Gliding Australia Training Manual

Trainer Guide

Unit 25

Threat and Error Management

Unit 25 - Threat & Error Management

AIM

To develop the skills and knowledge required to:

- recognise and minimise the impact of threats; and
- manage any subsequent errors in an aircraft in order to prevent these leading to an undesired aircraft state.

This unit develops non-technical skills and knowledge that underpins all GPC units and aviation activity.

PRE-REQUISITE UNITS

There are no pre-requisite GPC units to this unit.

COMPLEMENTARY UNITS

This unit should be delivered in close conjunction with:

- GPC Unit 24 Human Factors and Pilot limitations.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS

1. **TEM definitions.**	• Describe:
	  ○ Pristine flights,
	  ○ Threats,
	  ○ Errors, and
	  ○ Undesired Aircraft States (UAS).

2. **Prepare for flight using TEM strategies.**	• Demonstrate:
	  ○ A briefing for flight using TEM strategies:
	  ○ Daily self-assessment (IMSAFE);
	  ○ Assessment of the weather;
	  ○ Identifies if there are any NOTAMed Threats;
	  ○ Assessing what tasks are achievable;
	  ○ Identification of any other threats (e.g. Airspace, bush fire risk, landable terrain, known traffic etc.).

3. Conduct flight using TEM strategies.	• Describe:
	  ○ How biological functions create threats and;
	  ○ Mitigation through effective nutrition, hydration and waste management strategies;
	  ○ How to recognise and mitigate fatigue.
	• Demonstrate:
	  ○ Monitoring and positive strategies to identify and manage in-flight threats and aircraft handling, procedural communication or committed errors before an UAS occurs;
	  ○ Diligently using Standard Operating Practices (SOPs) / Procedures / Checks;
	  ○ Not succumbing to time or other perceived pressure;
	  ○ Conducting a Situation Awareness review after a period of high workload or interruption;
	  ○ Observing personal limits:
	  ▪ Particularly with respect to transition from Soaring Pilot to Landing Pilot or;
	  ▪ In cross wind conditions or:
	  ▪ When feeling fatigued.
	  ○ Performing post-flight evaluations and describing:
	  ▪ What threats were mitigated?
	  ▪ What errors were exhibited but managed?
	  ▪ What was learned?
	• What can be improved on in future flights?

KEY MESSAGES

- Threats come at you, while errors come from you.
- Our aim is for Pristine Flights - any variation to a straightforward pristine flight is a threat.
- Mismanaged threats can lead to errors.
- Errors can lead to Undesired Aircraft States (UAS).
- A UAS can lead to an aircraft incident or accident.
- Pilots must use TEM strategies to mitigate against Threats and Errors.

LESSON PLANNING AND CONDUCT

Briefing

Definitions

Pristine Flight:

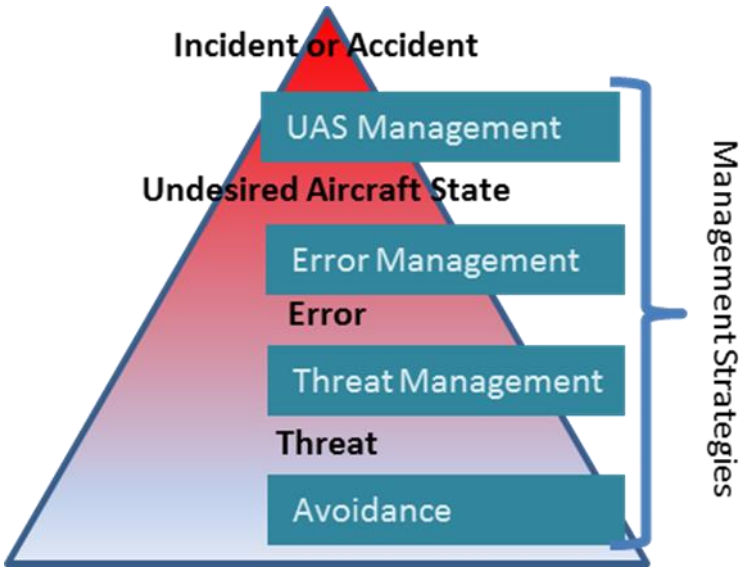
- Flight carried out entirely in a normal manner from pre-flight initiation to post-flight completion.

Threats:

- Any variation to a straightforward pristine flight is a threat;
- Every threat increases the likelihood of an error being committed;
- Every threat requires a positive strategy to manage it and prevent errors.

Errors:

- Slips
    - Observable externally;
    - Inadvertent fall to a lower level.
- Lapses
    - Observable internally only;
    - e.g., Lapse of memory.
- Mistakes
    - Rule or knowledge-based error.
- Violations
    - Deliberate avoidance of rules/Standard Operating Procedures (SOPs) such as not conforming to minimum distance from other aircraft, thermalling rules or conducting checks.



Uncorrected errors can lead to an Undesired Aircraft State (UAS):

- Pilot induced aircraft position or speed deviations, misapplication of flight controls, or incorrect systems configuration, associated with a reduction in margins of safety,
- e.g. wheels up, stall, spin, Airprox (near miss), in-flight break-up, fuel exhaustion.
- A UAS can lead to an aircraft incident or accident, which could have been prevented if the original threat, or the resulting error had been handled better.

Threats come at you, while errors come from you

Every glider flight, whether local, cross-country or competition, involves some threats, and all pilots must ensure they recognise these and have a strategy to manage the threats and prevent errors, and/or have a process to catch errors that may have occurred.

Remember we ALL make some errors on every flight - the important thing is to ensure they are not critical ones, or that they are captured before they lead to an UAS.

Useful Strategies

The following are just a few examples of TEM strategies that should become automatic to be a skilled and safe pilot:

- Prepare for flight:
    - Daily self-assessment (IMSAFE);
    - What's the weather?
    - What are the NOTAMed Threats?
    - Is the aircraft serviceable and prepared?
    - What task should be achievable?
    - What other threats are there? (e.g. Airspace, Bush fire risk, Landable terrain)
- Take advice from other pilots, especially experienced glider pilots.

- Use SOPs / Procedures/Checks diligently.
- Maintain sterile environments when necessary.
- Don't succumb to time or other pressures (get-home-itis, more people to fly, aircraft unserviceability),
- Plan the flight, fly the plan.
- Always fly the glider first – and always be thinking ahead of the aircraft.- anticipating not reacting.
- Maintain effective nutrition, hydration and waste management.
- Recognise the potential for fatigue and if fatigued be more careful and conscientious.
- After interruptions, say "Where was I?"
- Always carry out a Situation Awareness review after a period of high workload.
- Set limits and stick to them - particularly with respect to landing decision making;
    - Make an effective and clear transition from "Soaring" Pilot to "Landing" Pilot.
- Don't "see what you expect to see" – look for threats and errors.
- Listen to "that little voice" that questions what you are doing.
- Always evaluate after flight:
    - What threats were mitigated?
    - What errors were exhibited but managed?
    - What was learned?
    - What can be improved on in future flights?
- Check your personal ATTITUDE:
    - safety above all else;
    - it is after all a sport and should never become a life-or-death situation.
- Acknowledging your vulnerability to errors is actually a sign of strength.
- In flying, you never stop learning.
    - Every flight, whether you have 50 hours, 500 hours, or 15,000 hours, presents you with the threats that must be recognised and managed.
- On every single flight you need to ask:
    - What are my threats today?
    - How will I manage and mitigate these?

Notes:

- It goes without saying that the onus is on trainers to demonstrate good standards of TEM.
- Never deliberately induce threats to the environment, particularly interfering with aircraft systems. That is dangerous and unlawful. Instead, discuss scenarios where the student needs to consider Threats, Errors and mitigation strategies.

- Gather examples of experiences to describe where TEM has been applied (or not applied) in local flying operations if pristine flights are experienced.
- Use the Human Factors input as a key source of threats. Pilots must use TEM strategies to mitigate against Threats and Errors.

Flight Exercises

Trainer to:

- demonstrate how to prepare a day's briefing using TEM strategies;
- identify during flight operations when TEM is used.

Student to:

- demonstrate how to prepare a day's briefing using TEM strategies;
- identify during flight operations when TEM is used.

Post Flight:

- Debrief to identify all threats – which were expected, which were not;
- Did these lead to errors and how were these handled?
- Did the errors progress to a UAS?

THREAT AND ERROR MANAGEMENT

- Management of threats and errors specific to the safety of training this unit (if any)
- Student training on threat and error management for competencies in this unit

TRAINING MATERIALS AND REFERENCES

- Gliding – Threat and Error Management: Arthur Gatland; Soaring: June, August, October 2010.
- Human Error; James Reason; Cambridge University Press: 1990.
- Human Factors for Pilots; Package; CASA: 2012
- Threat and Error Management in Flight Operations: SKYbrary webpage: Flight Safety Foundation.
- Theory Lesson 8 PowerPoint Presentation