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Functional aspects of pilots' professional communication

Communication in aviation is both a key tool for the effective use of available resources and a factor contributing to the creation of a safer and more secure flight environment. The linguistic and functional aspects of oral (speaking and listening) and written (writing and reading) communication activities of the flight crew during the flight and its preparation have been outlined.

Professional pilot communication is an important element of aviation safety and flight control efficiency. It covers various aspects of the interaction between crew members, pilots, and other members of the aviation system, such as air traffic controllers, ground handling, etc. For effective pilots' professional communication, fluent English language proficiency is needed.

Communication in aviation establish a number of requirements to the language used by aircrew in flight: the language used employs a specific set of vocabulary, and functions; operational efficiency, rather than linguistic correctness, is the ultimate criterion by which proficiency is evaluated; communication is predominantly oral and most often with no visual contact [6].

Aviation authorities (ICAO, FAA, etc.) require that applicants for a language proficiency certificate be able to read, speak, write, and understand English [1; 3]. This prompts us to outline the functional aspects of both oral (speaking and listening) and written (writing and reading) communication for the crew during flight operations or preparation for them.

Listening and speaking skills are necessary for all primary types of professional communicative activities for pilots (communication in-flight and on the ground, communication with passengers).

This is primarily realized as radio telephony communication between pilots and air traffic control (ATC) in controlled airspace. Radio Telephony (RTF) is conducted so that ATC can 1) inform the crew about the situation in the flight area, the condition of the airfield, technical indicators of communication and radio systems, and emergency situations; 2) manage aircraft maneuvers, maintaining safe intervals to prevent dangerous proximity and collisions with each other and with obstacles on the airfield and in flight; 3) request information about the status and location of aircraft. The crew uses RTF to 1) report on the progress of the flight, and communicate the status of the aircraft and the situation occurring during the flight; 2) obtain clearances (warnings, permissions) for certain phases of the flight, etc. Thus, the communicative goals of RTF communication are information dissemination, requests, control, and the guidance of aircraft by ground services. The norms of RTF communication are based on the following principles: the forms of speech used (commands, clearances, requests, instructions, advice, prohibitions, etc.) must ensure minimal distortion and loss of information; in most cases, receiving information should be accompanied by a

response ("readback/hearback"); the number of words in RTF sessions and their duration should be (if possible) minimal. Functionally, RTF communication is a hierarchically organized speech act, structured into dialogic utterances.

Oral interaction during flight is not limited to voice radio communication between "pilot and controller." It also includes face-to-face communication between pilots in the cockpit. In cockpit communication, the following main speech forms are distinguished: 1) commands for specific actions or maneuvers ("Gear up," "Flaps 20"); 2) reports on command execution, confirmation of received information ("Descending," "...to 4 nm, speed 160"); 3) requests for information ("Heading request"); 4) utterances that do not carry command or operational information: denials, comments, exclamations, etc. The first three forms constitute the essential basis for crew communication; they are regulated and codified in rules that standardize voice radio communication. The last form is often considered excessive, or "noise," beyond the scope of routine technological verbal interaction. Communication during flight must be clear, precise, and informative. Since "the timing of information transmission is as important as the quality of the information" [2], a characteristic feature of utterances in RTF discourse is brevity.

The main difficulties that pilots and controllers experience with this type of communication are related to insufficient levels of correct understanding/formulation/transmission of information during radio exchanges. This occurs due to poor knowledge of RTF phraseology by pilots, inability to correctly, grammatically, and clearly describe the flight situation, poor articulation, etc.

Ground communication between pilots occurs during the pre-flight and post-flight stages of the crew's flight operations. The main functions of verbal communication between pilots and ground personnel are informational and regulatory. In this regard, ground communication is similar to the in-flight communication mentioned above, but it differs significantly in genres, forms, and styles of speech. Ground communication for pilots is realized in the following functional styles: official, scientific, and conversational (the choice depends on the situation, communicative tasks, and the relationships (formal/informal) between interlocutors). Oral speech is used in both dialogic and monologic forms across a broad range of genres: reports, announcements, briefings, discussions, etc.

The main difficulties that may arise during communication between pilots and ground personnel are related to constructing utterances in various genres and styles, as well as pilots' inability to select from available linguistic resources those that ensure the effectiveness of verbal influence, etc.

Communication with passengers is usually mediated through announcements made by the crew on board the aircraft. Direct interaction between crew members and passengers occurs rarely, only in some non-standard flight situations and when safety issues require it. Aviation psychologists note that the inability of the cockpit crew and cabin crew to make announcements can provoke passenger aggression and pose a safety threat. Sometimes the crew provides flight information too quickly and unclearly. In such cases, passengers cannot process and monitor the information, which may lead to anxiety that can escalate into aggression. This typically happens if crew announcements do not meet the following standards: they should be made in a

calm, confident tone; be clear, precise, and understandable; delivered at an appropriate pace; and avoid terms such as "emergency stop," "accident," "damage," etc.

In cases of direct communication with passengers, difficulties in professional communication for pilots may be related to insufficient knowledge of speech etiquette rules, inability to establish contact, and failure to project the communicative profile of the conversation partner, among other factors.

Given that pilot flight activities involve information overload, time constraints, working under stress, and the inherent limitations of human capacity, aviation experts have concluded that relying solely on the human memory of those operating an aircraft is insufficient to ensure flight safety. Non-standard flight situations require operations and actions that pilots do not frequently perform under standard flight conditions, which increases the likelihood of errors in the sequence and accuracy of these actions. Therefore, specialized technologies are implemented in pilot operations to minimize these risks, and these technologies require well-developed written skills.

Modern aircraft are equipped with an Electronic Flight Bag (EFB), which, for example, for Airbus family aircraft, includes more than ten manuals and reference guides. One of the first is the Flight Crew Operating Manual (FCOM), which aims to: 1) provide all necessary limitations, procedures, and system information required by the flight crew for the safe and efficient operation of the aircraft during normal, non-normal, and emergency situations; 2) serve directly as the Flight Crew Operating Manual or as a basis for operators to develop their own individual airline-specific Operating Manual in accordance with applicable requirements; 3) function as a comprehensive reference guide during initial and recurrent crew training.

The role of reading skills is reinforced by the fact that modern types of aircraft are equipped with advanced electronic computing systems, which, in the event of unusual flight situations, offer pilots possible solutions to the problem. The information is displayed on computer screens, and reading is the only way to access this information. In addition, the work of pilots is associated with constant knowledge updates and skill improvement, which requires both practical enhancement of skills and deepening of theoretical knowledge. This leads to the processing of significant amounts of information in printed form (such as documents from the on-board library and other printed materials of educational, informational, and instructional nature).

Writing skills are also important for pilots' communication with ground personnel. Writing is used during both pre-flight and post-flight phases of work. There is a special Technical Log Book on board the aircraft, in which the aircrew records information about the flight route, its duration, and other details. The use of written skills by the cockpit crew is specified in regulatory documents: for instance, a captain must ensure "timely entry into the relevant technical documentation of information regarding detected aircraft malfunctions on the ground and in flight, as well as deviations in the operation of the aircraft or its systems" [4]. Parke, Patankar, and Kanki, in their study on shift turnover-related errors in aviation, highlighted work cards as a contributing factor to a significantly higher proportion of incidents involving communication problems during turnover [5]. Vieira and Santos suggest that improving the completeness and accuracy of writing will result in a significant reduction in shift turnover communication problems [2].

Thus, high-quality professional communication is the basis of safe aircraft operation. Reliable information transmission will reduce the number of aircraft accidents. That's why a high level of foreign language proficiency is one of the most important aspects of training, not only for pilots but for all personnel involved in flight preparation and execution.

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