Data Link Technology

Until recently, communication between pilots and air traffic control (ATC) has mainly consisted of oral communication using a radio link. This is a fundamental premise of ICAO's language proficiency programme: the rating scale includes listening and speaking skills but does not address reading or writing.

In the last two decades, though, there has been increasing use of data link technology, which allows text messages to be transmitted between pilots and air traffic controllers. Known as controller-pilot data link (CPDL) or controller-pilot data link communications (CPDLC), this technology is now in use around the world. The aim is to make pilot-ATC communication more efficient, thereby reducing delays and increasing airspace capacity.

Data link systems allow air traffic controllers to transmit routine messages, which are shown on a visual display in the cockpit. Controllers can send various types of message: ATC clearances (e.g., level and speed assignments), radio frequency assignments, and requests for information. Pilots can respond to ATC messages, request and receive clearances and information, and report information. In addition, there is a free text function for exchanging information that does not conform to defined formats.

In the future, these systems will play an increasingly important role in pilot-ATC communication. As noted by Baumgartner (2017), this raises several questions:

- Do pilots and controllers trust a human voice more than an electronic text message?
- How will the new technology affect the distribution of attention in the cockpit?
- Will data link systems eventually replace oral communication altogether?

In addition to these questions, a significant limitation of data link systems is the possible degrading of pilot situational awareness due to the loss of so-called "party line" information, which comes from listening to the radio communications of other aircraft (Estival et al., 2016; Midkiff & Hansman, 1992). Another important issue is the vulnerability of data link systems to cyber attack (Gurtov et al., 2018).

References

Baumgartner, M. (2017). Communication and technology at the interface. *Hindsight 26*, 26-27.

Estival, D., Farris, C., & Molesworth, B. (2016). *Aviation English: A lingua franca for pilots and air traffic controllers*. Abingdon, Oxon: Routledge.

Gurtov, A., Polishchuk, T., & Wernberg, M. (2018). Controller–pilot data link communication security. *Sensors, 18*(5). Retrieved from http://www.mdpi.com/1424-8220/18/5/1636/htm

Midkiff, A. H., & Hansman, R. J. (1992). *Identification of important "party line" informational elements and the implications for situational awareness in the datalink environment*. Proceedings of the SAE Aerotech 92 Conference (Paper No. 922023). Warrendale, PA: SAE.

SKYbrary (n.d.). *Controller Pilot Data Link Communications (CPDLC)*. EUROCONTROL. Retrieved from https://skybrary.aero/articles/controller-pilot-data-link-communications-cpdlc