Integrating RPAS

Integrating unmanned flights into today’s ATM system is increasingly important.

With the huge increase in the use of remotely piloted aircraft systems (RPAS), the ATM industry is focusing on how best to incorporate RPAS into the global civil air traffic management environment, seamlessly, efficiently and safely. CANSO is working with other stakeholders in the ICAO process to develop the international standards and recommended practices (SARPs) that will form the basis for the regulatory framework.

As part of this effort, areas have been identified that will need to be addressed to safely accommodate RPAS, mainly in segregated airspace.

Accepting a large number of RPAS into the ATM system poses many challenges for ANSPs. Their speed, maneuverability, climb rate, and other performance characteristics, together with their avionic system equipage can differ substantially from conventional aircraft. Experience of RPAS operations and their interaction with the ATM system to date indicates that, currently, they are unable to comply with many standard, routine ATM procedures. While this has not prevented RPAS operations, it has limited their integration into the ATM system thus far.

Safety remains the industry’s number one priority. International regulations and standards require that any new system, procedure or operation that has an impact on the safety of ATM operations must be subject to a risk assessment and mitigation process to support its safe introduction and operation. The safe integration of RPAS into the ATM system with other airspace users is subject to standard safety management system (SMS) principles. RPAS are classified as aircraft and therefore should comply with the rules for flying, certifying, and equipping aircraft. A key factor in safely integrating RPAS in non-segregated airspace is their ability to act and respond in an equivalent way to manned aircraft. Therefore, there must always be a pilot responsible for the RPAS operation.

States are fully engaged in defining the processes to integrate RPAS. In Europe, the SESAR Joint Undertaking is looking at the regulatory arrangements and R&D activities needed. It is looking at where there are synergies with manned aviation so that it does not develop specific solutions for RPAS. NextGen in the United States is in a similar position, in the definition phase.

This highlights the necessity for global standards early on in the process. To that end, CANSO actively participates in the work of the ICAO UAS Study Group – operating under the CANSO Collaborative Airspace Workgroup – and is encouraged by ICAO’s announcement to elevate the Study Group to a Panel, in view of the all-encompassing nature of the technical provisions that need to be developed and promulgated. CANSO is represented by Doug Davis (Northrop Grumman Corporation) and Brian Guimond (NAV CANADA), providing input to the development of SARPs that will impact ANSPs.

The Study Group is making progress on a RPAS Manual, scheduled for release in 2015, that will include a focus on ATM integration. Though much work needs to be accomplished for specific areas such as airworthiness and flight crew licensing, it is recognised that there must be a balanced approach that considers the operational environment that encompasses the global ATM system.

Sense and avoid

Critical to RPAS accommodation is maintaining the high level of safety the global ATM system has been able to achieve. Technical progress around the development of ‘sense and avoid’ systems is difficult to ascertain, while frequency spectrum availability remains a key challenge as RPAS require more spectrum in view of the command and control communication requirements between RPAS and the pilot. At the same time, the demand for RPAS access to civil airspace continues to increase.
To inform the debate about the incorporation of RPAS, CANSO recently published ANSP Considerations for RPAS Operations. This publication is designed to raise awareness, provide examples and raise some of the issues that ANSPs need to consider when integrating RPAS into airspace. It lists some of the challenges to be overcome and gives examples of how two CANSO Member ANSPs accomplished RPAS integration in Switzerland and the United States. While not exhaustive and with the expectation that this will be an evolutionary document, it provides a good understanding of some of the issues facing RPAS integration into the ATM system. It is an information document and is not intended as a guide to incorporating RPAS, nor does it seek to make recommendations.

As an example of what the Guide covers, Flight Data Processing Systems (FDPS) will be challenged with accommodating the changes that RPAS will bring:

- FDPS may have difficulty processing RPAS flight plans, due to elements such as the flight profile, duration of the flight, inability to specify zero persons on board and alerting requirements.
- The accommodation of a RPAS by an FDPS may require special handling, such as the submission of multiple flight plans or the issue of revised secondary surveillance radar (SSR)/beacon codes.
- RPAS flight plans may need to be updated more frequently than others during their flight, due to long mission duration and operational mission needs or changes requested. Such flight plans may require more inputs as it may involve entering many route elements, such as latitude/longitude points as opposed to navigational aids, fixes and routes.
- There is no global set of RPAS performance characteristics and such data would therefore not be available to the FDPS.
- The impact of RPAS operations on the FDPS may include software upgrades or adaptation, production of associated manuals, briefings and staff training, which will all have budgetary implications.

As a case in point, the RPAS may wish to complete a spiral climb from the aerodrome of departure or may remain airborne for more than 24 hours, both scenarios that would be difficult to define in a standard flight plan.

Accommodating RPAS into the ATM system is being dealt with in two sub-classes: small, hand-launched RPAS that weigh under 25 kgs and are operating by visual-line-of-sight (VLOS) procedures, and are not transponder equipped; and larger RPAS that are operating Beyond-VLOS (BVLOS), and are equipped and operated similar to manned aircraft.

CANSO is currently developing training materials for ANSPs that will provide a basic level of understanding of RPAS, and their performance characteristics. Specifically, CANSO is working on a draft ATC Training Syllabus for RPAS Operations and an ATC Integration Impact Library that catalogues the changes necessary to move from RPAS accommodation to integration.

Good progress has been made to address the challenges of incorporating RPAS safely into the global air traffic management environment, but a huge amount of work still needs to be done. CANSO will continue to play a leading role so that RPAS are fully incorporated into CANSO’s vision of a seamless global air traffic management system.