Remotely Piloted Aircraft Systems for Maritime Surveillance

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Remotely Piloted Aircraft Systems (RPAS) gain increasing interest and use for civil applications. However, regulation for integration in airspace is not harmonised in Europe. Also flying beyond the line of sight (BLOS) is only possible by use of command & control communication through a reliable relay system. The ESA project DESIRE (Demonstration of Satellites Enabling the Insertion of Remotely Piloted Aircraft Systems in Europe), investigated to fly an RPAS as IFR (Instrument Flight Rules) traffic within national borders in controlled, non-segregated airspace by communication link via satellites. A real-time man-in-the-loop simulation environment has been set-up, where real air traffic controllers, a real pilot (for other traffic), and a pilot at an RPAS ground control station (GCS) participated to evaluate the concept. Several representative scenarios were evaluated, including emergency situations. Also the additional work load brought to air traffic controllers was investigated using the NASA TLX method.

We have shown that integration of RPAS in controlled airspace is a feasible concept. Air traffic controllers indicated that control of the RPAS did not differ significantly from control of other, manned aircraft, although at the beginning a slightly increased workload was observed. We have also demonstrated that RPAS emergency procedures can be designed equivalent to those of manned aircraft, such that the air traffic controller will understand and is able to predict the behaviour of the RPAS in several loss-of-satellite-communication situations.

The simulations paved the way for real flight demonstrations with a Male RPAS in non-segregated airspace for maritime surveillance missions.