Flight Advisor Corner by Hobie Tomlinson

July 2013 **Flying Multi-Engine Aircraft (Pt. XIII)** **AMEL PTS 4**

As we continue our series on flying FAR Part 23 (CFR 14, Chapter 1, Subchapter C, and Part 23) certified, small multi-engine airplanes, we are looking at the training issues involved in completing a multi-engine transition course.

This month we will pick up our discussion of the items involved in a **Multi-Engine Transition Course** with ***Single-Pilot Resource Management (SRM),*** which is embedded in the **Commercial Pilot – Airplane Practical Test Standards** Introduction Section, as we continue working our way through the Multiengine **P**ractical **T**est **S**tandards (**PTS**) ***FAA-S-8081-12C*** (***Commercial Pilot for Airplane Single- and Multi-Engine Land and Sea)*** that became effective on June 1, 2012.

The Cabin Twins ~ Piper PA31 - Navajo

Two Lycoming TIO-540A Engines (310 HP Ea.) 1,785 Produced **Wikipedia *Image***

Single Pilot Resource Management (SRM) is defined by the Federal Aviation Administration (FAA) as: "*The art and science of managing all the resources, both internal (on-board the aircraft) and external (not on-board the aircraft) that are*

Hobietw@att.net (802) 363-3411

available to a single pilot (both prior to and during the flight) ***to ensure that the successful outcome of the flight is never in doubt."***

The Pilot Examiner who is administering an Airplane Multi-Engine (AMEL or AMES) practical test is now required by the Practical Test Standards (PTS) to evaluate the applicant's ability to evaluate risks by using proper Aeronautical Decision-Making procedures throughout the practical test. The examiner is expected to accomplish this requirement by developing a scenario that incorporates as many Tasks as feasible in order to evaluate the applicant's use of risk management skills during the process of arriving at aeronautical decisions which are known to be safe. (There is no longer any provision made, either during the practical test or subsequent flying, for the *"think-it-will-be-o.k."* attitude. Proper Aeronautical Decision Making (ADM) means that the plan always has a *"known-satisfactory*" outcome and that suitable "back-up" alternatives remain available.)

The Applicant's Ability to utilize all available assets during the risk analysis process that is being used to determine the safest course of action is an essential component of satisfactory performance. The examiner-presented scenario should be both realistic as well as within the capabilities of the aircraft that is presented for the practical test. An example of such a scenario would be one that incorporates both weather decisions and performance planning.

SRM Resources that are available include the following items:

- **Human Resources** include all other personnel groups which routinely work with flight crews in the decision-making processes that are required for flight safety. These personnel groups would include (but not be limited to): flight dispatchers, weather briefers, maintenance personnel, Fixed Base Operator (FBO) personnel and air traffic controllers.

- **Hardware Resources** include aviation technical equipment both internal (on-board the aircraft) and external (not on-board the aircraft). These resources would include aircraft systems such as de-icing equipment, weather radar, pilot flight displays, multi-function displays, flight management systems, autopilots, flight directors, GPS navigation receivers, other on-board hardware (such a iPads or iPods), and external hardware (such a de-icing equipment, ground power units, desktop or laptop computers, cell phones, etc.).

- **Information Resources** include both internal (on-board the aircraft) and external (not on-board the aircraft). These resources would include aircraft software provided information such as traffic displays; uplink weather displays; multi-function displays such as terrain, navigation, and chart displays (both electronic and paper); aircraft system information (both electronic and paper – AFM) and external software systems/applications such as weight and balance calculators, flight planning software, Qualified Internet Certified Provider (QICP) weather, aircraft performance programs, etc.

Hobietw@att.net (802) 363-3411

SRM is a skill-set of competencies that must be evident in all PTS Tasks as applied to single-pilot operations and is composed of the following six items:

- **Aeronautical Decision-Making (ADM)**
- **Risk Management (RM)**
- **Task Management (TM)**
- **Situational Awareness (SA)**
- **Controlled Flight Into Terrain (CFIT) Awareness**
- **Automation Management (AM)**

Aeronautical Decision-Making (ADM) is a systematic approach to the mental processes used by pilots to consistently determine the best course of action in response to a given set of circumstances.

- **The Objective** of this Task is to determine if the applicant exhibits sound aeronautical decision-making during the planning and execution of the scenario-based practical test flight problem. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:
  - *Know and Use a sound decision-making process* when making critical decisions that will have an effect on the successful outcome of the flight, such as the DECIDE model (**Detect** a change has occurred, **Estimate** the need to react to the change, **Choose** a desirable outcome, **Identify** actions that will successfully control the change, **Do** implement the chosen actions, **Evaluate** their effect on mitigating the perceived risk). A shorter version is the 3P model (**Perceive** the current circumstances of the flight, **Process** by evaluating their impact on the flight's safety, **Perform** by implementing the best course of action). The applicant should be able to explain the factors and alternate courses of action that were considered in the decision-making process.
  - *Recognize and explain any hazardous attitudes* that may have influenced the decision-making process. (I.e. **Anti-Authority –** "Don't tell me," **Impulsivity –** "Do it quickly," **Invulnerability –** "It won't happen to me," **Macho –** "I can do it," and **Resignation –** "What's the use.")
  - *Decide on and execute an appropriate course of action* to properly mitigate any increased risks, which may have arisen due to a change of the original flight plan circumstances, so that a safe and successful conclusion of the flight is assured.

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- *Explain how* risk management, CFIT awareness, overall situational awareness, automation management, and task management influenced the decisions made and resulting course of action.

Risk Management (RM) is a systematic approach to the mental processes used by pilots to consistently determine the potential hazards to which their flight will be exposed. Then evaluating both the likelihood of those hazards occurring and the severity of the consequences should any of those hazards occur. Lastly implementing defensive strategies that will mitigate either (or both) the likelihood of occurrence or the consequences of occurrence of those same hazards to an acceptable risk level.

- **The Objective** of this Task is to determine if the applicant is able to utilize proper risk management tools and models to properly assess the potential risks associated with the planned flight activity during both preflight and the subsequent flight. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:

  - *Explain the four fundamental risk elements* associated with the given flight scenario and how each one was assessed.

  - *Use the PAVE* checklist (or other such tools) to assess the four risk elements. (I.e. **P**ilot, **A**ircraft, En**V**ironment, and **E**xternal Pressures.)

  - *Use a personal checklist*, such as *I'MSAFE,* to determine pilot risks. (I.e. **I**llness, **M**edication, **S**tress, **A**lcohol, **F**atigue, and **E**motions.)

  - *Use of weather reports and forecasts* to properly assess weather risks associated with the flight.

  - *Explain how to recognize and mitigate risks* associated with the flight.

  - *Use the **5P** model to assess risks* associated with each of the five factors. (I.e. **Plan** – Mission, **Plane** – Aircraft, **Pilot** – Applicant, **Passengers –** External Pressures, and **Programming –**Automation Management.)

Task Management (TM) is a systematic approach to the mental processes used by pilots to consistently manage both their preflight and in-flight workloads by planning, prioritizing, and sequencing tasks in order to prevent task saturation and/or overload.

- **The Objective** of this Task is to determine if the applicant is able to properly prioritize the various tasks associated with the planning and execution of the upcoming flight portion of the practical test. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:

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- *Explain how to prioritize tasks* in such a way as to minimize distraction from flying the aircraft. (I.e. Tasks should be prioritized in their order of importance and then performed from most important to least important. This prevents "task saturation" – the "glazed-over" eyes look as well as "automatic task shedding." "Automatic task shedding" occurs when the brain becomes overwhelmed by the amount of incoming data and involuntarily discards the largest, and *usually most important*, task in order to dramatically reduce its data intake.)

- *Complete all tasks in a timely manner*, considering the phase of flight, without causing a distraction from flying. (I.e. Have a good understanding of which tasks are "time critical" and/or "phase of flight" critical and which are not.)

- *Execute all checklists and procedures* in a manner that does not increase pilot workload at critical times. (I.e. move "non-time-critical" and/or "non-phase-of-flight critical" tasks to the lower workload phases of flight, such as enroute.)

Situational Awareness (SA) is a systematic approach to the mental processes used by pilots to consistently maintain the knowledge of the aircraft's four dimensional location (latitude, longitude, altitude and time) relative to the flight plan, weather environment, terrain, system status, air traffic control, regulation compliance, and any other factors that may affect the flight.

- **The Objective** of this Task is to determine if the applicant is able to maintain proper situational awareness during all phases of the practical test flight. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:

  - *Explain the concept* of situational awareness and its associated factors. (See definition of situational awareness above.)

  - *Explain the danger of fixation* on a particular issue to the exclusion of all other aspects of the flight.

  - *State the current situation* at randomly selected points during the flight portion of the practical test in such a way that it displays an accurate assessment of the flight's current and future status, including weather, terrain, traffic, ATC situation, fuel status, and aircraft status.

  - *Explain taxi route planning procedures* to include recording and reading back taxi instructions, as well as reviewing the taxi route on a current airport diagram prior to initiating taxi.

  - *Explain procedures for ground steering and maneuvering* to maintain taxiway or runway position and situational awareness. (I.e. Maintain

Hobietw@att.net (802) 363-3411

marked centerlines, observe and understand airport signage, and follow taxi progress on a current airport diagram – paper or electronic.)

- *Explain procedures to hold pilot's ground workload to a minimum* during taxi operation in order to improve situational awareness while taxiing. (I.e. Do not begin taxi operations until flight-route clearance has been received and understood, all automation programing is completed, all possible pre-takeoff checks are done, and the taxi route has been received, understood, and visualized on a current airport diagram.)

- *Perform proper ATC communications and pilot operations* at both controlled and uncontrolled airports before takeoff, before landing, and after landing.

- *Appropriately use aircraft navigation displays* to display traffic, terrain, weather, routing and any other available features so that a complete and accurate situational awareness is maintained for both the current status and any reasonably anticipated changes that may occur.

Controlled Flight Into Terrain Awareness (CFIT) is a systematic approach to the mental processes used by pilots to consistently maintain the knowledge of the aircraft's four dimensional location (latitude, longitude, altitude and time) relative to all current and anticipated terrain including the preemptive maneuvering of the aircraft to avoid any dangerous proximity to that terrain.

- **The Objective** of this Task is to determine if the applicant is able to accurately assess risks associated with terrain and obstacles, to maintain an accurate awareness of terrain and obstacles, and to use appropriate techniques and procedures to avoid controlled flight into terrain or obstacles by using all available resources. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:

  - *Uses current charts and procedures during preflight planning* to insure that the planned practical test flight scenario avoids terrain and obstacles.

  - *Is aware of potential terrain and obstacles* along the intended route.

  - *Can explain* any terrain display, Terrain Awareness and Warning Systems (TAWS) and/or Ground Proximity Warning System (GPWS) installed in the practical test aircraft.

  - *Appropriately uses the terrain display, TAWS and/or GPWS* portions of the navigational display during the flight portion of the practical test to maintain situational awareness while avoiding terrain and obstacles.

  - *Plans all departures and arrivals* to avoid terrain and obstacles.

- *Alters the flight as necessary* to avoid terrain.
- *Plans all course deviations*, for whatever reason, to ensure proper terrain and obstacle clearance enroute to the new destination.
- *Understands and can explain any aircraft performance limitations* associated with known CFIT accidents.

Automation Management is a systematic approach to the mental processes used by pilots to properly program and consistently maintain knowledge of the current and anticipated mode status of all automated equipment installed in the aircraft being used for the flight portion of the practical test.

- **The Objective** of this Task is to determine if the applicant is able to effectively use the automation features of the aircraft (including the autopilot/flight director, auto-throttles, and flight management system – FMS) in such a way as to appropriately manage cockpit workload while remaining aware of the current and anticipated modes and status of the automation systems. Successful completion of this Task is dependent upon the applicant being able to meet the following practical test standards:
  - *Explain how to recognize the current modes* of operation of the autopilot and FMS.
  - *Explain how to recognize mode and status changes*, both anticipated and unanticipated, of the autopilot and FMS.
  - *Is able to state the current and anticipated modes and status* of the autopilot and FMS at random intervals during the flight.
  - *Uses the autopilot and FMS to reduce workload*, as appropriate for the phase of flight, during any emergency or abnormal operations.
  - *Recognizes any unanticipated mode changes* in a timely manner and promptly returns the automation to the correct mode.

The Applicants Use of An Approved Manufacturer's Checklist (or a suitable equivalent if none was published by the manufacturer) will be evaluated during the practical test. Proper use is dependent upon the situation and the specific Task being evaluated. Some situations may be such that the use of a checklist during single pilot operation may be impractical and/or unsafe. In such cases, the required memory items are to be performed with an appropriate review of the applicable checklist after the immediate Task elements have been accomplished. Appropriate division of attention and the continuation of proper visual scanning should be considered when using a checklist.

Realistic Distractions are to be used by the examiner during the flight portion of the practical test in order to evaluate the applicant's ability to utilize proper control techniques while dividing attention both inside and outside the cockpit and maintaining a safe flight status. This is because many studies have indicated that numerous accidents have occurred while the pilot was distracted during critical phases of flight.

During the flight portion of the Practical Test, there must always be a clear understanding between the examiner and the applicant as to who actually has control of the aircraft. A preflight briefing will be conducted that includes the proper procedure for exchange of the flight controls between the applicant and the examiner.

A Proven/Positive Three Step Procedure for the exchange of the flight controls between the applicant and the examiner will be briefed and used. When the examiner wishes to take control of the aircraft, he/she will announce to the applicant, "I have the flight controls." The applicant will respond by relinquishing the flight controls while visually verifying that the exchange has actually taken place and stating "you have the flight controls." The examiner will restate "I have the flight controls" while providing positive visual and tactile reinforcement by "wiggling" the flight controls. When the examiner wishes to return the flight controls to the applicant, the same procedure is reversed. (I.e. you have the flight controls, etc.) There should never be any doubt as to who is actually flying the aircraft.

There must always be a clear understanding concerning stall and spin awareness during the flight portion of the practical test. In accordance with FAA policy as stated in the current version of the Commercial Pilot Practical Test Standards (FAA-S-8081-12C), which became effective on June 1, 2012, "all stalls for the Commercial *(Pilot)* Rating will be *(only)* taken to the "onset" *(of buffeting – approach to)* stall condition." (**Note:** The flight portion of the commercial practical test now conforms to the Airline Transport Pilot (ATP) practical test in that only approaches to stalls are to be performed, relegating full stalls to the Private Pilot and Flight Instructor – Airplane practical tests. This is a safety policy put in place to reflect the higher wing loadings of aircraft now typically used for practical tests at this certificate level.)

Minimum altitudes for the performance of any Tasks involving stalls (or the potential for an unanticipated stall) is set by current FAA policy, stated in the applicable Practical Test Standards, as an altitude that will allow full aircraft recovery ***not lower than*** 3,000 feet AGL (Above Ground Level), unless a higher altitude to initiate recovery is recommended by the OEM (Original Equipment Manufacturer).

This appears to be a good place to break for this month. Next month we will begin working our way through the actual Practical test, by picking up the discussion with the various ***Areas of Operation*** which make up **Commercial Pilot – Airplane Practical Test**, while we continue working our way through the Multiengine **P**ractical **T**est **S**tandards (**PTS**) ***FAA-S-8081-12C*** (***Commercial Pilot for Airplane Single- and Multi-Engine Land and Sea)*** that became effective on June 1, 2012.

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The Thought for this Month: ***"Beware of false knowledge, it is more dangerous than ignorance." ~*** **George Bernard Shaw, Irish Playwright & Essayist.**

So until next month, be sure to ***Think Right to FliRite!***

The Cabin Twins ~ Cessna 402C @ KSQR

Two Continental TSIO-520VB Engines (325 HP ea.) 681 Produced **Wikipedia *Image***

Hobietw@att.net (802) 363-3411