to be on speed and glide path crossing the fence
- Sharp awareness of the runway centerline during the flare, touchdown and roll out

- Failing to account for wind in the turn to final and going through centerline
- Failing to maintain coordination in the turn
- Improper slip or crab technique to remain aligned with the runway centerline
- Tendency to react late and make large corrections due to improper use of pitch and power
- Failing to maintain reference to an aim point to maintain the glidepath
- A tendency to relax and lose the centerline during the flare and rollout

MISSION: VFR #06 EXERCISE

"THE ULTIMATE SHORT FIELD LANDING"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to practice a spot landing and short field technique.

INSTRUCTOR NOTES: Because the exercise uses a carrier deck to enhance the challenge, the P-I-T must fly the recommended short field speed to minimize aircraft energy at the flare. The P-I-T must establish an aim point that leads to touchdown precisely at the end of the runway. There is also an OLS (meatball) visible on the left side of the deck to provide glide path guidance. A very strong headwind requires the P-I-T to manage pitch and power properly to compensate for low ground speed during the descent.

TRAINING ELEMENTS:

- Anticipating the headwind effect on the descent and using pitch and power to stay on speed and profile during a long approach
- Establishing minimum airspeed of 61 KIAS on or before short final
- Flying precisely to an aim point: the spot in the windshield that does not move
- Managing the sink rate and flare to prevent float or bounce and retracting flaps immediately to increase braking effects if needed
- Flying on the backside of the power curve (the area of reverse command).

- Inconsistent glide path and speed on the descent leading to float or "chop and drop" over the numbers.
- Insufficient attention to airspeed during the scan and a tendency to get slow as the pilot pitches up to stay on glide path in a stiff headwind/ slow ground speed situation
- Poor energy management and a tendency to drag it in, requiring excess power and nose high attitude
- Tendency to react late and make large corrections instead of making fine adjustments all the way through the approach and landing
- Failing to pick and maintain reference to an aim point to keep the glide path constant and/or uncoordinated use of pitch and power
- Failing to retract flaps on touchdown to facilitate braking

MISSION: VFR #07 EXERCISE

"HELLO, CLEARANCE..."

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to practice basic ATC communications in two Class C and one Class B airport environments. Live ATC provided by remote controllers enhances the reality of copying and reading back clearances accurately.

INSTRUCTOR NOTES: There are three sub-missions, which should be done in sequence. The instructor will need to reposition the ATD for each sub-scenario, thus the Navigator will have three Mission 7 settings (VFR 7 - BUR, VFR 7 – SNA, VFR 7 – LAX).

- At Burbank, the P-I-T will call clearance for VFR flight following to Bakersfield at 8,500. Instructions will be "After departure intercept and parallel the Golden State Freeway northwest bound until advised. Keep the freeway off your right at all times, Departure frequency 134.2, squawk ."
- 2) At John Wayne, call clearance for VFR flight following to Santa Monica at 3,000. Instructions will be to "fly heading 220, maintain VFR at or below 2400 until advised, departure frequency 128.10" squawk ____
- 3) Finish up on the south ramp at LAX with a call to clearance for a VFR departure to the southeast along the shoreline, negative advisories (no flight following). Instructions will be, "Cleared out of the Los Angeles Class Bravo Airspace. Make a Left Crosswind departure at the shoreline, maintain VFR at or below 2500" (no squawk or dep freq).

Once the P-I-T has correctly read back the clearance and properly entered the requisite frequencies and squawk code stop the sub-scenario and reposition the airplane to the next airport.

- Understanding what the P-I-T must tell Clearance Delivery in the initial call and organizing the information before keying the mic
- Developing a system for capturing the Clearance in an organized way: CRAFT
- Clear, orderly read backs

- Understanding that a read back does not need to be done until the pilot fully understands the clearance. If needed, "Standby for read back" is appropriate
- Setting up the airplane with the clearance information and confirming the settings before calling for taxi

- Speaking without thinking ahead and taking more time than is necessary
- Only giving a portion of the required information in the call up or read back, requiring the controller to ask questions and clarify
- Copying the clearance incorrectly or not having a framework for anticipating what information is coming
- Reading back immediately when the pilot needs clarification or must confirm some feature of the clearance before read back
- Reading back out of order
- Failing to load all of the appropriate data into aircraft systems
- Failing to complete a final check of that data before taxi

MISSION: VFR #08 EXERCISE

"READY to TAXI"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to practice complex taxi instructions at Long Beach, CA (KLGB), a 5-run-way airport.

INSTRUCTOR NOTES: The aircraft is at the FBO on the west ramp at Long Beach. The assumption is that the pilot has already gotten the ATIS that indicates departures on Runway 25R. Call ground (133.0) and request taxi to runway 25R for a straight out departure. If the P-I-T is efficient, they can contact tower at 25R (120.5) and call for takeoff. The mission ends once they reach ~500' MSL, or they can terminate upon reaching the runway with the taxi complete.

TRAINING ELEMENTS:

- Understanding the Airport Diagram and studying possible routes to the intended runway
- Capturing taxi instructions accurately and reading back taxiway assignments, hold short and crossing instructions.
- Determining that the instructions make sense after reading them back and calling for clarification if needed

- Speaking without thinking ahead and taking more time than is necessary
- Only giving a portion of the required information in the call up or read back, requiring the controller to ask questions and clarify
- Copying the clearance incorrectly
- Reading back immediately when the pilot needs clarification or must confirm some feature of the clearance before read back
- Reading back out of order
- Failing to complete a final check of that data before taxi

MISSION: VFR #09 **EXERCISE**

"TO TURN or NOT TO TURN, WHAT is the ANSWER?"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to experience power failures on takeoff at a variety of altitudes and distances from the runway. This will hopefully teach the P-I-T the importance of a before takeoff briefing that includes what actions the pilot will take at numerous points along the takeoff path.

INSTRUCTOR NOTES: Although the P-I-T will be expecting a failure at some point, by varying when the failure occurs we hope to engender some form of "startle response". There will be three takeoffs, each requiring a reposition of the ATD. It is suggested that the first failure will be prior to rotation or no more than 50° AGL, the second at 500° AGL, and the third at 1200° AGL.

In addition the pilot will also have to deal with high-density altitude, which can at times reach 8000' at McCall, a crosswind (210 @ 12 KTS), as well as the potential for other aircraft being present. The Chart Supplement advises runway 16 for takeoff and runway 34 for landing.

Be sure to suggest to the P-I-T as part of the post-flight debrief that they carry the same mentality they had flying the scenario (expecting a failure at any moment, from start of takeoff roll to reaching cruise altitude) in every takeoff that they conduct for real!

- The importance of briefing for the potential engine failure at any point from the start of the takeoff roll all the way through climb-out to an en-route altitude.
- The importance of reducing AoA immediately upon engine failure;
- Consideration of the many factors (wind, altitude, distance from useable runway, density altitude, etc.) that need to be considered for a successful outcome.
- The relationship between angle of bank/pitch vs time/altitude lost in a course reversal.

- Choosing off airport landing sites.
- Use of emergency checklists (memory items pre-briefed) if time permits.

- Failure to reduce Angle Of Attack immediately.
- Turning back without sufficient altitude.
- If turning back, turning away from the wind.
- Lack of coordination (stall/spin) in the turn back.
- Too high airspeed in off airport landing.
- Failure to complete emergency items. (Fuel off; master off after flaps; door cracked open; declare "mayday"; etc,) time permitting.

MISSION: VFR #10 EXERCISE

"ABRUPT GLIDER TRANSITION"

THE OBJECTIVES: This exercise provides the PIT with the opportunity to deal with an engine failure at altitude. It should drive home the importance of a pilot's priorities: aviate; navigate, communicate.

INSTRUCTOR NOTES: With the engine failing over the San Marcus VOR at 6500', reaching the Santa Barbara airport, which is only 6 miles away, is not a problem. However there are many other challenges, including: Situational awareness; checklist usage; planning the glide with winds that change, from 300 @ 13 kts at altitude to 140 @ 10 kts on the ground (these were the actual winds at the time of the writing of this mission); communications (at the start of the exercise Com 1 is tuned to the SBA TRACON); avionics management (communication and navigation); etc.

TRAINING ELEMENTS:

- Establishing best glide speed
- Trimming to maintain best glide speed
- Choosing a landing site /ongoing situational awareness relative chosen landing spot.
- Using checklists
- Effective communication
- Managing avionics (squawking 7700; announcing mayday; using GPS for "nearest"; etc.)

- Failing to establish and <u>trim</u> for best glide speed
- Loss of situational awareness
- Failing to communicate situation effectively (declare "Mayday" on appropriate frequency; squawk 7700).
- Failing to trouble shoot (checklist usage)
- Failing to pull throttle to idle position, which could allow for an engine restart in the flare if not done

MISSION: VFR #11 SCENARIO

"OUR NATIONS CAPITAL: LOCAL PHOTO FLIGHT"

THE OBJECTIVES: This scenario provides the PIT with the challenges of navigating at a low altitude, maintaining situational awareness of airspace restrictions and "minimum safe altitudes", communicating on multiple frequencies, all of these while being distracted by a client (photographer) in the right seat, and then flying a "turn around a point" to the right with a 12 knot wind.

INSTRUCTOR NOTES: The mission starts on the ramp on the west side of KHEF. The PIT will have to call: clearance delivery (120.2) to get a SFRA squawk code; get the ATIS (125.75); Ground for taxi (121.8); tower (133.1); and finally Potomac Departure (128.525). Communication will also include announcing "on site" to Potomac as well as requesting return to HEF.

Navigational challenges begin with taxiing to the runway, and continue with flying from HEF to the golf course (5.5 NM, heading 293°) while remaining clear of the Class B airspace.

The CFI should play the role of a "demanding photographer" as well as serving as a coach for the PIT.

The scenario can end with the PIT calling "airport in sight" to the TRACON or if time permits continuing all the way to a landing and taxi to the ramp.

- Ground operations at a busy Class D airport
- Operations within the DC SFRA
- Avionics management (recommended that ATC (Tower / TRACON) be on Comm #1 and all "ground" (ATIS, CLRNC DEL, Ground Control, etc.) be on Comm #2.
- Low altitude navigation / MSA regulations
- Situational awareness of airspace (Class B and D)
- Ground reference maneuvers
- CRM (sterile cockpit when/as necessary)

- Poor situational awareness
- Poor avionics management
- Poor communication

- "Busting" airspace
 "Busting" altitudes
 Not accounting for wind in "turn around a point"

MISSION: VFR #12 SCENARIO

"ANGEL FLIGHT"

THE OBJECTIVE: This scenario presents a variety of challenges: departing from Runway 36L, a 3152' X 40' runway in poor condition; winds are 290° @ 12KTS; 25' trees at the immediate end of the runway; surfaced based Class B airspace less than a mile to the east.

INSTRUCTOR NOTES: In this mission the pilot has already been in touch with the Cleveland TRACON and assigned a squawk code of 5734 and a departure frequency of 119.625. Because the surface based class B airspace is less than a mile to the east the pilot will have to turn westbound and gain clearance into the Bravo before heading to KBKL. Because of time limits to this scenario the mission can end when the pilot calls KBKL in sight. If the P-I-T continues to fly the scenario to the destination airport, they will have to get the ATIS at KBKL, and call the tower at the appropriate point.

TRAINING ELEMENTS:

- Reviewing Class B airspace and the entire route as it relates to this scenario considering TFRs
- Communicating with TRACON to receive proper clearance prior to entering Class B airspace
- Determine required frequencies and setting up radios
- Think about what will be said to each controller as one transits the route
- Deciding on how best to use navigation and other avionics in the aircraft to minimize workload and maximize situational awareness
- Using pilotage as a primary navigation technique (IFR I Follow Railroads)
- Determining aircraft takeoff distance to ensure a safe takeoff can be made and consider doing a short field takeoff
- Completing a crosswind takeoff

COMMON ERRORS:

• Not understanding the correct phraseology for entry into Class B airspace

- Entering Class B airspace prior to obtaining permission
- Failure to check NOTAMs for any issues preventing a safe landing at the airport.
- Not understanding how to correctly accomplish, or not proficient performing a short field takeoff
- Not understanding how to correctly accomplish, or not proficient performing a strong crosswind takeoff
- Not checking for active TFRs

MISSION: VFR #13 EXERCISE

"BUCKEYE BATTLE"

THE OBJECTIVES: To provide the pilot-in-training with the opportunity to improve and perfect their accuracy landings both with the use of power as well as with power at idle.

INSTRUCTOR NOTES: The exercise will start with the airplane having just turned from crosswind to downwind for Runway 9L. The first landing will be a power on landing followed by a touch and go. For the second landing power is reduced to idle when abeam the landing "zone".

In National Intercollegiate Flying Association (NIFA) contests the contestant is allowed one power application after reduction of power to "clear the engine". Also in the contests the contestant is required to fly a rectangular pattern and loses points for failing to do so. Points are also lost if flaps are retracted after initial deployment. However for this exercise we'll have pilots fly it as they would for the commercial certificate "power-off 180° accuracy landing". Thus a "circular" pattern will be accepted as well as s-turns along with the use of flaps "as needed" to achieve the goal of touching down as close to the "line" as possible.

Please note that this is NOT Valdez. We are not looking for backside of the power curve, drag it in, approaches, but rather a stabilized, on spot /on speed normal landing using good situational awareness to achieve it.

- Improving situational awareness relative to an accuracy landing,
- The importance of the relationship of the aircraft to the landing spot and how to determine if / when / what changes need to be made to achieve accuracy.
- For power on landing, proper coordination of pitch and power to maintain a stabilized glide path to the landing spot.
- For power off landing, the adjustment of flight path, along with configuration changes to achieve accuracy.
- The importance of maintaining appropriate airspeeds.

- Failure to correlate sink rate with distance to landing spot.
- Failure to account for headwind on final and how to correct for it.
- Poor situational awareness relative altitude, distance from runway / landing spot, airspeed, configuration, winds, etc.
- Poor airspeed control
- Extending the downwind leg too far.
- Turning base too soon.
- Turning final when too high, rather than flying through the extended center line and s-turning back, as needed.
- Fixation on landing spot.
- Trying to stretch the glide.
- Failure to trim as necessary

MISSION: VFR #14 **EXERCISE**

"LOS BRAVOS: FLYING the LAX CLASS B"

THE OBJECTIVE: To provide the P-I-T with the challenges of flying a published route through the Los Angeles Class Bravo Airspace. The challenges include: situational awareness; communications; electronic navigation; and pilotage.

INSTRUCTOR NOTES: The mission begins airborne over BAYST intersection at 3500' MSL. From this position the pilot will have to call SMO tower, reporting their position and requesting the "mini-route" transition prior to entering their Class D airspace. SMO tower will provide a squawk code and instruct the pilot to fly overhead at 2500' and join the route. They will also caution to remain outside the Bravo until cleared. Crossing overhead SMO the pilot will be instructed to contact "LAX helicopters" on 119.80. LAX Helicopters will clear them into the Bravo and request reporting "passing overhead KLAX". Once overhead KLAX radar service will be "terminated , but keep the code" and they will be handed off to KHHR Tower (121.1). Pilot should advise KHRR of intentions to land at KTOA. KHRR will hand off to KTOA Tower (124.0) who will advise to "enter right downwind for RWY 29R".

- Reviewing Class B airspace as it relates to this exercise
- Based on your review determining the best way to navigate to entry point for the Mini-Route
- Determine required frequencies and setting up radios
- Think about what will be said to each controller as you transit this route
- Deciding on how best to use navigation and other avionics in the aircraft to minimize workload and maximize situational awareness

- Misreading or not understanding the chart and the directions for the route selected
- Failing to take a macro view of the flight and then breaking it down into smaller pieces
- Failure to understand the difference between the various controller's and how they fit into the routing process
- Lack of familiarity with a higher traffic environment and the communication skills required to effectively and efficiently communicate with the various controllers
- Setting wrong course indicator / OBS heading for intercepting "LAX R-323""

MISSION: IFR #01 EXERCISE

"EASY DOES IT INTO LONG BEACH"

THE OBJECTIVE: This mission is designed to introduce beginning or low time instrument pilots, or for that matter highly skilled instrument pilots who have never flown an AATD, to flying an instrument approach in somewhat benign conditions. It is also an opportunity to introduce the pilotin-training to the control/performance numbers vis-à-vis pitch, power and configuration that are requisite to flying a stabilized approach without chasing airspeeds or attitudes. Additionally, it can be used to introduce an instrument pilot to the G1000 or a GPS WAAS approach if they have never flown one before.

INSTRUCTOR NOTES: The mission starts in the air southwest of KLGB (see the website for details). Conditions favor Rwy 30 and the P-I-T may choose the ILS or LOC, or the RNAV approach. After checking in with SOCAL and requesting your approach you'll receive a squawk code and then vectors to final. It will be difficult for you, as the CFI, to know if the P-I-T is skidding turns to remain on the localizer without keeping an eye on the inclinometer. Be sure to show the P-I-T the XTK info, either in the G100 HSI display, or the CDI display of the GNS 530, that will provide situational awareness of perpendicular distance to the final approach course.

- Introducing the P-I-T to the controllability/maneuverability of the AATD.
- Introducing the P-I-T to the G1000.
- The use of proper pitch/power/configuration to obtain requisite performance without "chasing" airspeeds, or glide slope.
- Developing a good scan.
- Developing situational awareness (Where am I? What's next? What has to be done when I get there? What can I be doing now to prepare?)
- Properly and sequentially briefing the approach.
- Proper avionics set-up for flying the approach.
- Communicating with ATC.
- Proper use of an HSI (if first time using one.).
- Proper automation management (optional).
- Proper management of step-downs on approach w/o glidescope.

<u>COMMON ERRORS</u>:

- Over controlling
- Fixation / failure to maintain instrument scan
- Loss of situational awareness (distance from final approach course / relationship to glide slope [below/above/ on] while on vectors.
- Flying through final approach course
- Failure to properly brief the approach
- Improper setup of avionics.
- Failure to adhere to ATC instructions in a timely manner.
- Allowing ATC to distract from flying the airplane.
- Tracking glide slope before "established"
- Not using known control/performance numbers to establish a stabilized approach.
- Skidding turns/using rudder to maintain localizer.
- Using power to maintain glideslope.
- Failure to set heading bug to reference heading.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #02 EXERCISE

"HERE COMES THE WEATHER"

THE OBJECTIVE: This mission is designed to challenge instrument pilots to fly an instrument approach in typical IFR conditions. The P-I-T or instructor may choose from the LDA DME, ILS or LOC, or RNAV (GPS) Y to Rwy 20R. All three will have their challenges. For example the LDA provides lateral guidance to track inbound but step-downs and an offset approach course will test their situational awareness and reinforce "raw data" scanning. The RNAV (GPS) Y is a straight-in WAAS approach.

INSTRUCTOR NOTES: This exercise begins airborne Northwest of KSNA. Before you start the mission discuss the approach options, choose an approach and brief it. Then check in with SOCAL and get a new squawk from PilotEdge controllers and request a VTF clearance. It will be difficult for you, as the CFI, to know if the P-I-T is skidding turns to remain on the localizer without keeping an eye on the inclinometer.

Be sure to show the P-I-T the XTK info, either in the G1000 HSI display, or the CDI display of the GNS 530, that will provide situational awareness of perpendicular distance to the final approach course. Show them how they can "sync" the heading bug for their reference heading on the approach. Also coach them to set the altitude bug for reference. If the pilot chooses to use the autopilot for vertical flight ensure that they re-set the altitude pre-select bug as soon as practicable after capturing each successive altitude in the step downs.

- P-I-T will improve controllability/maneuverability skills in the ATD
- Introducing the P-I-T to glass panel technology if their first time flying the G1000.
- The use of proper pitch/power/configuration to obtain requisite performance without "chasing" airspeeds.
- Developing a good scan, particularly if the panel is not typical for them

- Developing situational awareness in this step-down, offset localizer approach. (Where am I? What's next? What has to be done when I get there? What can I be doing now to prepare?)
- Properly and sequentially briefing the approach.
- Proper avionics set-up for flying the approach.
- Communicating with ATC.
- Proper use of an HSI (if first time using one.).
- Proper automation management (optional).

- Overcontrolling
- Fixation / failure to maintain instrument scan
- Loss of situational awareness (distance from final approach course, progress and position in the step-downs)
- Flying through final approach course
- Starting descent before "established"
- Failure to properly brief the approach
- Improperly setup avionics.
- Failure to adhere to ATC instructions in a timely manner.
- Allowing ATC to distract from flying the airplane.
- Not using known control/performance numbers to establish a stabilized approach.
- Skidding turns/using rudder to maintain localizer.
- Failure to set heading bug to reference heading.
- Failing to re-set the altitude pre-select (if using autopilot) upon reaching and capturing each step down altitude
- More than ³/₄ scale deflection of CDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #03 SCENARIO

"MAKE IT RAIN"

THE OBJECTIVE: To provide the P-I-T with a realistic simulation scenario demanding a high degree of situational awareness and decision making. Everything will be happening quickly, thus the P-I-T will have to be able to prioritize their actions in order to keep up with the fast pace of the scenario.

INSTRUCTOR NOTES: We have combined two missions from previous years into one. This mission is a scenario which means that the P-I-T is the PIC and judgement is required in order to complete the flight. The mission starts on the ground at KSNA (see website for details). The clearance will be "heading 220°, vectors SLI, direct, climb 2000' expect 4000' 5 minutes after departure, Departure frequency 128.10, squawk____". The winds at KTOA are westerly and the P-I-T may choose the ILS or LOC, RNAV (GPS) for Rwy 29R. Be sure to show the P-I-T the XTK info, either in the G1000 HSI display, or the CDI display of the GNS 530, that will provide situational awareness of perpendicular distance to the final approach course. The instructor or pilot may verbally declare the necessity for a missed approach or the instructor can induce reduced visibility via the Navigator instructor station to make a missed approach absolutely necessary.

- Effectively communicate with ATC on the ground, tower and approach control frequencies
- Reviewing all necessary information for departure and arrival airports
- Correctly assess position on the airport and safely and correctly taxi to departure runway
- Based on assigned departure procedure set up avionics to efficiently manage the fast pace of this instrument departure
- Set-up avionics correctly for this fast paced IFR approach and arrival at destination to minimums
- Review and brief the potential for having to execute a missed approach
- Automation management (if pilot chooses to use autopilot)

- Asses the environment at the destination airport well in advance and choose the best approach for a successful landing.
- Choosing the approach based on weather, pilot capability and aircraft performance.
- Brief the approach, including the missed procedure.

- Failure to completely brief the information required to safely and effectively complete this scenario
- Failure to brief airport diagram and or fail to follow taxi instructions
- Asking for, understanding and copying clearance
- Avionics set-up to handle communication and navigation efficiently
- Failure to brief approach procedure to include missed approach procedure
- Lack of familiarity with the avionics and associated buttonology
- Improper programming of autopilot.
- Failure to confirm autopilot mode in the annunciator panel.
- Communicating with and understanding communications with ATC
- Allowing ATC to distract from flying the airplane.
- Tracking glide slope before "established"
- Not using known control/performance numbers to establish a stabilized approach.
- Skidding turns/using rudder to maintain localizer.
- Using power rather than pitch to maintain glideslope.
- Failure to set heading bug to reference heading.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #04 **EXERCISE**

"WE HAVE CLEARANCE, CLARENCE"

THE OBJECTIVE: The primary goal is to transition from a precision ILS to a circle to land. The pilot needs to be aware of the circling minimums and the maximum distance from the airport that is permitted during the circling, so as to be afforded terrain and obstacle protection. They also need to be aware of, and prepared for, a missed approach should they lose sight of the runway / climb back into the overcast. This is similar to the Easy Does It mission with the exception of the runway change.

INSTRUCTOR NOTES: The exercise begins a few miles south of the LGB ILS RWY 30 localizer with an assumed clearance to Long Beach. Prior to calling SOCAL Approach the pilot checks the ATIS only to learn that RWY 30 is closed and to expect the ILS 30 circle-to-land RWY 25L. The pilot checks in with SOCAL approach as if they'd just been handed to this frequency from the previous controller. The pilot will request the ILS RWY 30 approach with a circle to RWY 25L. The controller issues a new squawk code (since the ATD starts out squawking VFR) and vectors them to the final approach course. The weather is at circling minimums.

The mission ends after they have exited runway 25L.

- The use of proper pitch/power/configuration to obtain requisite performance without "chasing" airspeeds, or glide slopes.
- Developing a good scan.
- Developing situational awareness (Where am I? What's next? What has to be done when I get there? What can I be doing now to prepare?)
- Properly and sequentially briefing the approach
- Using the circling minimums rather than straight-in minimums
- Maintaining at or above MDA until in a position to make a continuous descent to land
- Automation management (if using autopilot)
- Being aware of the limits of the terrain protection afforded during circling based on the category of aircraft

- Being prepared to fly the missed approach if loosing sight of the runway.
- Proper avionics set-up for flying the approach.
- Communicating with ATC.
- Proper use of an HSI (if first time using one.).
- Proper automation management (optional).

- Overcontrolling
- Fixation / failure to maintain instrument scan
- Loss of situational awareness (distance from final approach course / relationship to glide slope [below/above/ on] while on vectors.
- Flying through final approach course
- Improper autopilot programming
- Failure to confirm autopilot mode in annunciator panel
- Failure to properly brief the approach
- Improperly setup avionics.
- Failure to adhere to ATC instructions in a timely manner.
- Allowing ATC to distract from flying the airplane.
- Not using known control/performance numbers to establish a stabilized approach.
- Skidding turns/using rudder to maintain localizer.
- Using power to maintain glideslope.
- Failing to maintain visual contact with runway during circling / climbing back into overcast.
- Failing to establish the aircraft on final for the new runway on speed and on altitude for a normal landing
- Failure to set heading bug to reference heading.
- Failure to use altitude bug for reference.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #05 **EXERCISE**

"LEAST ONEROUS ROUTE"

THE OBJECTIVE: This exercise is designed to instill the importance of knowing what Obstacle Departure Procedures (ODP) are and when to expect the procedure. When is a pilot required to fly an ODP, if at all, and when might you expect one from ATC?

The objective is for the P-I-T to copy a clearance with an ODP, understand what the procedure is, where to find the procedure, and how to execute the procedure. Learning how to pre brief the airport departure and knowing what to expect is half the battle. Finding out what the standard departure procedures are and having an idea what the controllers are going to ask of the P-I-T is the other half.

INSTRUCTOR NOTES: This mission starts on the ramp at KSDM. The P-I-T will call for a TEC clearance to KSNA (this does not require filing a flight plan). The clearance will be: "Cleared to KSNA via Runway 26R departure procedure, MZB, V23 SLI Direct". After flying the ODP, getting vectored, and on course to the first fix the mission ends.

Have the P-I-T ensure the aircraft can manage the expected procedure. Help them understand how to translate "Min Climb of feet / Nautical Mile". You might want to think about Ground Speed /60 X Feet per Nautical Mile Climb Rate in Feet per Minute.

- Differentiate between a SID and ODP.
- Copy the Clearance, read back and understand the Clearance.
- Proper phraseology.
- Physical Location of ODP (where to find the procedure).
- Understanding Climb gradients to meet Climb requirements.
- Proper set up of Avionics prior to departure.
- Intercepting a radial to a VOR.
- Developing Situational Awareness.
- Proper intercept of MZB VOR radial.

- Not knowing where to find the ODP.
- Failure to brief the airport procedures prior to receiving a clearance.
- Improper technique of avionics set up prior to departure.
- Misunderstanding of Min Climb Gradients.
- Unable to intercept a radial from a VOR.

MISSION: IFR #06 **EXERCISE**

"SID VICIOUS"

THE OBJECTIVE: This exercise is designed to introduce instrument pilots to a challenging pilot nav SID, the Teterboro 2 Departure (TEB2.TEB) procedure from Teterboro, NJ. This is one of the most violated SIDs in the entire country. The goal is to have the pilot remain ahead of the airplane, being prepared for the strict heading and altitude changes required by the procedure. The pilot will state their current altitude and 'climbing via SID' upon initial contact with the departure controller.

Additionally, the pilot will need to decode the myriad exit gates on the procedure, realizing that each gate has specific 'expect' instructions. The pilot should be able to state the route to be flown to the exit gate (LANNA in this case) in the event of lost comms.

INSTRUCTOR NOTES: Aircraft starts on runway 24 at TEB with an assumed clearance to KABE via the Teterboro 2 Departure, vectors to LANNA and climb via SID. (**The instructor will act as ATC for this mission.**)

Take time to brief the SID. This can be a confusing document to a pilot so a great deal of learning can take place before the simulation mission is activated.

Instructor will issue takeoff clearance and handoff to NY departure. Pilot will set radio to 126.7 and call with "xxxx thousand xxx hundred, climbing via SID." NY departure will respond "radar contact." If pilot fails to use "climbing via SID," instructor should query pilot, "verify climbing via SID?"

Once all altitude restrictions are met, instructor will clear aircraft "direct Solberg, direct LANNA." Once the pilot has started navigating to SBJ, the mission ends.

TRAINING ELEMENTS:

- Proper configuration of radio frequencies (tower and departure)
- Proper avionics set-up for navigating along the departure.
- Simulated communication with ATC (provided by instructor)
- Proper automation management (optional).
- Compliance with heading and altitude directives on the SID
- Articulation of lost comms routing (SBJ SBJ R-274 LANNA

- Overcontrolling
- Fixation / failure to maintain instrument scan
- Being unsure of altitude to climb to for given segment of departure
- Being unsure of the heading to be flown
- Failing to use "climbing via SID" when contacting departure
- Loss of situational awareness (distance from turning points and climb points on the SID)
- Failure to properly brief the SID including the expected route to the gate
- Improperly setup avionics.
- Failure to adhere to ATC instructions in a timely manner.

MISSION: IFR #07 EXERCISE

"HOLD ON A MINUTE"

THE OBJECTIVE: Deal with unexpected enroute holding. The primary challenge is being able to understand the instructions issued by ATC, converting them from a stream of words into an easily visualized steady state holding pattern. The secondary goal is to demonstrate the ability to correctly enter and maintain the holding pattern.

INSTRUCTOR NOTES: Mission starts 8nm NW of PACIF, southeast bound on V25 at 5,000ft, enroute from SNA to SAN. With the ATD paused, the P-I-T will set up the avionics for SNA Direct MINOE V25 MZB Direct SAN in the flight plan. If using GPS, activate the leg from MINOE to PACIF, then unpause the ATD.

30 seconds later, instructor (**playing the role of ATC**) says, "I have holding instructions for you, advise ready to copy."

Note the current Zulu time. Then, issue the following holds over the course of the exercise.

"N123AB, cleared to PACIF, hold northwest on V25, expect further clearance at [20 mins from now]."

"N123AB, cleared to PACIF, hold east on V208, expect further clearance at [30 mins from now]."

"N123AB, cleared to PACIF, hold east on V208, left turns, expect further clearance at [15 mins from now]."

Note that the holding clearance does not include a leg time, or length. The Controller's Handbook (FAA Order 7110.65W) states: "d. Leg length in miles if DME or RNAV is to be used. Specify leg length in minutes if the pilot requests it or you consider it necessary." Thus if the P-I-T is unsure of the time or distance for the holding leg have them query ATC. Alternatively they could also make life easy and request a DME or RNAV leg length. There are numerous ways to set up for the hold at PACIF using GPS and/or VORs plus DME. Be sure to use all the tools that are available in the panel set up that you are teaching in.

Once they have:

- 1. Completed the entry
- 2. Are established in the hold (and have reported entering the hold to ATC with a time check)
- 3. Can articulate what they would do next in terms of how to fly the hold.

Then reset the ATD to the beginning of the mission and fly the next hold. The exercise ends when they have completed all three holds.

TRAINING ELEMENTS:

- Translating verbal holding instructions into a visual holding pattern
- Understanding that unpublished holds need not contain a leg length or direction of turn if they are standard
- Determining the best way to configure the given avionics suite to identify the holding fix and inbound holding track
- Determining which hold entry to use (direct, parallel, teardrop respectively)
- Correctly flying the hold entry
- Transition from entry to steady state holding
- Meeting mandatory reporting requirements (becoming established in the hold)

- Inability to translate verbal instructions into a graphical holding pattern
- Not knowing the default leg length (1 minute) or default direction of turn for the steady state hold (right turns)
- Inability to determine correct holding entry
- Fixation / failure to maintain instrument scan
- Failure to configure avionics correctly to identify holding fix and inbound holding track
- Failure to report entering hold to ATC with current time

MISSION: IFR #08 **EXERCISE**

"APPROACH MODE A: CIRCLE TO LAND"

THE OBJECTIVE: The primary goal is to transition from a precision ILS to a non-precision circle to land. The pilot needs to be aware of the circling minimums and the maximum distance from the airport that is permitted during the circling, so as to be afforded terrain and obstacle protection. They also need to be aware of, and prepared for, a missed approach should they lose sight of the runway / climb back in to the overcast. This is similar to the "Easy Does It…" exercise with the exception of the runway change.

INSTRUCTOR NOTES: The mission begins a few miles south of the LGB ILS RWY 30 localizer with an assumed clearance to Long Beach. Prior to calling SOCAL Approach the pilot checks the ATIS only to learn that RWY 30 is closed and to expect the ILS 30 circle-to-land RWY 25L. The pilot checks in with SOCAL approach as if they'd just been handed to this frequency from the previous controller. The pilot will request the ILS RWY 30 approach with a circle to RWY 25L. The controller issues a new squawk code (since the ATD starts out squawking VFR) and vectors them to the final approach course. The weather is at circling minimums.

The exercise ends after they have exited runway 25L.

- The use of proper pitch/power/configuration to obtain requisite performance without "chasing" airspeeds, or glide slopes.
- Developing a good scan.
- Developing situational awareness (Where am I? What's next? What has to be done when I get there? What can I be doing now to prepare?)
- Properly and sequentially briefing the approach
- Using the circling minimums rather than straight-in minimums
- Maintaining at or above MDA until in a position to make a continuous descent to land
- Automation management (if using autopilot)
- Being aware of the limits of the terrain protection afforded during circling based on the category of aircraft

- Being prepared to fly the missed approach if loosing sight of the runway.
- Proper avionics set-up for flying the approach.
- Communicating with ATC.
- Proper use of an HSI (if first time using one.).
- Proper automation management (optional).

- Overcontrolling
- Fixation / failure to maintain instrument scan
- Loss of situational awareness (distance from final approach course / relationship to glide slope [below/above/ on] while on vectors.
- Flying through final approach course
- Improper autopilot programming
- Failure to confirm autopilot mode in annunciator panel
- Failure to properly brief the approach
- Improperly setup avionics.
- Failure to adhere to ATC instructions in a timely manner.
- Allowing ATC to distract from flying the airplane.
- Not using known control/performance numbers to establish a stabilized approach.
- Skidding turns/using rudder to maintain localizer.
- Using power to maintain glideslope.
- Failing to maintain visual contact with runway during circling / climbing back into overcast.
- Failing to establish the aircraft on final for the new runway on speed and on altitude for a normal landing
- Failure to set heading bug to reference heading.
- Failure to use altitude bug for reference.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #09 EXERCISE

"APPROACH MODE B: DENSITY ALTITUDE"

THE OBJECTIVE: The primary goal is to recognize the impact on performance of normally aspirated piston engines at high density altitudes. Secondarily, the pilot will be challenged by unexpected weather and a need to pick up a pop-up IFR clearance. Vectors to final aren't an option due to high Minimum Vectoring Altitudes that would leave them too high for the approach, so they will fly the full approach with a DME arc leading to a precision approach. Additionally, they will need to maintain a high degree of situational awareness during the exposure to IMC and the potential for icing by watching the OAT.

Upon breaking out, there will be an aircraft already on the runway. The P-I-T can either go missed or circle for an adjacent runway.

INSTRUCTOR NOTES: The mission begins airborne, 5nm SW of PAGRE at 10,000'. The pilot determines that an IFR clearance is needed. They call Denver Center, pick up a clearance and fly the full ILS RWY 17 approach from PAGRE.

Once they break out, an aircraft should be visible on runway 17 and they should circle for runway 13. Going missed is allowed, but not necessarily the best idea due to a prolonged climb in IMC at high DA's with potential for icing with a climb to 11k.

The exercise ends after they have circled and landed, or shortly after they are established on the missed.

- Picking up pop-up IFR clearance
- ATC Communication
- Properly and sequentially briefing the approach
- Demonstrate ability to fly full approach including vectors to final
- Proper avionics set-up for flying the approach
- Proper use of heading and altitude reference bugs.

- Flying DME arc
- Use of bearing pointer (G1000) to aid in Situational Awareness while flying the DME arc.
- Automation management (if using autopilot).
- Identifying traffic on runway
- ADM regarding high DA missed with climb to 11,000ft with potential icing versus circling to land
- Potentially using circling minimums rather than straight-in minimums
- Maintaining at or above MDA until in a position to make a continuous descent to land
- Flying a circle to land below normal pattern altitudes
- Being aware of the limits of the terrain protection afforded during circling based on the category of aircraft
- Correct leaning for high DA operations
- Situational awareness regarding trends with OAT throughout the descent (increasing or decreasing)

- Inability to determine correct ATC frequency
- Not clearly stating request for pop-up IFR clearance
- Unable to load and execute approach from correct IAF
- Inability to configure avionics correctly for DME arc
- Improper programming of autopilot
- Failure to confirm autopilot mode in annunciator panel.
- Expectation of vectors to final
- Incorrect engine leaning
- Poor energy management during circling maneuver
- Skidding turns/using rudder to maintain localizer.
- Using power to maintain glideslope.
- Failing to maintain visual contact with runway during circling
- Failing to establish the aircraft on final for the new runway on speed and on altitude for a normal landing
- Failure to set heading bug to reference heading.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #10 SCENARIO

"SITUATIONAL AWARENESS"

THE OBJECTIVES: This scenario is designed for experienced instrument rated pilots. It provides ADM challenges along with the requirement to set up for the approach in a limited amount of time and the opportunity for pilots to fly an approach to 150' in the safety of simulated flight. Obviously the low time / inexperienced instrument pilot should request a diversion to an alternate airport in this scenario. The challenges for the pilot include not only choosing the approach that will allow a safe landing given all the information available to them, but also briefing the approach and getting the avionics set. Autopilot usage is encouraged at least as the pilot briefs and sets up the avionics.

INSTRUCTOR NOTES:

This mission starts on the ramp at KSBA. The P-I-T will have to call for a TEC clearance to KOXR. The clearance will read: "Fly runway heading, vectors KWANG, Direct CMA VOR, Direct. Climb and maintain 3000'. Departure frequency 120.55. Squawk ____". After receiving the clearance they will then go to ground control for taxi, tower for takeoff clearance, etc.

As soon as practicable, the choice of the approach should be discussed. The scenario is such that although the winds favor the RNAV 7 at KOXR, the ceilings, visibilities, and lighting favor the ILS 25. In fact the ceilings are 50' below minimums for the ILS and the visibility is right at minimums. Because the ILS 25 does have MALSRs the approach can be completed per 14CFR 91.175 (c) (3) which allows descent to 100'. Hand flying the actual approach is recommended, but not mandated. If flying the G1000 Skyhawk, hand flying the approach with just raw data is the most difficult, however some pilots have little to no experience flying with a flight director, so hand flying using the flight director could be a good learning experience for some pilots. In this scenario let the P-I-T make the ultimate decision on the approach flown. Upon landing the debrief should include the reasoning for, and validity of the selection made.

TRAINING ELEMENTS:

- Choosing the approach that provides the best possibility of success.
- Communicating approach request with ATC.
- Briefing approach and setting up avionics while flying and communicating.
- Using control/performance "numbers" to fly a stabilized approach.
- Automation management.
- The use of Heading and Altitude bugs for reference.
- The use of a flight director to aid in hand flying an approach.
- If hand flying the G1000 without the FD, the use of the "track bug" along with the heading bug to aid in maintaining the localizer.

- Failure to make note of lighting for the two different approaches.
- Improper phraseology when making approach request with ATC.
- ATC distractions leading to improper avionics setup.
- Improper autopilot mode selection / failure to corroborate with autopilot annunciator, even when flying with flight director.
- Skidding turns / using rudder to maintain localizer.
- Using power to maintain glideslope.
- Failure to set heading bug to reference heading.
- More than ³/₄ scale deflection of CDI / VDI.
- Misinterpretation of HSI information for pilots new to the HSI.

MISSION: IFR #11 EXERCISE

"FLIGHT PLANNER"

THE OBJECTIVE: This mission is designed to provide a great example for when Obstacle Departure Procedures (ODP) are expected. Radar Outage in IMC is a sure sign of the need to utilize an ODP. The exercise is also designed to challenge the pilot with flying in a non-radar environment.

When briefing and planning the flight, what will the pilot decide to file and what route will the pilot choose? With a Radar outage this is an ODP for sure. Also selecting the appropriate runway for departure with the 20 kt winds will ensure that runway 8 is chosen.

This exercise is a great example in understanding Min Climb performance for Runway 8. Also with radar outage the pilot will have to plan on how to transition to the destination airport from the ODP. The ILS 7 at SBA, using GVO as the IAF, would be a good transition off of the ODP.

INSTRUCTOR NOTES: This exercise starts on the ramp at KIZA. Ideally the P-I-T will identify the need to fly the ODP. If they do, then they can contact SBA Approach on 124.15 and put in a quick flight plan, get a clearance and release. Then fly the ODP and once established on the GVO R-307 request vectors back to GVO and then transition to the ILS 7 at KSBA, Alternatively radar can come back to life once they are airborne and they can request and receive vectors for the ILS. If the P-I-T does not identify the need for the ODP the instructor should pause the mission, explain the need for the ODP, and then re-fly the mission. In this situation the mission ends once the P-I-T is established on the ODP.

TRAINING ELEMENTS:

- Identify the need for the ODP.
- Copy the Clearance with read back and understand the Clearance.
- Proper phraseology.
- Physical Location of ODP (where to find the procedure).
- Understanding Climb gradients to meet Climb requirements.
- Proper set up of Avionics prior to departure.
- Intercepting a radial to a VOR.
- Developing Situational Awareness.
- Proper intercept of GVO R-307°.
- Understand the need for the 6000' climb.

- Not knowing where to find the ODP.
- Failure to brief the airport procedures prior to Filing and receiving a clearance.
- Improper technique of avionics set up prior to departure.
- Understanding of Min Climb Gradients.
- Unable to intercept a radial from a VOR.
- Expecting Radar Vectors when Radar is out of service.

MISSION: IFR #12 **EXERCISE**

"STRAIGHT OUT OF ANNUAL"

THE OBJECTIVE: To expose the P-I-T not only to a variety of failures, whether engine, avionics, electrical or other systems, but also to see how they apply risk management to flying an airplane on it's first flight out of maintenance in the given weather conditions?

INSTRUCTOR NOTES: Obviously anyone who chooses to fly an airplane that has just completed an annual inspection in the weather conditions of this mission would not be demonstrating any sense of risk management. That being said, if a pilot chooses to fly this mission, perhaps just so that they can test themselves to survive a bad situation, then the instructor has carte blanche to throw anything at the pilot that they choose.

This failures are up to the CFI and there are a wide range of failures that can be introduced. The main objective is for the P-I-T to maintain situational awareness and maintain aircraft control at all times. How is the Pilot using the checklist? Are they able to stay focused and calm? Surviving the potential situations is perhaps more a matter of mental skills as it is stick and rudder skills.

- Go / No-go criteria.
- Checklist usage.
- Lost Communications 7600, 121.5?
- Engine Loss emergency 7700?
- Partial Panel scan, identify inoperative instruments.
- Trouble shooting / Checklist items.
- Developing Situational Awareness.
- Navigation with compass and clock

- Not maintaining proper control of the aircraft during an emergency.
- Incorrectly remembering transponder codes and radio frequencies.
- Not able to identify inoperative instruments.
- Poor scan of instruments.
- Unable to maintain situational awareness.
- Poor, or no use of emergency checklist to trouble shoot problem
- Not shedding electrical load in case of alternator failure
- Failing to navigate to a potential survivable landing site in case of engine failure.
- Failing to prepare for ditching if landing in ocean.

MISSION: IFR #13 **EXERCISE**

"PARTIAL PROBLEM"

THE OBJECTIVE: This mission is about the ability to stay focused and control the aircraft in turbulence and hard IFR. Two minutes into the exercise the vacuum system, or AHRS fails. The P-I-T now has to identify the failed instruments / systems. In the G1000 this should be easy. In a standard 6 -pack not as much. After identification of the problem what does the pilot do to minimize distraction and fly the aircraft?

INSTRUCTOR NOTES: This exercise starts airborne at 7000' at the ORCUT intersection north of KSBA. It could be any variety of issues that causes the partial panel situation: a failed vacuum system for legacy panels, or an AHRS failure for the G1000. It could also be a pitot/static failure. Whether the ATD is equipped with the G1000 panel or the legacy panel the GPS can, and should be used for navigation. Each ATD station should have have either stickies or suction cups for the P-I-T to use to cover failed instruments in legacy panels.

TRAINING ELEMENTS:

- Identifying failed instruments.
- G1000 backup displays / standby instruments
- Partial Panel scan.
- Use of GPS to provide DTK and TRK information for navigation
- Declaring emergency
- Situational Awareness.
- Using SRM (all available tools) to meet the emergency

- Not maintaining proper control of the aircraft during an emergency.
- Failing to identify inoperative instruments.
- Failing to cover failed instruments.
- Failing to declare an emergency and squawk 7700.
- Poor scan of instruments.
- Unable to maintain situational awareness.
- Unable to manage the situation.

MISSION: XTT #01 EXERCISE

"YEAGERMEISTER"

THE OBJECTIVE: To provide the P-I-T, specifically those transitioning from certified to experimental aircraft, with a realistic simulation mission involving a risky maneuver at low altitude. Impress upon the P-I-T the extreme risk of a high angle of attack combined with a climbing steep turn.

INSTRUCTOR NOTES: This mission is an exercise on loss of control in flight. There have been numerous accidents pertaining to non-standard pattern entries to an airport where pilots perform a low altitude flyover the field followed by a steep climbing reverse turn; in essence a chandelle. The purpose of the training is to underscore the risk of this maneuver and discourage its casual use. Spend some time prior to beginning the mission with the basic aerodynamics of lift in a climbing steep turn. The instructor should direct the pilot to regard the AATD as safe environment for appreciating the real danger of performing this action; not as a practice session.

The mission begins with the airplane inflight, about 2 miles out and inbound to runway 36 at the Oshkosh Airport below pattern altitude. In order to maximize the climb required to pattern altitude (1,808'), lead the P-I-T to a lower altitude as he approaches the field. Keep the speed down well within the green arc. At midfield, the pilot should initiate a climbing left turn at a high angle of attack (15° or greater) and steep bank (45° or more). The lower and slower the airplane is at the origin of the climbing turn the better for the lesson. Ideally the plane should not reach pattern altitude before stalling without corrective action.

TRAINING ELEMENTS:

- Review the basics of lift and the negative impact on this force with a high angle of attack and steep turn condition.
- Treat the simulation exercise as an opportunity for a safe venue to induce a power-on stall in a steep climb and bank condition.

<u>COMMON ERRORS</u>:

- Entering the pattern at an excessive rate of speed for the actual aircraft allowing the pilot to falsely simulate a successful maneuver.
- Treating the mission as a training session for tactical maneuvers rather than a lesson to avoid such operations prior to receiving special training .

MISSION: XTT #02 EXERCISE

"I GOT THIS"

THE OBJECTIVE: Underscore the risk of realizing a cross control stall condition by attempting to salvage an overshot turn to final.

INSTRUCTOR NOTES: The exercise begins with the airplane on a short left base to the Spicewood, Texas airport (88R). The mission narrative presents a situation where a pilot of a VFR flight is concerned about approaching weather and wants to land a soon as practicable. He has just spotted the Spicewood airport to the left and decides to land. However, unbeknownst to the P-I-T, there is now a 30 knot tailwind on the base leg.

The P-I-T will likely be pushed by the wind beyond the desired turn point and will have to correct in order to line up with the narrow runway. This will be difficult and the smart money will choose abandon the approach and find an alternative landing location. There are several other landing fields nearby, and some with suitable runway alignments.

Prior to starting the mission, take time to brief the situation. The airplane has been positioned on a very short base leg and the P-I-T should be prepared for the turn. The 30 knot tailwind makes this more imperative.

TRAINING ELEMENTS:

- The weather has deteriorated from a nice VFR environment, but this is not an emergency that requires a landing and at this particular field. There are other options. Consult the VFR chart and find an alternate.
- An aborted landing at Spicewood could at least tell us the wind direction and provide criteria for an alternate airport runway.

- Trying to save an overshot base turn and entering a cross control stall.
- Not recognizing the opportunity to find a more suitable runway nearby.

MISSION: XTT #03 **EXERCISE**

"GET SULLY"

THE OBJECTIVE: To impress upon the P-I-T the importance of a predeparture brief and how proper preparation for an event such as an engine failure on takeoff could make a crucial difference for a safe recovery.

INSTRUCTOR NOTES: The mission begins with the airplane at the end of Rwy 20 at KHVN, ready for departure. After briefing for the takeoff the P-I-T applies full power, proceeds down the runway for a straight out departure. The instructor can simulate a power failure at any time. At that moment the P-I-T has a basic choice of returning to the airport or finding a suitable landing alternative.

This is a perfect opportunity to brief for specific "what if" situations such as a loss of power on takeoff; e.g., if we are at this point on the runway and we have not achieved our required rotation speed we will abort the takeoff. The Tweed-New Haven Airport offers an interesting condition for this emergency exercise. A troubled departure from runway 20 presents the P-I-T with an option of returning to a paved runway at the airport by making less than a 180° turn to runway 32.

The instructor may choose the method of the engine failure and the altitude at which it occurs. Clearly the location of the airplane at the time of a loss of power will determine the best course of action for the emergency which includes continuing straight ahead for a water landing.

TRAINING ELEMENTS:

- Briefing for departure. Verbalizing "what-if" scenarios; e.g., if we're not off the ground at this point on the runway I will abort the takeoff".
- Being prepared for a way out; e.g., I know that if I'm at 1,000 feet at this point I could make it back to the airport for a landing on the oblique runway, otherwise I'm heading straight ahead for a water landing.

- Trying to make if back to the airport with insufficient altitude.
- Commencing the departure without adequate briefing and preparation for such an emergency.