AIRF 3206: MRU Aviation
Pre-flight Package for LOFT #4

Objectives:

Demonstrate proficiency in the AREAS and ELEMENTS of CRM.

Demonstrate the ability to apply the Threat & Error Management model.

Demonstrate the ability to communicate effectively in a written format.

Read through the assignment and expectations CAREFULLY, IN ADVANCE.

Outcomes:

In the last LOFT assignments, the following info was reviewed in the pre-flight package. These are also a desired outcome of LOFT #4.

CRM is problem solving using all available resources: hardware, software, and liveware.

CRM addresses ***cognitive skills***
*(*mental process for problem solving, decision making, and situational awareness)
and *interpersonal skills*
needed to manage the flight
in a safe manner.

Preflight:

Depart Cranbrook for Golden, FL200. Surface winds from the northwest, 10 knots, visibility 2 SM. Scattered 1500 AGL, Broken 3000 AGL, Overcast 4400 AGL to 14 000' ASL. Broken layer at Golden, starting at 2000 AGL, and surface winds calm. You're expecting gradual improvement as you get towards Golden, that will meet your minimum weather requirements. Upper winds 40 kt tailwind, 200 KIAS.

Dispatch is again available to you, on 129.55.   Use autopilot as appropriate.

Use "CLEAR" for decision making.

Using the CRM Areas and Elements and the Threat and Error Management (TEM) model, the students anticipate the threats to the flight and discuss countermeasures. The pre-flight brief should be a MINIMUM of 30 minutes, but may be much longer. In the pre-flight, discuss each individual's specific goal (re: CRM / TEM) in this final LOFT. This goal is part of the crew pre-flight brief and individual assignment post-flight.

The sim room will be closed to you until 5 minutes prior to your flight time. Do your planning before hand, including your takeoff briefing. Be ready to start – in the Alsim you will start on the runway.

In-flight

This flight will adhere to MRU Aviation's COP and SIM, and students will incorporate CRM aspects.

The instructor operating the Alsim is NOT an instructor for the purpose of the LOFT. No advice or hints are provided; any information provided as "ATC" or any other individual should not be interpreted as advice or hints that the crew must take. It is the crew's responsibility to respond to "ATC" or any other individual in the manner they determine best for the safe operation of the flight.

LOFT training is not a "pass" or "fail" exercise. It is assumed that there will be errors made in this LOFT, as there are on any flight. The purpose of the LOFT is to learn through experience, and practice CRM skills which include TEM skills.

Post-flight Assignments

Crew assignment: Students will debrief the flight, using the TEM model. Ideally the debrief occurs immediately after the flight. The entire crew is expected to contribute to the debrief, and the post-flight briefings will be recorded in the format of pages 7-8, and submitted by email. The post-flight brief should be a MINIMUM of 30 minutes, but may be much longer.

Individual Assignment: See page 9. This can be submitted by each individual, via email.

Assessment
The crew and individual assignments are each 5% of the course grade (as in the previous LOFTs); the instructor assessment is an additional 5% for LOFT #3 and 4. Instructor Assessment is explained on page 10.

6 CRM AREAS:

1) COMMUNICATION/INTERPERSONAL SKILLS - Each crew member holds valuable information, and a single non-assertive attempt to communicate their ideas is not sufficient effort.
- barriers, e.g. rank, age, crew position
- polite assertiveness
- participation, listening, feedback

2) SITUATION AWARENESS - One's perception of reality sometimes differs from reality itself, therefore this awareness helps the crew member to continue on-going questioning, cross-checking, and conscious monitoring.
- total awareness of surrounding environment, inside AND outside of the aircraft
- reality versus *perception* of reality
- fixation/distraction
- monitoring

3) PROBLEM-SOLVING/DECISION-MAKING/JUDGEMENT - All final decisions must come from the pilot-in- command because the team will fail if command authority is not maintained. This requires the support of all crew members.
- conflict management, differing opinions
- review (immediate, ongoing)

4) LEADERSHIP/FOLLOWERSHIP - The PIC is responsible for the supervising of all crew members, but each individual should be actively planning and managing their own workloads with respect to time. Each crew member is responsible for actively contributing to the team, for monitoring changes in the situation, and for being assertive when necessary. Each crew member can be a leader from their position, in coordination with the PIC's authority.
- team-building
- managerial and supervisory skills: plan, organize, direct, control
- barriers
- responsibility of all crew members
- time/workload management

5) STRESS MANAGEMENT - Emotions are intertwined in every aspect of our lives, and while many people would prefer to "leave their emotions at the door" when flying, this is not necessarily possible. Open and frank communication between crew members should occur. The reality is that each crew member brings their own personal lives into the sim room, and this may affect performance in the flight.
- fitness to fly: mental and physical
- ask how everyone is: what is their reality (reference the role of "Host/Welcomer" in AIRF 3242)
- incapacitation in varying degrees

6) CRITIQUE – the ability to analyze a plan of action
- pre-flight analysis and planning / on-going review in flight / post flight debrief
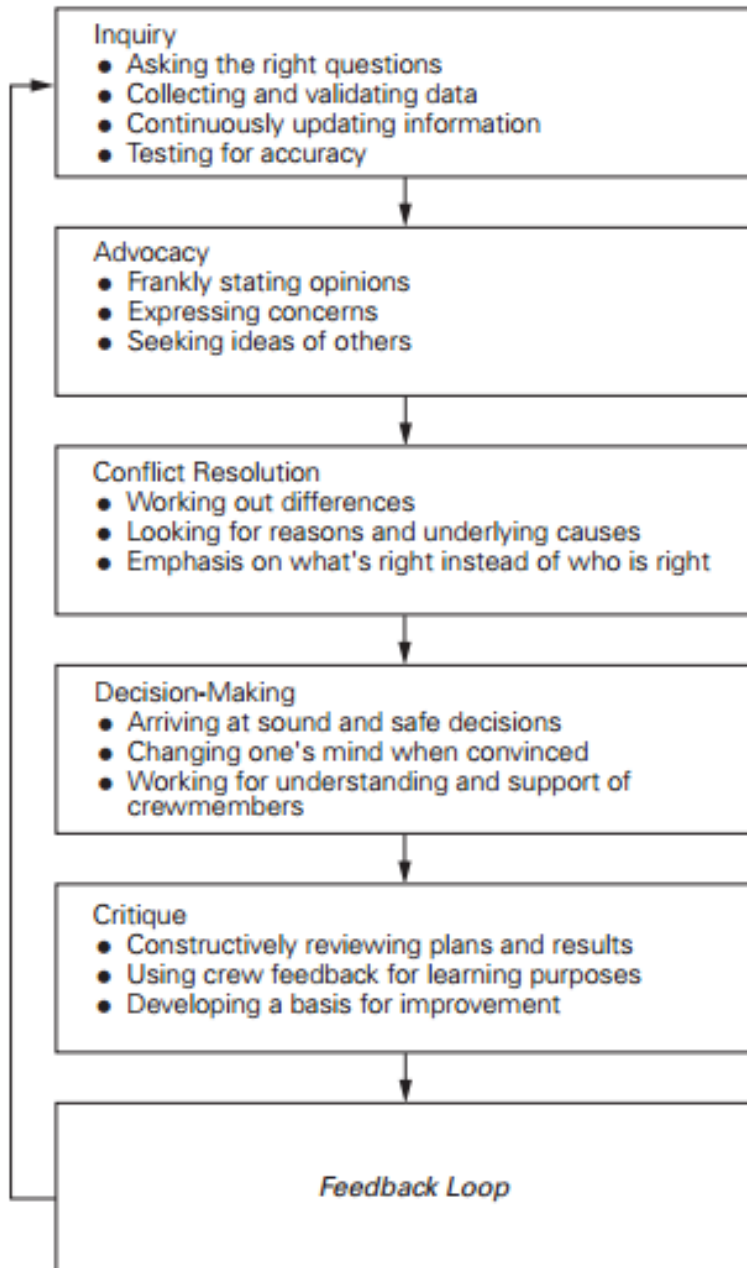
5 ELEMENTS OF CRM:

Advocacy and Inquiry

Inquiry
- Asking the right questions
- Collecting and validating data
- Continuously updating information
- Testing for accuracy

Advocacy
- Frankly stating opinions
- Expressing concerns
- Seeking ideas of others

Conflict Resolution
- Working out differences
- Looking for reasons and underlying causes
- Emphasis on what's right instead of who is right

Decision-Making
- Arriving at sound and safe decisions
- Changing one's mind when convinced
- Working for understanding and support of crewmembers

Critique
- Constructively reviewing plans and results
- Using crew feedback for learning purposes
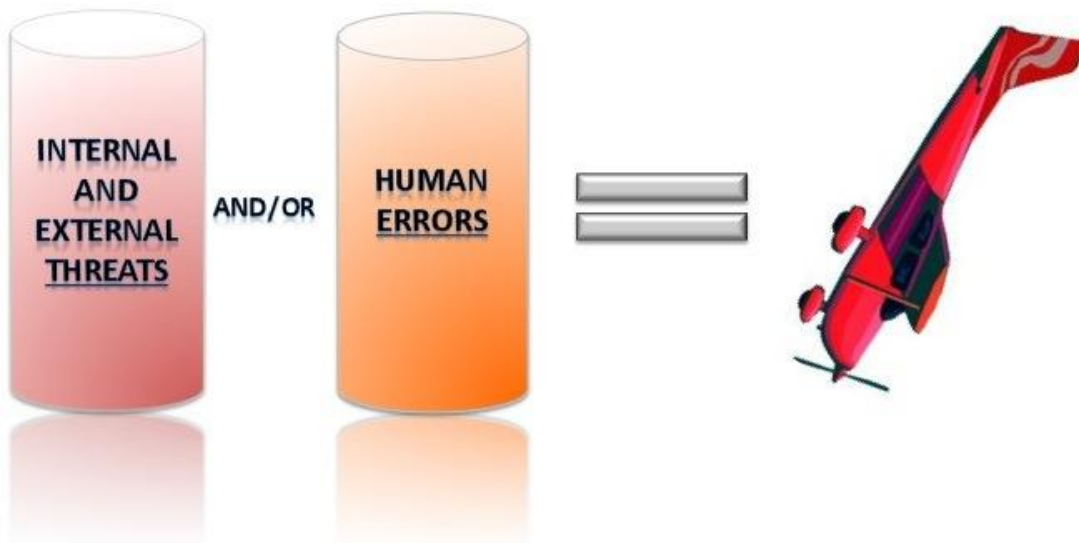- Developing a basis for improvement

Feedback Loop

Figure 3

NOTE: This model concerns several of the six areas taught.

Reference: http://www.caa.co.uk/docs/109/CAP720%20(digest%202-%20CRM%20and%20LOFT).pdf

Threat and Error Management (TEM)

THREATS

Threat Management

Errors

Error Management

Undesired States

Undesired State Management

End State

MANAGEMENT OF THREATS AND ERRORS CAN AVOID AN UNDESIRED AIRCRAFT STATE

INTERNAL AND EXTERNAL THREATS

AND/OR

HUMAN ERRORS

MRU Aviation AIRF 3206
Using the Threat & Error Management Model: LOFT #4 Pre-Flight Brief

Due: at the start of the sim, in paper copy or easily available on your laptop / tablet.
Demonstrate understanding of the TEM model.

Crew's Last Names: _____

Reminder of Types of Threats, for Reference:

Anticipated Threats: expected or known to the flight crew. i.e. a busy and/or unfamiliar airport, something new

Types of Anticipated Threats:
        Latent Threats – may not be obvious i.e. equipment design issues, shortened turn-around schedules
        External Threats – i.e. birds, unfamiliar airport, ATC, dispatch, workload, night
        Internal Threats – i.e. boredom, stress, fatigue, hazardous attitudes, lack of assertiveness
==Note that Unexpected Threats and Active Threats CANNOT be determined before a flight; Latent threats may or may not be evident before a flight.==

PRE-FLIGHT BRIEF

Threats - list the specific threat and EXPLAIN why it's a threat. For example, simply listing "stress" is not acceptable. Explain why. If the threat doesn't apply to all crew members, then clarify this under "the specific threat".

The specific threat (explain)	Type (i.e. Anticipated)	Countermeasure

Add more rows to the table as needed.

What is each individual's specific goal (re: CRM / TEM) in this final LOFT?

How much time was spent was spent as a crew together, (not counting individual preparation) on the Pre-Flight Brief (including study of SOPs and checklists)? _____

MRU Aviation AIRF 3206
Using the Threat & Error Management Model: LOFT #4 Post-Flight Brief

Due 2 days (48 hours after end of sim) in email or paper form. Provide a well thought out, well explained, accurate submission that demonstrates understanding of the TEM model.

Crew's Last Names: _____

Threats:

1. What additional threats appeared in-flight? (see types of threats below; also consider if any of other External or Internal appeared in-flight)
   Unexpected Threats – happen suddenly and without warning, requiring crew skill and knowledge i.e. in-flight
   Active Threats – i.e. incorrect procedure, checklist item missed
   Latent Threats – may not be obvious i.e. equipment design issues, shortened turn-around schedules, system malfunction

2. What countermeasures were used for the threats that appeared?

Errors:

3. What errors occurred that can be identified?

4. Were there any occasions in which the aircraft was in an "UAS"(undesired aircraft state)

5. What error led to the UAS? If more than one UAS, answer for each one.

6. What happened when the error/errors occurred? Was it trapped? Exacerbated? Responded to? Ignored? Describe.

7. What *potential* errors (errors that didn't happen but could have) can be identified? This could be a potential error in the flight that was stopped either through action or luck. This is not any potential error you can think of; i.e. we could have potentially put milk in the fuel tank... we could have hit a deer (but there was no possibility of wildlife in that scenario)...

Strategies:

8. What resources were used?

9. What "links in the chain" or "lines through the Swiss cheese holes" occurred?

10. Preventative: What strategies can the crew develop to minimize the future potential for error?

11. Reactive: Should the error/errors occur again in the future (for some reason your strategies didn't work or other threats arose that resulted in the error/errors occurring again) how would you react differently in your response to the error/errors?

Risk:

12. What was the level of risk or consequences?

13. What resources were left to "save the day"?

14. Ask the "what if" questions. Think of realistic "what if" questions that are appropriate to the flight; not something that there wasn't even a possibility of it happening (i.e. what if we had hit a meteorite)

How much time was spent as a crew <u>together</u> on the Post-Flight Debrief? _____

Marks for LOFT #4 Post-flight Debriefing: 5%: thorough, complete, clear examples and explanations 4% mostly thorough, good examples, 3%: some specific examples, some vague, general examples 2%: lacking depth, only providing vague, general examples 1%: incomplete, requiring re-submission

MRU Aviation AIRF 3206, LOFT #4

Individual Assignment

Length of this section is a ==minimum== *of one full page* ==single-spaced,== *12 point font, to* answer the questions thoroughly. ==Ensure there is no additional spacing included (some== ==people have additional spacing automatically set on all their documents in their Page== ==Layouts). Don't include the questions in your submission, just list "a", "b", etc. Don't== ==double space in between questions or the title; the entire page must be double spaced== ==without additional spaces. If the minimum length is not submitted, the assignment will== ==not be accepted.==

Note: This is a *self-reflection*, therefore this needs to be about **you**, not the crew.

a. Explain your individual specific goal (re: CRM / TEM) that you set prior to this final LOFT. Did you meet your goal? Why or why not? What learning can you take away?

b. Refer to this document: the 6 CRM *AREAS* (reference the words / examples used).

- Comment on your excellence in one *AREA* of CRM. Provide an example from the LOFT.

- Comment on one *AREA* you feel you could improve. Provide an example from the LOFT.
  (You MUST pick one specific area – don't say you could improve in all of them)

c. Refer to this document: the 5 *ELEMENTS* of CRM(reference the words / examples used)

- Comment on your INQUIRY. Was it weak or strong? Provide an example from the LOFT.

- Comment on your ADVOCACY. Was it weak or strong? Provide an example from the LOFT.

d. This section is wide open for you to comment on anything you want about LOFT 1 through 4. Completely up to you! (Just don't skip it).

Keep in mind that this is about learning about yourself, not about the end result of the simulated mission: please do NOT reference anything along the lines of "well, I made it there safely so I think I did alright". We know that a safe landing does not automatically mean the individual or the crew was at their best performance in CRM.

Marks for LOFT #4 Individual Assignment: 5%: thorough, complete, clear examples and explanations 4% mostly thorough, good examples, 3%: some specific examples, some vague, general examples 2%: lacking depth, only providing vague, general examples 1%: incomplete, requiring re-submission

MRU Aviation AIRF 3202
LOFT Assessment by Instructor

The instructor's portion of the LOFT assessment will be based on the **crew** performance as indicated by the Behavioural Markers below. However, the assessment will also include the crew post-flight debrief which immediately follows the flight. The reflection and self-awareness is the greater consideration in this learning experience.

The assessment comes down to one question:

Assessment: Does the student demonstrate effective CRM skills*, reflection, self-awareness, and interpersonal skills?

No – 0   Somewhat – 1   Yes – 2

*assessed through *crew* performance, according to the Behavioural Markers listed below:

CRM Behavioural Markers

1. Poor	2. Acceptable	3. Good	4. Outstanding
Observed crew performance had safety implications	Observed crew performance was adequate, but needs improvement	Observed crew performance was effective	Observed crew performance was truly noteworthy

Situational Awareness

Situational awareness is often referred to and discussed in training as though it were a commodity, something tangible. It is not. Situation awareness, or perception, is a very personal, individual, interpretation of the world, filtered through the candidates level of experience, awareness, and attention. An individual's reality will change as new information is received. It is only when crewmembers openly communicate and share their interpretation that effective situational awareness takes place. **This communication or exchange of perceptions then becomes the medium through which SA can be observed and assessed.**

Situational Awareness		
Plans Stated	Shared understanding of plans. "Everybody on the same page" Clearly states intentions and goals	
Inquiry	Question, investigate, and/or clarify. Crew members not afraid to express a lack of knowledge or understanding.	
Monitor/ **Crosscheck**	Crew actively monitored and crosschecked systems, and each other. (Perception checking) Aircraft position, settings and crew actions are verified.	

Decision Making (Threat Management)

In assessing a crews decision making process, it is impossible to "Get in the crews head" to assess **how** a decision was made. Only the outcome and the verbal process can be observed and graded. Did the crew consider alternate courses of action identify potential threats associated with them?

Decision Making (Threat Management)		
Risk Assessment	Crew identified risk, and discusses potential threats, and future problems	
Option Generation	Crew anticipated, developed, and communicated strategies to manage operational challenges. States alternative courses of action. Asks other crew members for options.	

Workload Management

Is the measure of the crew's effectiveness in maintaining an appropriate pace, especially one that could be maintained by the slowest member of the crew. Observable behaviours such as; Taking condition of crew members into account, Helping others in demanding situations, allocating sufficient time to

complete tasks, defining roles and responsibilities, distributing workload and use of automation help determine the measure of effectiveness.

Workload Management		
Workload Management	Operational tasks prioritized. Avoided task fixation and did not allow overload	

Automation Management

Is the measure of the crew's effectiveness in utilizing the automation to alleviate workload and enhance situational awareness.

Automation Management		
Automation Management	Automation was properly managed to balance situational and/or workload requirements. Automation setup was briefed to other crew members.	

Communication

As all the other categories all require a skill in clear communication, the assessment of communication skills is implicit in the rating of any of those categories, and should be referred to in the debrief of those skills. Some elements of communication to consider;

Communication		
Quality of communication	Was the communication used clear unambiguous and understood. Was there clear acknowledgement.	
Utilization of Resources	Were other groups / people (ATC, F/A, OCC) contacted or utilized, as appropriate.	