Risk Assessment

A common threat among PTS requirement for each license or rating is the requirement for a pilot to assess the conditions of flight and make a competent Go/No Go decision. In general, this decision tends to be the result of identifying an item or condition that renders a flight illegal. For example, in inoperative instrument required for VFR flight, low ceilings, NOTAMs prohibiting flight or an expired medical certificate are some of these. In each case, the decision not to make a flight is based on an empirical comparison of a condition and a regulatory requirement. A more common and difficult situation arises from a set of conditions, each of which is not a disqualifier for flight, but in the aggregate present an unwise GO decision. The purpose of this handout is to provide a framework for assessing cumulative risk and how to apply mitigation techniques.

Step 1. Define an assessment model. Here the FAA provides us a framework for assessing risk factors. It is found in several publications, including the Fundamentals of Instruction Handbook. The FAA categorizes risk in four fundamental areas. This handout examines each area in the context of light, single engine land operations at Shannon Airport. The FAA's acronym is PAVE. Use of a common acronym is less important that performing a thorough assessment.

1. **Pilot**. Two aspects of the pilot are considered here. The first is the condition of the pilot with respect to the flight. The IMSAFE check list provides this assessment. The acronym identifies Illness, Medication, Stress, Alcohol, Fatigue and Eating as items for assessment. Sometimes E has been linked to Emotion. The second is the pilot's personal minimums checklist. This subject has be poorly covered for years. It is also difficult to assess. Notice again that the criteria here are not empirical, but more subjective. A good way to do this is to assess the pilot's capability with respect to a particular aircraft.
2. **Aircraft**. Similar to the pilot, the aircraft must be considered. Included here are the aircraft's operational equipment, backup equipment, lighting, performance characteristics and capabilities.
3. **enVironment**. There are several key areas for review here. First, the weather comes into play. Included would be NWS warnings in the form of AIRMETs, NOTAMs, or other atmospheric conditions that introduce a level of risk into the flight. Second, the airport(s) and elements for airspace infrastructure such as special use airspace. Third, the geospatial considerations, including terrain type and time of day implications.
4. **External pressures**. This fourth area has recently been elevated in status to the point of warranting individual consideration. The desire not to disappoint passengers or make a deadline has proven to be a major contributing factor toward many accidents. For this reason alone, it is worth considering as a stand-alone item.
5. All of the above items must be considered in the context of a specific **operation.** Consider the operation as the lens through which to view the first four areas.

Step 2. Set the Limit. A critical step is this one, which is to set the criteria for what constitutes acceptable vs. unacceptable risk. Human nature requires this step to be earlier than the assessment

step, otherwise pilots will exercise a decision-making process that assumes flight will take place, rather than assessing cumulative risk. A recommended set of criteria are as follows.

- No flight will begin if there is any single factor that contradicts regulatory requirements.
- No flight will begin if there are **more than three** risk factors assessed against the pilot's personal limitations.

Step 3. Make an assessment. This is the thoughtful part of the exercise and demands personal honesty. In this step, the pilot weights factors within the area above against the operation and carefully considers where elements of risk appear. The scenarios that follow better articulate this step.

Step 4. Risk Mitigation. This step offers the pilot the opportunity to reframe the operation or the areas of consideration in a way that reduces or eliminates individual risk factors. Often just a simple and minor change can mitigate or eliminate a risk factor.

Step 5. Make a competent decision. Instead of uncertainty, this step is reduced to a comparison of the number of risks remaining against a number for tolerance.

Here is a scenario involving risk mitigation. Your assessment might be different. However, what is important is the process.

Scenario 1: You are a private pilot who would like to renew currency for night flying in preparation for flights in the winter when landing after dark may be necessary. You have not flown at night in about six months. You contact an instructor and make your request for a night flight with at least five take-offs and landings at Shannon Airport. Winds are forecast to be light, visibility unrestricted, temp/dew point about 5 degrees C, and clouds scattered at high altitudes. It is a Tuesday evening after work. Sunset is 5:30 and departure is scheduled for 7:00 PM for a one hour flight. You have a flight scheduled next week and would like to get this done before then. You reserve N61954 for two hours.

Assessment. The operation is a VFR night flight. The proposed flight starts and ends at Shannon Airport. While not inherently dangerous, night flying is different from day flying. Here are some potential risks.

1. Pilot. You have not flown at night in six months. That's a risk, but you are with an instructor, so is that really a risk? In this case, since you have not flown with this instructor, the risk is that you and he don't know each other, leading to possible miscommunications or a reduced level of comfort about his proficiency and ability. Not all instructors are equal and you don't know what you are getting here. Going through the IMSAFE check list, the obvious question is fatigue, since you are getting to the airport after work and an evening commute. An initial assessment puts this pilot against this operation identifies two risks.
2. Aircraft. N61954 has only one light (single landing/taxi light). The useful life of the light is rated at 12 hours, though it is unusual to get more than 5 in normal operations. The aircraft has a GPS, but it is VFR only and does not have a moving map display. The cockpit lighting is marginal. Aircraft lighting identifies two risks.

3. enVironment. Shannon Airport (assume no NOTAM prohibiting night operations) is a high risk airport at night. The airport is difficult to find and can be lost, even in the pattern. The lights are low intensity and the PCL feature does not work. On takeoff from Runway 24 results in a black hole effect until the aircraft is over the height of the battlefield. The weather is not a factor. The environment shows the airport as a risk.
4. External Pressures. There is some urgency to complete the night checkout. This is also a risk.

Now that the risks have been identified, look at the total picture. There are six risks identified. Initially this means that the flight would be ill advised. However, are there steps that could be taken to mitigate the risks. Here are some options.

1. Instead of making the night flight a first meeting with the instructor, it would be better to conduct a day flight with the same instructor so that the both of you could familiarize yourselves with each other. Also, take a half day off from work so that the commute is not during rush hour, and you have some time to relax before the flight. This will also allow you to get to the airport earlier and perhaps preflight during in the daylight.
2. Instead of taking 61954, substitute 1464E. The lights are rated at 300 hours and there are two of them (one taxi and one landing). Cockpit lighting is about the same, so you decide to take a cap-mounted light as well as a red filter flashlight. This aircraft also has a monochrome GPS with a moving map. This will assist you in staying away from the SFRA and other special use airspaces.
3. Shannon Airport is risky at night. Plan the flight to depart at dusk, go to Stafford and conduct pattern operations for a while, with each successive landing in a darker setting. Stafford had PCL that works and landing on the runway is easily accomplished without operational lights, if necessary. Have a friend pick you up from Stafford after the last landing. Coordinate with the airport and the flight school to pick up the aircraft the next morning and fly it back to Shannon.
4. External pressures are a reality, but this case is one where the immediacy is less onerous. To mitigate this pressure, tentatively schedule a second flight prior so that the necessity to complete this flight is not as great.

Reviewing the risk factors here, no how do you stand? Aside from the fact that this is a night flight, you have successfully mitigated or eliminated all the risks. This flight can now be safely accomplished within the pre-established criteria of no more than three risks.

Risk assessment should be accomplished prior to each flight. With consistency in applying this model, actually performing the assessment becomes a simple matter.