Crew Resource Management and Aircraft Science as a Contribution for Medical Science

O Crew Resource Management como Contributo da Ciência Aeronáutica para a Ciência Médica

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Introduction to Crew Resource Management

Crew Resource Management (CRM) is based on the need to better understand factors related to accidents. The introduction of black boxes in the aircrafts pinpointed the main causes of accidents to be uncontrolled procedures, followed by inadequate and untimely situational awareness. These induce distortions in risk analysis with consequences on the decision-making process. In other words, accidents are essentially due to behavioural-related reasons rather than to technical failures.

Statistical analysis shows that three in every four accidents occur in an airplane with no technical abnormalities and are instead related to 'pilot error' or to factors that could have been prevented. CRM emerged as an important tool for classroom and simulator-based Refresher, Training and Evaluation courses.

These behavioural characteristics are related both to aircrew and medical team environment. Disciplined procedures, leadership, teamwork, risk analysis and decision-making, stress, fatigue, workload and lifestyle management *versus* rest management, communication and critique, conflict management, discipline and accuracy, voluntary safety report culture and individual and organizational error management, routine error acceptance and underlying conditions and complacency are, among many others, some of the human factors that contribute to safety.[1]

Safety culture

In aviation, the implementation of Safety Culture is based on keeping the number of events, incidents or accidents below an acceptable level. This commitment involves discipline and professional skills regarding attitude, knowledge and its application.

A high price has to be paid for safety, as underlined in a symbolic statement used in Flight Safety Departments: 'if you think safety is expensive, try the accident'.

Error culture is a little subjective and although we know "to err is human", we must learn from each other's errors, through accident and incident analysis as well as through the voluntary reporting of situations with a negative impact on safety.

Reporting culture

Reporting is a major safety requirement, an added value in every professional area, promoting progress and a change for the better. Confidentiality and trust should obviously be met.

Turning an operating room into a cockpit should be performed under a behavioural perspective. Both are in fact very different professions, both being highly specialized and supported by advanced technology, in the event of an error that might place human life in danger.

An error is natural, not reporting is intentional. In aviation, reporting a mistake that prevents a future accident should be a cause to celebrate. A reporting culture should be based on a non-punishment principle, as well as on learning from other's errors.

Our Latin culture often prevents us from admitting to an error: we tend to passively accept what are known as latent conditions, which sooner or later can lead to an incident or accident, making us as accomplices.

Checklist

Checklists are essential for aviation error prevention, interruption and distraction management, workload and priority allocation, conflict management and decision-making, a quick adaptation to new procedures, communication and interpersonal assertiveness, standardisation of procedures and a better situational awareness and mutual supervision.[2]

The checklist principle and discipline protects us

1. Piloto de Linha Aérea e Responsável pelo CRM de todos os tripulantes. TAP. Lisboa. Portugal.

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from our own weaknesses, such as forgetfulness, fatigue, doubts and personal methods, among others.[3] However, it can only be enforced in a disciplined fashion; in other words, it is not enough to respond 'check', if confirmation is not undertaken before responding. Indiscipline is the opposite of discipline and the limit between both is very slim, unfortunately explaining many accidents.

Assessment

In aviation industry, performance is subject to regular Supervision and Assessment, requiring a constant update. In common language, I would say that we are pleased when things go well and we are not pleased when they do not, even when we know why. Pilots, as physicians, always want a good outcome.

Pilots are assessed several times per year, a procedure that should be the rule in every profession. In this world of rights and duties, there should be a call for greater liability in performance and commitment which would benefit us all.

We usually do not like to be evaluated. We all have weaknesses that we avoid to expose. However, our commitment would not be so strong and wrong practices and forgetfulness would arise if there was no evaluation, due to the lack of continuous update.

However, assessment should not be randomly performed. It is necessary to carry out honest assessments allowing for the identification of situations leading to anomalies. Assuming that such situations do not exist translates into voluntarily following an organizational errors and feeding latent conditions. That is why the evaluator's professionalism and exemption are so essential – and therefore the evaluator's role, together with the instructor's should also be assessed.

The assessment principles follow well-defined requirements. Refreshing of theoretical and airplane systems knowledge is annually carried out. Learning is subsequently trained on a simulator and assessed the following year. In addition, our proficiency impels us to perform adequately in every flight and not just during checks or trainings.

Human factors

Communication between aircrew members, call-outs or warnings, conflict management, leadership and team spirit are essential human factors for an aircraft pilot, as for any other profession; communication problems arise as a result of "how" a sentence is formulated rather than "what" it means, where and in front of whom the interaction takes place. We all know how we do not like people to talk to us, a matter of intellectual honesty not to do it to others. Effective

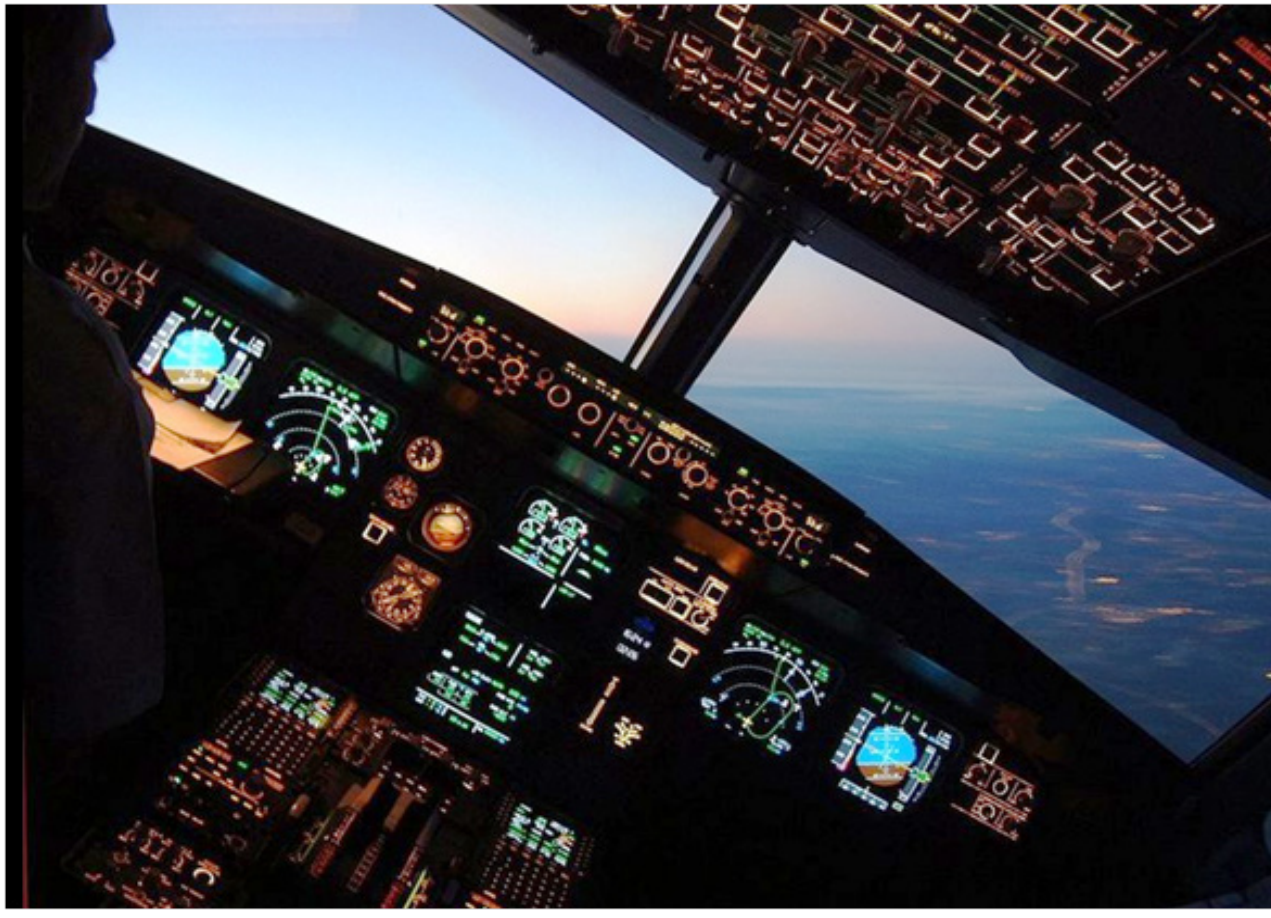

Figure 1 – Cockpit environment

communication is based on good education and mutual respect. For instance, when we make an observation to someone, this should be done in a positive way, aimed to improve things. On the contrary, a destructive observation is difficult to explain and provides no results.

In conflict management, it is important to differentiate conflicts of ideas from personal conflicts. We all know the results of 'pouring oil over troubled waters' or 'adding fuel to the fire' but we sometimes end up in situations that only bring unfavourable results for everyone. These situations are unthinkable and counterproductive in the cockpit.

The workload management means to recognize that we all lose certain elementary capacities under high workloads. For instance, we stop paying attention or we do not listen to important details. Good management of this issue requires correct and timely task delegation, establishing priorities and the practice of what we define as anticipating requirements.

Leadership should be about serving rather than exercising power. A team leader is only another team member. When acting as such, the team is united; otherwise the leader risks isolation in a fundamental moment. To lead is to like people and to know them before judging.

The presence of two pilots within the cockpit leads to intended redundancy, supervision, assertiveness and team spirit regardless of each other's experience or responsibility.

Briefings clarify work strategies and contribute to remembering every detail during takeoff and approach and landing under normal as well as under an emergency situation. They also facilitate supervision and assertiveness by the other pilot easier under deviation from what was previously accorded.

Debriefings are part of the oral reporting culture: at the end of the flight, honest self-criticism, aimed to learn and recognize what could have gone better remains important.[4,5]

Accountability

Understanding error chains is a crucial issue – including some previously referred intimate aspects as well as external factors such as Air Traffic Control, meteorology, legislation or even luck and chance. What is really important in error chains is that we usually are the last link; in other words, an accident is avoided thanks to attitude and professionalism.

Society has evolved towards the need to find accountability. It became increasingly necessary to identify the responsibility in accidents, with pressure from the family of the victims, insurance companies, aircraft operators, aircraft manufacturers, the media, political pressure and even from the Pilot-in-Command regulation.

This is based on a 'Just Culture' concept which is not always well understood. If error is well accepted and even praised when it has been reported, negligence or gross violation is not tolerated, resulting in investigation or disciplinary procedures and giving way to the concept of organizational error or accident. That is the reason why airline safety blacklists exist.

We are increasingly facing 'organizational errors'. We keep on postponing major decisions, with the best of intentions. In aviation, the lack of opposition towards postponement may turn out to be costly.

Sterile cockpit

Within the sterile cockpit's concept any communication not directly related to ongoing activities is to be prevented – below certain altitude, when ascending and descending, thereby imposing a clearly defined concentration strategy aimed to avoid distractions during the critical stages of the flight.

Statistics show that accidents mostly occur while taxiing, during takeoff and on approach and landing. Therefore concentration has to be promoted during these critical stages and irrelevant issues have to be avoided.[6]

Aircrew

One of the major differences between aviation and medicine regards the team composition in each flight. In aviation, aircrews are rarely the same, which is considered as an advantage against carelessness. Within the narrow space of a cockpit the pilot's mood easily spreads. When you always fly with the same crew, routines are encouraged and over time these may lead to laid-back situations and to indiscipline which does not allow for the correct attitude at the first attempt.

Another difference between both professions regards the working time and rest management before and after flights, issues which are mostly dependent on both lifestyles, regardless of what is regulated. In aviation, working time limitations depend on factors like presentation time, the number of landings and the number of pilots, among others. In medicine, limitations in working time are related to times of rest and therefore rest management does not always follow the recommendations.

When the established rules are not followed in aviation authority, the following outcomes are considered: routine error, indiscipline, lack of leadership, organizational error, latent condition and gross violation, amongst other aspects that may lead to error.

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REFERENCES

1. O'Dea A, O'Connor P, Keogh I. A meta-analysis of the effectiveness of crew resource management training in acute care domains. Postgrad Med J. 2014;90:699-708.
2. Schlack WS, Boermeester MA. Patient safety during anaesthesia: incorporation of the WHO safe surgery guidelines into clinical practice. Curr Opin Anaesthesiol. 2010;23:754-8.
3. Sparkes D, Rylah B. The World Health Organization Surgical Safety Checklist. Br J Hosp Med. 2010;71:276-80.
4. Manser T. Fragmentation of patient safety research: a critical reflection of current human factors approaches to patient handover. J Public Health Res. 2013;2:e33.
5. West P, Neily J, Warner L, Mills P, Mazzia L, Paull D, et al. Surgical programs in the Veterans Health Administration maintain briefing and debriefing following medical team training. Jt Comm J Qual Patient Saf. 2014;40:235-9.
6. Fore AM, Sculli GL, Albee D, Neily J. Improving patient safety using the sterile cockpit principle during medication administration: a collaborative, unit-based project. J Nurs Manag. 2013;21:106-11.

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