

Note: The main theme of this workshop is directed towards classroom training.

CRM FACILITATION WORKSHOP — THURSDAY 1330-1500

- The role of facilitation
- Understanding your clients
- Human Factor Threat & Error
- Is culture an issue?
- Story Telling does it work?
- Evidence based CRM relevance
- Where to find your evidence
- Exercises that work for your specific target audience



SOUTHERN CROSS - CRUX

- Distances in light years: 4.37 -88.6 - 230 - 279 - 322 - 350 -400
- Brightest Pointer Alpha Centauri – 3 Stars
- A & B components orbit one another every 79.91 years (1.68 – 5,33 billion km apart)
- 4.37 light years from the sun
- At 58 000 km/h (speed of Mars One Explorer) would take 81128,71 years to reach Alpha Centauri
- Modern Homo Sapiens approx. 50 000 BC
- Our Universe 93 Billion light years across







MESSIER 51 – THE WHIRLPOOL GALAXY

- Approximately 31 million light years away (NASA).
- Light from this constellation started its path to earth long before humans (in any form) existed.
- Light is an electromagnetic energy that travels in waves.
- Only energy visible to the human eye.





ATOMS

- Atoms range from 30 to 300 picometers (1 x 10⁻¹² m or 1 ten millionth of a millimetre).
- Average atom Nucleus = a marble, the electron = a grain of sand, one kilometre apart.
- Remove the space between the nucleus and the electron and the entire world will fit in a matchbox.
- A glass of a certain atom dispersed equally throughout the worlds oceans would result in taking the same glass anywhere in the world, scooping the sea water and there would be 18 000 of the original atoms in that glass.







THE ROLE OF FACILITATION





UNDERSTANDING YOUR CLIENTS/PARTICIPANTS

ADULT LEARNING PRINCIPLES

- Adults are internally motivated and self-directed
- Adults bring life experiences and knowledge to learning experiences
- Adults are goal orientated
- Adults are relevancy orientated
- Adults are practical
- Adult learners like to be respected









FLIGHT CREW – NO TECHS





THE 24 PILOT PERSONALITY TRAITS (ALPA)

- Physically and mentally healthy
- Reality based
- Self-sufficient
- Difficulty trusting anyone to do a job as well as themselves
- Suspicious
- Intelligent but not intellectual
- They like "toys"
- Good at taking things apart and putting them back together
- Concrete, practical, linear thinkers rather than abstract, philosophical, or theoretical.
- More analytical than emotional.
- Reality-oriented
- Goal-oriented

- Short term goal orientation and not longterm goal driven.
- Bimodal (black/white, on/off, good/bad, safe/unsafe)
- Tend to modify environment instead of their behaviour
- Hunger for excitement
- Competitive
- Do not handle failure well
- Low tolerance for personal imperfection
- Long memories of perceived injustices.
- Draw conclusions about people at a glance rather than relying on long and emotionladen conversation.
- Avoid introspection
- Have difficulty revealing, expressing, or even recognizing feelings.
- When experiencing unwanted feelings, a tendency to mask them with humour or anger.



AIRLINE PROFESSIONAL CULTURE

20 out of 83 Nationalities in a



CABIN CREW QUALIFICATIONS

	Cabin Crew	Bachelors Degree	Masters Degree
	13	4	3
	16	8	3
	17	7	2
	25	19	0
	19	14	4
	18	6	1
	13	10	2
	13	7	3
Total	134	78	18
Ratio	7,44	4,17	1,00

On average, for every seven CC, four will have a Bachelors and one a Masters

Other qualifications and skills found in this sample:

Accountants, Advanced rescue diver, Banker, Belly dancer, Counselling skills, Dental nurse, Financial advisors, Forensic psychologist, Journalist, Lawyer, Martial arts skills, Psychologists, Rafting guide, Ski instructor, Taekwondo instructor, Teachers ...

Survey conducted on 8 random flights (Middle East)

GENERATIONAL DIFFERENCES

1400



140

HOW DO THEY LIKE TO LEARN?







STORY TELLING - DOES IT WORK?

This is an individual exercise and not a team exercise. Please conduct the quiz in absolute silence.

QUIZ TIME – CONDUCT WITHOUT TALKING

- 1. Regarding the Southern Cross, how far in light years is the closest star?
- 2. What is the name of the brightest pointer?
- 3. About how long would it take us to reach the brightest pointer if we travel at 58 000 km/h?
- 4. What is another name for the Messier 51 galaxy?
- 5. What is the only energy visible to humans?
- 6. How many millimetres in a picometer?
- 7. What is the relative size of an average atom?
- 8. If we removed the space between the nucleus and the electron, what size would the earth be?
- 9. If we pour a beer glass of a certain atom into the sea and allow it to disperse evenly throughout the worlds oceans, how many of the same atom would you have if you scooped the same beer glass into the ocean anywhere in the world?

- 1. 4.37 light years
- 2. Alpha Centauri
- 3. About 81 000 light years (81128,71)
- 4. The whirlpool galaxy
- 5. Light
- (1 x 10⁻¹² m or 1 ten millionth of a millimetre)
- If the nucleus was a marble and the electron a grain of sand, they would be 1 km apart
- 8. In a matchbox
- 9. 18 000 atoms





STORY TELLING WORKS

- Selling items on Ebay <u>https://www.youtube.com/watch?v=Nj-hdQMa3uA&t=17s</u>
- It provides a conceptual background to the data you are providing.
- It aids in creating links to the data your provide.
- It "paints" a picture in the mind that is easier to recall than singular items.
- The use of case studies aids the understanding of where and why the data should be utilised.
- Ask the older captains for their "there I was " events.
- Make sure you summarise the story with your links to the human factors you are trying to sell.





HUMAN FACTORS THREAT AND FRROR



EXERCISE – IDENTIFYING THREATS

- A threat is an external event to the individual that could result in the individual (aircrew/cabin/operators, etc) from diverting from their initial intention.
- Think about a typical, or not so typical, threat that could cause your crew/operators to divert from their intended path.
- Each table should have a flipchart with one of the threats listed on it.
- Please identify typical errors that people make when trying to manage the threat listed on your page.
- There is no right or wrong and the errors should not be edited i.e. write down all the errors that your table generates.



EXERCISE – CLASSIFYING THE ERRORS

- Consider each error and categorise it into one of the following categories:
 - Communication
 - Leadership and teamwork
 - Situational Awareness
 - Workload Management
 - Problem Solving and Decision Making



CRM COMPONENTS

EBT CORE COMPETENCIES	Communication	Workload	Situational Awareness	Problem Solving and Decision Making	Leadership & Teamwork
CRM or No Techs Components	Coordination inside and outside the flight deck	Human Error & Reliability	Vigilance & Monitoring	Error Chain	Operator Safety Culture
	Communication	Error Prevention and Detection	Situation Awareness Processing	Information Acquisition and Processing	SOP's
	Language	Stress & Stress Management	Automation	Decision Making	Organisational Factors
	Sharing Mental Models	Fatigue	Philosophy on the use of Automation	Skill & Reliability	Leadership
	Assertiveness & Verbal Intervention	Workload Management	Perception	Judgement	Team Behaviour
		Surprise and Startle	Attention		Synergy
					Personality & Cultural Differences
					Coordination & Role Definition





SIGNATION OF AN ISSUE?

CORE COMPETENCIES FOR EBT 44 846 GRADED EVENTS – DATA SKEWED BY CAPTAINS, TRE/TRI'S & TENURE IN THE COMPANY – DATA FIRST OFFICERS ONLY



Graded from 1 to 5. Grade of 1 or 2 requires a repeat.





N=1394, Std Dev = 0.07598,



Grade Average



COMMUNICATION

N=1394, Std Dev = 0.1127



Grade Average



PROBLEM SOLVING & DECISION MAKING

N=1394, Std Dev = 0.0729



SITUATIONAL AWARENESS

N= 1394, Std Dev = 0.094741



Grade Average

LEADERSHIP, TEAMWORK & SUPPORT

N=1394, Std Dev 0.080713



Grade Average



EVIDENCE BASED CRM -RELEVANCE

USING EBT TEM STRATEGY TO SELECT YOUR TOPICS • Severity

Likelihood

- 1. Rare once in a career or less;
- 2. Unlikely a few times in a career;
- 3. Moderately likely once every 3-5 years;
- 4. Likely probably once a year; and
- 5. Almost certain more than once a year;

- 1. Negligible insignificant effect not compromising safety;
- 2. Minor reduction in safety margin (but not considered a significant reduction);
- 3. Moderate safety compromised or significant reduction in safety margin;
- 4. Major aircraft damage and/or personal injury; and
- 5. Catastrophic significant damage or fatalities;

Note.— The most likely outcome, not the worst possible outcome, should be considered.

- Training Benefit
- 1. Unimportant training does not reduce severity;
- 2. Minor enhances performance in managing an event;
- 3. Moderate having no training compromises safety;
- 4. Significant safe outcome is unlikely without effective training; and
- 5. Critical essential to understanding the event and coping with it.

Source: ICAO – Manual of Evidence Based Training – 2013 (Doc 9995 AN/497 Chapter 3 Par 3.3.4)



WHERE TO FIND YOUR EVIDENCE





FINDING DATA

- All shared common traits:
 - Observation and
 - Creativity
- Observation flights vs Observing sim sessions
- What do people do and how do they interact
- Observing students in work groups while conducting exercises
- Metacognition Thinking about thinking
- Provide seeds for thought that they take home with them







DETECTION OR RECOGNITION

"I have observed the other pilot make errors due to a lack of knowledge /understanding of the automation"





DETECTION OR RECOGNISING

"I have observed the other pilot make errors due to lack of knowledge /understanding of the automation" Responses based on Years in Aviation







DO OPERATORS REPORT EVERYTHING?



Source: Monitoring & Automation Questionnaire (326 Pilots : 145 Captains & 161 FO's)

OPERATORS ADMITTING THEIR MISTAKES?

"If any of the crew has made an error and the other crew member, or SOPs has caught it and it has been corrected, I do not feel it necessary to report this event" (N:81, Ave: 3.839, Mode: 4, Std Dev 0.872)



FINDING HF DATA FOR YOUR CRM COURSES



QUESTIONNAIRES

- Draw up your questions in a certain subject or core competency.
- Ask others outside your department to review the questions.
- Do a test run with a small sample of random recipients.
- Change the questions or format of the questions if required.
- Throw out those that don't really work.
- Be very thoughtful and specific in drawing up your questions (see next 2 slides).
- Do not ask questions that will implicate your crew.



SELF INCRIMINATING

300

"My decision making ability is as good in emergencies as in routine flying conditions"





CAN BLAME IT ON WORKLOAD – NON INCRIMINATING

"I am more likely to make judgement errors when the workload is high"







DESIGNING EXERCISES SPECIFIC TO YOUR TARGET GROUP

PURPOSE OF CLASSROOM EXERCISES – BUILDING RESILIENCE





SEEING IS BELIEVING (WHETHER IT IS FACT OR NOT)

- Decision Making Exercise as part of CRM Initial
- Colombo or Mali?
- Ditching?
- Visual evidence Ethiopian Airlines Comoros
- 15 January 2009 Sully in the Hudson









STAYING FACTUAL – PROVIDING TRUTH

- When did heavier than motorised flight start?
- 17 December 1903 (37 meters in 12 seconds) with two more flights of 51 and 62 meters.
- 121 years (to the day) after the Montgolfier Brothers successfully conducted a balloon flight on 17 December 1782
- 20 September 1904 first full circle turn.
- 26 September 1905 first flight longer than 30 minutes.
- Always provide a source or reference to your material – provides students with ability to go and read more. Not all – but some will want to.









Pilot Confidence & Automation — Dunning Kruger Effect

"I would be able to fly a SID and meet all target speeds and altitudes, without the auto pilot, auto-throttle and flight director, i.e. totally manually."



Source: 243 Pilots (118 Captains & 125 FO's)

DUNNING-KRUGER EFFECT

- "Suggests that poor performers are not in a position to recognize the shortcomings in their performance"
- "If you're incompetent, you can't know you're incompetent"
- Yet, competent students tended to underestimate their own competence
- 400 plus one-on-one HF sessions often revealed an overall lack awareness of own performance
- Practical complex exercises aided the individual in realising their actual ability





EXERCISES



- Make them relevant to your crews.
- Improving resilience complex joint exercise at the end of the day. Explain that it resembles a landing accident – end of flight (end of day) when resilience is most needed.
- Some exercises can take a long time and this needs to considered based on the amount of time that is allocated to the course, initial vs recurrent vs joint.
- Most important of all exercises is the debriefing. Provide sufficient time to take home the learning points through a facilitated feedback discussion.







EXERCISE EXAMPLE - COMPONENTS OF RESILIENCE

- Self Control acting or reacting
- •Adaptability improvise & creativity
- Optimism maintaining a positive outlook
- Self Sufficiency trust in own talents & solutions
- Persistence stick-to-it attitude

Measuring your own GRIT (Resilience) https://angeladuckworth.com/grit-scale/



HF TRAINING COMPONENTS OF RESILIENCE

- Self Control stress & workload management, decision-making, judgement & knowledge
- Adaptability information processing, situational awareness, knowledge
- **Optimism** communication, attitude and behaviour
- Self Sufficiency personality awareness, selfassessment and self-critique, conflict management, leadership
- Persistence assertiveness, teamwork, fatigue and vigilance



EVACUATION EXERCISE CABIN CREW

Flight Brief

- You are finishing a flight and the aircraft is coming into land;
- After touch down the aircraft is involved in an accident;
- As Cabin Crew you are required to manage the evacuation;
- During approach you have no indication that there is any abnormal situation.









EVACUATION EXERCISE - CABIN CREW



- <u>To evacuate the following rules apply:</u>
- For all decisions/actions you must consider your "Öwn Airline" procedures
- You can only pick up and drop one bean in time with the clock beat (audio)
- If you determine you are unable to use your door you can pass your beans into another crewmembers zone
- You will be provided cards that represent the conditions you are experiencing (water level, smoke etc.) you must react accordingly
- Do not read your card to others, you can only communicate as you would in the cabin
- You have a limited time.





GALACTIC BATTLE – A GOOD JOINT/COMBINED EXERCISE BUT CAN BE CONDUCTED WITH A MONOGAMOUS GROUP AS WELL.

SITUATION

It is the year 2060 and you are on board the Battle Craft the "Lemac". The Snoobab's have attached a Toidi bomb to the craft.

It cannot be detached since this will cause it to blow up with a force of 200 Megatons, destroying yourselves and the fleet.

You need to get back to the mothership and dock, entering your calculated ATA into the bomb to defuse it.

EXAMPLE OF CARDS HANDED OUT

HOW MANY MIRS ARE THERE IN AN HOUR? 18	WHAT IS A MIPP? 20	A MIPP IS A WAY OF MEASURING DISTANCE. 22
THERE ARE 2 MIRS IN AN HOUR. 19	WHAT IS A DAR? 23	A DAR IS 10 WORS. 21
WHAT IS A WOR? 25	A WOR IS 5 MIRS.	HOW FAST DOES THE LEMAC TRAVEL FROM THE CURRENT POSITION TO STELLAR LACTIC? 26



USE OF VIDEOS

- Make them short and relevant.
- But don't leave it there explain and link to your central theme.
- Example: The Monkey Mind and Meditation. <u>https://www.youtube.com/watch?v=4PkrhH-bkpk</u>
- If you are going to use videos from the Aircraft Accident series, BBC, Air Crash, on aircraft accidents, make sure you can edit them down to the more factual aspects of the accidents. Lots of sensationalism on most of the movies.
- While humorous videos are fun, make sure you explain the relevance of the lesson.





	AIRBUS
BOEING	R – Recognise
N – Navigate	A – Assess
M – Manage	E – Evaluate
A – Alternatives	D – Decide
T – Take Action	T – Take Action
E?Evaluate	E – Evaluate & Monitor
	R – Resume Normal Flight



BIASES INFLUENCING JUDGEMENT

- More than 200 biases which could affect judgement
 - Decision making, belief and behavioural biases = 123
 - Social Biases = 27
 - Memory error and Biases = 42
 - Additional Cognitive biases = 28
- Maybe concentrate more on what affects individual judgement prior to making a decision than forcing Decision Making models (27 plus) onto crew.



UPDATING YOUR INITIAL CRM

- WE ARE
- The initial crm course will remain stagnant over a long term.
- Have to present all of the initial subjects over a 3 year term.
- A lot of work (start at least 7 8 months before release) is done on the recurrent themes.
- Once completed over the year place the recurrent modules into the initial crm (make sure all required regulatory aspects as covered).
- In this way, the initial remains updated and new entrants are being subjected to the same data as the existing crew.









ADDITIONAL DATA TO SUPPORT CRM CREATION

CRM GUIDANCE

- EASA Crew Resource Management in Practise December 2017 <u>https://www.easa.europa.eu/document-library/general-</u> <u>publications/crm-training-implementation</u>
- UK CAA <u>https://www.caa.co.uk/Safety-initiatives-and-resources/Working-with-industry/Human-factors/Crew-resource-management-training/</u>
- UK CAA CAP 737: Flightcrew human factors handbook <u>http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&m</u> <u>ode=detail&id=6480</u>
- Why CRM? Helmreich <u>https://booksite.elsevier.com/samplechapters/9780123749468/97</u> 80123749468.pdf
- CASA Australia CAAP SMS-3(1) (April 2011) <u>https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/dow_nload/caaps/ops/sms-3-1.pdf</u>
- CAA New Zealand AC 121-4 (Dec 2013) <u>https://www.caa.govt.nz/Advisory_Circulars/AC121_4.pdf</u>
- Skybrary -

https://www.skybrary.aero/index.php/Category:Human Factors T raining



CRM GUIDANCE WORLDWIDE – JOINT/COMBINED TRAINING

- FAA AC 120-51E Crew Resource Management Training 2004 "Joint CRM training for pilots and flight attendants is not required by FAA regulations, but it is encouraged and has been practiced effectively at some air carriers for years."
- UK CAA CAP 737 Crew Resource Management (CRM) Training November 2006 ("There is some combined CRM Training with Flight Crew in the 3 year syllabus" – Nov 2017)
- CASA Australia CAAP SMS-3(1) (April 2011) Approved on a case-tocase basis – some flight crew/cabin crew coordination
- CAA New Zealand AC 121-4 (Dec 2013) "The ground training programme should include an interactive training session involving flight crew and cabin crew members"
- EASA GM3 ORO.FC.115 (March 2019) Consolidated AMC & GM to Annex III (Part-ORO) ORO FC – March 2019. Operators should provide combined training for flight crew, cabin crew and technical crew during recurrent CRM training.
 - (i) combined CRM training: 6 training hours over a period of 3 years; and
 - (ii) initial operator's CRM training: 18 training hours with a minimum of 12 training hours in classroom training;



TRAINING PILOTS

UK CAA - PRACTICAL CREW RESOURCE MANAGEMENT (CRM) STANDARDS: THE HANDY GUIDE

1. CRM training has clear aims in terms development of specific skills

2. Routine and overt use of **Behavioural Markers** in **briefing and debriefing**

3. **Trainers are able to identify CRM root causes** of both effective and poor performance

4. Simulator lessons allow crews to **practice time management skills** that replicate the real world

5. Instructor is able to pass on practical CRM tips to enhance **pilot performance**

6. Instructors can use CRM models or illustrations to help **pilot understanding**

7. Instructors are able to facilitate effectively to a reasonable standard

8. Instructors limit the number of debrief items to **maximise in-depth learning**

9. Trainers are able to role model CRM skills

10. Training is **practical**, and **integrates** both **technical and CRM / TEM aspects**



FAA AC -120-51E - TOPICS FOR JOINT TRAINING

- Examples of shared issues include delays, the use of personal electronic devices in the cabin, evacuation and ditching, and hijack response.
- Other specific topics for joint training include:
- (a) Pre-flight briefings;
- (b) Post incident/accident procedures;
- (c) Sterile cockpit procedures;
- (d) Notification procedures (pre-takeoff and pre-landing);
- (e) Procedures for turbulence and other weather;
- (f) Security procedures;
- (g) Passenger-handling procedures;
- (h) In-flight medical problems;
- (i) Smoke/fire procedures;
- (j) Passenger-related regulations such as those relating to smoking (section 121.571), exit row seating (section 121.585), and carry-on baggage (section 121.589); and
- (k) Authority of the pilot in command.



CRM MODULES

<u>Individual Human Factors</u> (Intrapersonal)

- Cognitive Factors/Patterns of human error
- Situational Awareness
- Physiological Factors
- Decision Making & Judgement
- Self-Management
- HMI (Automation)
- Information Processing
- Personality Profiles
- Risk Management

<u>Team Process</u> (Interpersonal)

- Communication
- Transactional Analysis
- Leadership
- Workload Management
- Assertiveness
- Conflict Management
- SOP's
- Threat & Error management
- Cultural Influences

Included recently: Monitoring and Intervention, Startle Effect, Resilience and Jet Upset Recovery



AMC/GM TO ANNEX III (PART – ORO)

- "Should ensure following aspects addressed":
 - Automation and philosophy on use of automation
 - Monitoring and Intervention
 - Resilience Development
 - Performance Adaptation
 - Surprise and Startle Effect
 - Cultural Differences
 - Operators Safety culture and company culture
 - Case Studies



THANK YOU FOR YOUR PARTICIPATION

Lrheemstra@gmail.com