

OPERATION OF AUTOMATED AVIONIC SYSTEMS

GROUP MEMBERS:

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DESCRIPTION/ AIM:

To investigate flight control systems, with an overview of the evolution of flight control systems and current implementation of the technology. Also aim to focus on one or two specific key aspects of the technology, with the possibility of simulation of one of these aspects.

CONTEXT OF DSPC TECHNOLOGY:

The purpose of a flight control system (FCS) is to transmit the forces of the cockpit controls to the control surfaces (yoke for roll, column for pitch and rudder pedals for yaw). The latest type of FCS, the digital autopilot, uses digital computers to do signal processing. The cockpit controls operate signal transducers that generate the appropriate commands, which are then processed by a digital controller.

TECHNICAL ASPECTS/ RELEVANT THEORY:

A flight control system is a complex implementation of feedback control, which relies on mechanical sensors in order to control and improve the performance, stability and robustness of an aircraft.

Modern Aircraft use a Flight control system called “Fly-by-Wire” where with the invention of the autopilot it is possible to control an aircraft completely electronically. For modern autopilots, the signals transmitted are digital, and all the signal processing is done by a computer. This allows for increased flexibility in the aircraft abilities as well as increased stability. The computers read positions and forces from the pilots controls and sensors and then calculate the differential equations modelling the aircraft which in turn moves the flight controls to carry out the intentions of the pilot.

Another technology in automated avionics is FADEC (Full Authority Digital Engine Control) this means that the engines have full control over their performance and optimisation. This significantly reduces the pilots’ workload, which in large aircraft can be very demanding.

	<i>Project task / Outcome</i>	<i>Duration, Weeks (w)</i>		<i>Responsibility*</i>
1	Research into the evolution and history of flight control systems	2w	Week 5 & 6	A, D, P
2	Investigate algorithms used in commercial flight control systems	1w	Week 7	A,D,P
3	Future advances in flight control	1w	Week 8	A
4	Concept illustration of FADEC: Simulations	2w	Week 8 /Semester break	D,P
5	Investigation into FADEC	2w	Week 8/ Semester break	D,P,A
6	Begin writing report	2w	Week 9	D,P,A
7	Finalised report submission / presentation preparation	1w	Week 11	D,P,A

*Responsibility, D: Daniel, P: Priscilla, A: Anna