Masters’ Thesis

Integration of Controller-Pilot Data Link Communication (CPDLC) Functionality into a Flight Management System

Flight Guidance

Task Description:
Controller-Pilot Data Link Communication (CPDLC) is a means of communication between air traffic controller and pilot, using a data link. The communication is performed through a wide range of clearance, information and request message elements. CPDLC as a digital means of communication for air traffic services offers the possibility to translate ATC commands directly into a format, which is readable by the flight management system. The major objective of the proposed thesis is to develop a CPDLC application, which interprets the received messages and generates corresponding flight guidance commands to automatically react to ATC instructions.

Work Packages:
- Identification of relevant CPDLC messages and specification of communication procedures in the context of UAS operation
- Analysis and specification of required functionality to automatically respond to ATC instructions and to fulfill communication regulations of civil airspace
- Implementation of datalink protocol de-/encoding functions for on-board application
- Implementation of a GUI for a ground station to support CPDLC communication
- Implementation of functional modules for interpreting decoded messages (uplink) and for automatically generating response messages (downlink) in Simulink
- Verification in Model-in-the-loop and Hardware-in-the-loop Simulations
- Investigation and discussion of challenges, potentials and risks that the use of CPDLC implies in the context of integrating UAS in civil airspace

Requirements:
- Interest in flight guidance and control
- Experience in Matlab programming language and Simulink is required
- Good knowledge of C is desired

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