International Journal of Psychosocial Rehabilitation, Vol. 23, Issue 06,
2019 ISSN: 1475-7192

Crew Resource Management and Communication

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Abstract--- *Communication is one of the few unbounded topics with several definitions and applications as it is so central to human endeavour. Communication is an integral part of the social sciences, whether printed, verbal or non-verbal, remote or face-to-face: political science, anthropology, sociolinguistics, psychology, etc. Beyond conventional scholars, conversation is pragmatic; that is to say, people interact to gain what we need and achieve goals. In this paper, researchers demonstrates about the communication in terms of success; people are confused or understood, knowledge is transmitted or not; they are either unmoved or convinced. Communication skills helps determining the failure or success of achieving goals, and communication efficiency becomes important when one's ambitions are added to the high stakes.*

Keywords--- *Crew Resource Management, Applications, Communication, Psychology.*

I INTRODUCTION

There's no question that working in today's airspace is a high-stakes career since every flight spends lives and expensive properties. Communication, as in other dynamic, human-technical processes, plays an important role in achieving goals, organizing people and managing activities. In this segment, we would like to highlight the importance of communication for safe and efficient flight operations and their role throughout achieving mission objectives and facilitating the “Crew Resource Management” (CRM) [1].

The material was updated to reflect how collaboration has developed as a CRM capability over the last 11 years. The major differences are in the final segments of the paper. Since 1992, CRM training and assessment methods have evolved dramatically and the manner in which collaboration is now educated and tested represents similar intellectual development. It is no longer considered a common soft ability that “they will know when they see it” but it is difficult to pin down. Today, preparation and assessment have developed, particularly in the simulator, where coordination metrics are related to specific performance targets in flight phases and under particular operating conditions [2].

Flight safety and communication*:*

Perhaps the most vivid and convincing examples of the connection between connectivity and flight safety emerges from the National Transportation Protection Board (NTSB) crash reports undertaken in the USA. Consider the case of "Avianca flight #051", a Boeing 706B from Columbia, Medellin, to "John F. Kennedy International Airport" (JFK), New York, running out of fuel across Long Island; Many crucial coordination errors were evident; in fact, the crew failed to communicate the details to the air traffic control (ATC) that they were extremely low on fuel and

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Received: September 2019 | Revised: October 2019 | Accepted: November 2019

required urgent permission to land [3].

After a failed approach to JFK was conducted, the crew suffered power loss on all 4 engines and crashed about 14 miles from the airport. The NTSB traced probable cause of the crash to the flight crew's failure to properly control the fuel load on the aircraft and their failure to report an immediate fuel condition to ATC until fuel was depleted. Safety issues that included external troublesome ties to contact included:1. Pilot and dispatch duties for the training, fuel needs and flight follow-up on international flights; 2. Pilot to controller correspondence on the terms to be used to communicate fuel status and the special handling provision; 3. ATC flow management protocols and aircraft accommodation duties for low fuel condition and 4. Coordination of flight crew and ability of foreign crews to speak English [4].

In Fig. 1 Bi-directional arrows are shown on the vital contact connections. Although the reason behind the accident is due to Link #2, it has called into question at least four sets of information/communication linkages. The concept of co-ordination of crew has always been an important component of better communication between many crew members. The first reference by NTSB of' "flight deck resource management'" was made in the 1977 crash report of "United Airlines flight #172" in Portland, Oregon.

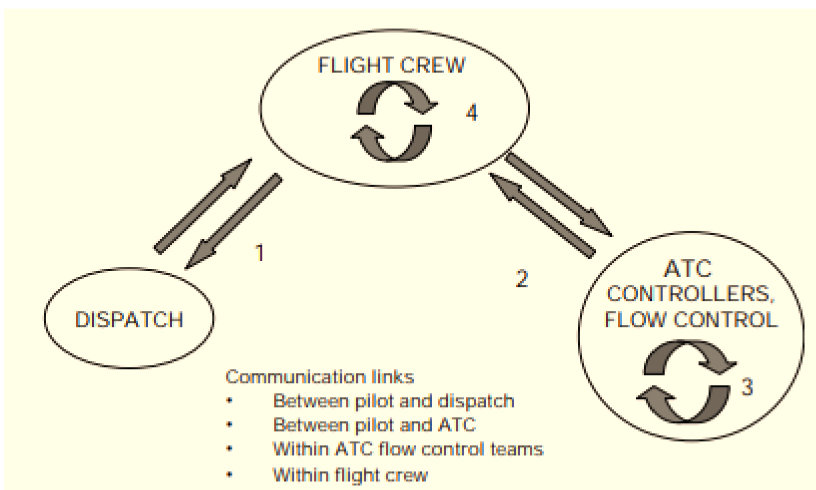

Fig. 1: Critical information links in the Avianca flight #051 accident

Another result of that inquiry was the "FAA Air Carrier Operations Bulletin Number 8320.16", which gave information for air carrier flight crews on interpersonal communication or resource management preparation. Such action was taken in reaction to one of NTSB's four guidelines that concentrated on both participatory captain control and assertiveness instruction for other crew members in the cockpit. The NTSB has been continuing to consider the possible effect of crew resource management and crew contact in sequences of injuries since 1978.

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

NTSB reports, however, also recognize cases of exemplary CRM in their findings based on communication data provided by the voice recorder (CVR) in the cockpit. Perhaps the most dramatic cases are United 810 and United 233, where interactions between flight crews were" indicative of the value of cockpit resource management training that has existed at UAL for a decade." An overview of the CVR interactions established specific patterns of contact that may have led to the outstanding CRM.

A number of organizations (e.g. associations, airlines and national government repositories such as the NASA Aviation Safety Reporting System (ASRS)) produce and compile incident reports in much larger numbers, as opposed to accident reports. Such findings are typically sent anonymously and cannot be said to reflect an unbiased perspective on all aspects of the aviation program. However, further groups of incidents may suggest repeated spots of trouble. In fact, the US-wide survey review informs us whether such problems occur throughout the aviation sector, or whether they are unique to specific geographic areas, airspace, airports, weather conditions, etc.The function of contact is not directly observed since voice recordings are not included in incident reports. For instance, an accident identified as a question of “workload control” may be caused in part by the inadequate communication style of a pilot. Face-to-face contact within the flight deck or between flight crew leaders and ground support staff may not be understood so quickly or identified as a communication problem. In brief, the amount of explanation is left to the particular author, who in their narrative account may or may not provide any information.Although communication issues cannot be evaluated at a level of “transcript” word-by-word, data from events can support higher-level evaluations. For starters, researchers analysed the flow of knowledge issues in the aviation system and found that in this area fall over 60 percent of the 27,000 reports submitted by pilots and air traffic controllers. Studies centred on contacts between pilot / manager and dispatcher to monitor communications more often than conversations within the cockpit [5].

Cockpit Voice Recorder (CVR):

One of the first detailed studies of interactions from CVR records was undertaken by scholars outside the field of official investigations. Hypotheses arose out of understanding that, as suggested by the NTSB, instruction in assertiveness may be needed for junior crew members. A classification scheme was designed to distinguish mitigation levels (i.e. direct communication versus softened communication) in order to study crew member assertiveness, and included speech types such as explanation, planning, and command and control. A command stated in the imperative form, for example, is less mitigated than a suggestion which is usually spoken as a question. To consider whether captains were engaging in crew member participation, mitigation levels were compared across positions, captain vs. first officer (FO), or second officer (SO), respectively. The findings, which were based on eight transcripts and 1,645 speech events, included: Subordinate crew members were distinguished by a more mitigated (softened) manner of making requests; mitigated voice was correlated with subsequent subject shifts and ungratified orders, suggesting less effective mitigated communications; requests were less mitigated in recognised emergencies or problems [6].

Whereas alleviated requests seemed less effective at generally eliciting a response, this pattern of speech usually happened during less crucial phases of flight. Conversely, demands were less mitigated (hence more effective) at periods when issues were known. In brief, it did not appear that the use of mitigated expression was an easy or common procedure. Alternatively, mitigated messages during different flight environments seemed to meet different purposes.

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

For instance, the use of recommendations rather than orders during a pre-departure briefing can be a means of promoting crew member involvement; although in a crucial stage it could be an ineffective strategy.

Problems associated with communication research:

A main problem in the context of CRM analysis is to what degree findings generalize to the" real world." Analysis methodology presents a first constraint. For starters, field research in which an analysis is performed while operations face validity which is difficult to match with other approaches. Field studies however are restricted in ways that decrease their scope. Because field studies sometimes constitute of travelling with flight crews for many hours, this may reduce the number of crews that could be reasonably sampled. Therefore, a study has minimal control over environmental or operating environments, and therefore cannot effectively control interest factors. On the other side, laboratory studies still lack the practical sensitivity to generalize results into the real world with certainty, even if the circumstances are carefully monitored and the data are secure. What researchers have thought and continue to believe today is that full-mission simulation provides an outstanding solution, providing sufficient flexibility for experimental conditions to establish operationally realistic scenarios [7]. In fact, the advantages of full-mission modelling for work in the testing and assessment field are significantly magnified.

The researchers' implemented high-fidelity full-mission simulation methodology not only provided a scientific advance for CRM researchers but was a valuable tool for extracting other results from CRM analysis. Nonetheless, it is important to keep in mind that researchers made choices based on research intent, even in the best full-mission simulation. Such choices lead to the collection of specific conditions and architecture manipulations best suited to the research question. These options at the same time restrict the results to a limited range of real-world operations. Specific types of challenges, for example, are designed into situations and create opportunities to evaluate the decision-making and crew management capabilities of pilots. But each scenario is bound necessarily to the specific conditions and issues incorporated, thus exempting many other differences. So the conclusions decided on the basis of a single complete-mission study or a single "line operational simulation" (LOS) scenario must be carefully qualified.

Ultimately, question emphasis is limited by simulation constraints (e.g., it is challenging to practical scenarios involving cabin crew) and the study goal. Of starters, from a CRM viewpoint, we frequently concentrate on interactions within the flight deck and therefore do not look deeply at the pilot / ATC linkages although they have been shown to be critical in accident reports and accidents. A pilot / controller partnership study found that pilots were more likely to have rendered operational errors as ATC economized their workload by writing longer texts. In addition, non-routine transactions also involved procedural deviations.

The findings suggesting these possible pilot / ATC tradeoffs indicate that (1) pilot contact and workload experiments can identify the problem area very broadly and should assume that both pilot and controller efficiency is impaired by their interactions and (2) significant training consequences that emerge for both pilots and controllers when their communications are tested directly. This is not to say that all research must include pilot / ATC procedures, but care must be taken to validate conclusions drawn from studies that exclude those facets of flight operations.

Developments in Investigation and communication:

In both aircraft and space incident research, extensive use of speech review allows use of voice records and

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

transcripts. Scientists have always used the "cockpit voice recorder" (CVR) evidence to help them understand the incidents and circumstances surrounding an incident, but with the awareness and acceptance of CRM principles, scientists have started to implement structured approaches for evaluating CVR transcripts and concentrating on CRM activities as part of a more general human output analysis. A formal study of interactions from the CVR and a review of CRM habits are now common in many countries. Such analyzes were also applied to operations in space.

Methodologies for the analysis of communication have integrated most of the principles of communication pointed out earlier in this section; for e.g., an admiration of many tasks that communication serves. A prominent example is use of contact details to promote the development of consistent behaviour; the use of communication protocols, in particular in radio communications, and the use of standard procedures such as briefings and check lists. Another prominent example is use of data from communication in assistance of the absence or presence of team relations. Communications can in some cases indicate uncertainty about governance or tension that closes down communications [8].

Communications, as an enabler for strategic, operational, and CRM targets, are often the primary predictor for an evaluator to determine that clear priorities have been met. Key developments in event-set methods have enhanced assessment procedures in the LOS context. At the same period, it has allowed evaluators to make fairly transparent use of communications as measures of scientific, operational, and CRM priorities. Many chapters discuss in detail the nature of LOS scenario and the roles of instructor / evaluator, but it is only when LOS has implemented a structured framework for the implementation of stimuli and behavioural markers that assessments can be carried out more effectively and accurately.

In flight process event sets have unique operating conditions within which such crew activities are expected to take place. Behaviours are differentiated even more finely by position (CA versus FO) or pilot flying versus pilot control. While in any case both functional targets and organizational goals are needed because they are part of normal processes, main behaviours can be analyzed by creating operating variables that include target behaviours. Because the situation is controlled, pilot options can be controlled comparatively well and certain target behaviours must occur within a suitable timeframe [9].

The capacity to design-in the sense of specific challenges-is the best way to test, train and assess new procedures and technology. Monitoring crew performance in the simulator could be an effective way to evaluate the suitability of the new procedures and techniques as well as a way to determine what training is needed with the appropriate changes in procedures, policies, and possible new best practices. Via AQP and the introduction of successful LOS, crew efficiency control can be accomplished across ship and company-wide deployments, thus improving instructor / evaluator effectiveness at the same time [10].

II CONCLUSION

Communication is a workhorse which is best supported by CRM preparation and assessment. Communications found within the CRM and AQP system, and using collections of LOS incidents, are the action markers for many organizational and CRM goals. Communication as a practical skill has thus found a useful place in simulator training, which can hardly be matched anywhere else. Nonetheless, looking to the future, there are always different opportunities

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

to achieve. The new area that is most convincing is in effect an existing field that has never been fully implemented, namely the pilot / ATC system. Since we expect a lot of new practices related to data processing and navigation protocols, such adjustments must be integrated into the roles of controller and pilot. Ideally, a type of pilot and controller operational simulation could be used to research, train and review the techniques as they are being created rather than after they have been introduced.

Finally, flight deck technologies such as the "Electronic Flight Bag" (EFB) and other changes in display will also alter the pilot's task. Another concern, as with other types of automation technology, is that pilots may keep their heads down when engrossed in their latest source of information, thereby losing awareness of the situation. Furthermore, management of the EFB can generate unnecessary workload during a time-critical flight period if these activities are not properly incorporated into a sufficiently scheduled flow and correctly spread throughout pilot positions.

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Received: September 2019 | Revised: October 2019 | Accepted: November 2019