

Unmanned Aircraft Systems Programme Office (UASPO)

SOUTH AFRICAN



***CIVIL AVIATION
AUTHORITY***

SACAA-Regulation of Unmanned Aircraft Systems in South Africa

SACAA - REGULATION OF UNMANNED AIRCRAFT SYSTEMS IN THE REPUBLIC OF SOUTH AFRICA

(presented by Andy Mamba)

Purpose

The purpose of this paper is to articulate the position of the SACAA with respect to its safety oversight functions as far as Unmanned Aircraft Systems are concerned. Article 8 of the Convention on International Civil Aviation states that:

“No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization. Each contracting State undertakes to insure that the flight of such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obviate danger to civil aircraft”.

It can be observed from the above that Unmanned Aircraft Systems were contemplated as early as 1944 and that they are indeed an integral part of civil aviation.

Historical background – International Treaties and Conventions on Sovereignty

The Treaties of Munster and Osnabruck (1648) enshrined into international law the principle of sovereignty of States: i.e. only States can adopt rules with force of binding law towards legal or natural persons.

Article one of the Chicago Convention extends the sovereignty to the airspace over the territory of a State. As a consequence, ICAO provisions have to be transposed into instruments having force of law towards citizens. The same approach is uniformly applied to almost all activities of modern mankind which have international relevance.

However, there are exceptions to which the principle of sovereignty does not wholly apply:

- The United Nations Convention on the Law of the Sea (UNCLOS) came into force in 1994 and replaced the older concept of the “freedom of the high seas” as well as the previous treaties of 1958. (All waters beyond the territorial ones, are hence considered “international”, and as such, free to all nations, belonging to none of them (the *mare liberum* principle published as an international juridical doctrine by Hugo Grotius in 1609);
- The Antarctic Treaty (1959) which, although not excluding sovereignty claims, established the framework for international control of that territory for peaceful use. Fifty years later, the Treaty still provides a sound basis for missions to Antarctica, while no sovereignty by any State has yet been established on it;
- The Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, which entered into force on 10 October 1967 and whose Article II states that "outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means". Therefore the law adopted under the aegis of the UN directly applies there;

Like many Acts of the Republic, the South African Civil Aviation Authority (SACAA) has been established on the basis of the South African Civil Aviation Authority Act No. 40 of 1998 hereafter referred to as the “Act”. The Act establishes the SACAA as a juristic person.

OBJECTS OF THE AUTHORITY

The objects of the Authority are to control and regulate civil aviation in the Republic and to oversee the functioning and development of the civil aviation industry, and in particular to control, regulate and promote civil aviation safety and security. The underlying factor of the Authority’s mission is to promote and maintain the highest standards of safety, security and environmental protection in the Republic and on the continent as well.

The Authority employs around 400 persons and will continue to recruit highly qualified specialists and administrators in the coming years as it consolidates its position as Africa’s centre of excellence in aviation safety.

LEGAL COMPETENCE OF THE SACAA

Presently the Authority is responsible for the airworthiness and environmental compatibility of all aircraft (manned or unmanned; aerodynes or aerostats; etc) as well as the safety regulation of their operations and flight crew. Furthermore the Authority has competence over second and third country operators.

The Authority is also responsible for the safety regulations regarding airports, air navigation services (ANS), air traffic management (ATM) and aviation security (AVSEC) . However, it has to be borne in mind that the following is excluded from the Authority's competence:

- Unmanned Aircraft Systems (UAS) and related operators and personnel, when engaged in military, customs, police or similar services (Article 3 of the Convention refers).

In other words, all civilian UAS registered in the Republic (or operated by an entity established in the Republic) shall be subject to SACAA policies and South African Aviation Legislation including their operators, pilots and maintenance personnel.

Furthermore, all civilian UAS operators established outside the Republic, should they wish to conduct commercial aerial work in the airspace over the Republic, will need prior authorisation from the SACAA. This condition shall be included in the pertinent UAS legislation in future.

SCAA APPROACH TO AIRWORTHINESS

In recent years considerable progress has taken place in the field of the Unmanned Aircraft Systems (UAS), not only concerning military applications, but also civil applications. There is an increased demand for UAS civilian operations in the commercial aerial work domain in the short, medium and long-term (i.e. before 2020). The regulatory framework needs therefore on one side to accompany the possible evolution of the state of the art, while on the other ensuring a sufficient level of safety, including protection of lives and property on the ground as well as minimising the risk of collisions with other traffic.

In accordance with the Proposed UAS Interim Policy of December 2008, the SACAA is responsible for the UAS airworthiness regulation of South African registered UAS. The Authority has established the Unmanned Aircraft Systems Program Office (UASPO) at its Midrand HQ.

- The SACAA has to establish new rules or specifications required for the airworthiness certification of UAS in the remit of the Airworthiness Requirements of SA-CAR Part 21.02.3. (e.g. FAR 23) could be the starting point to develop the certification basis, also taking into account the kinetic energy of the Unmanned Aircraft (UA).
- The airworthiness certification process will include the UA, the control station and the command and control link between the two.

- Guidelines for the operation and approval of visual line of sight UAS have been incorporated in the proposed interim policy document of December, 2008.

As to which type of airworthiness approval could be granted following an airworthiness assessment (i.e. Type Certificate TC or Restricted Type Certificate) will be decided on a case-by-case basis.

Furthermore, the SACAA plans to issue a circular on the airworthiness matter early in 2010 in order to provide more guidance to the industry when preparing applications for possible airworthiness. A number of requests for UAS civil applications have been received, including the National Health Laboratory Services (NHLS), the South African Weather Services (SAWS Intsikizi Rainbird Project) any many others.

AIR OPERATIONS AND PILOTS

The SACAA also needs to prepare itself to progressively develop, certification specifications (CS), acceptable means of compliance (AMC) and guidance material (GM) as appropriate, not only for the airworthiness and environmental compatibility for the UAS, but also for their crews and their operations.

While clear positions expressed by ICAO would ease the process, nevertheless any aviation safety rule in the Republic will have to be established accordance with the CARCOM rulemaking procedure and the standards introduced as per Article 22A of the Aviation Act No.74 of 1962. In fact, rules for air operations and flights crews are, although not sufficient in isolation, airspace management remains to be taken into consideration.

AIR TRAFFIC MANAGEMENT AND SPECTRUM –PRESENT AND FUTURE ASPECTS

The UASPO proposes that a Regulatory Impact Assessment (RIA) be conducted before proposing or adopting any possible rule affecting ATM. The RIA can be, where appropriate, an iterative process. While, according to UASPO`s information, complete consensus among the experts has not yet been reached on the architecture for UAS communications, UASPO felt that a preliminary impact assessment, specifically addressing such communications, was urgent and necessary. In fact their architecture may have a significant impact on safety, cost, and feasibility and time to start operations of civilian UAS in non-segregated

airspace classes, not to mention a different impact on the requirements for electro-magnetic spectrum.

The determination of the scope of the preliminary impact assessment on the communication architecture for civilian UAS, can be the first step of the RIA process. This study will however exclude the payload link(s) and the “sense and avoid”. Conversely it will concentrate on the following communication links:

- An air-ground link between the Control Station and the UA for command and control;
- An air-ground link between ATS/C and the UA for traffic surveillance (and/or communication) purposes, if assessed as necessary;

Communication link(s) between the UAS crew (course on the ground or airborne) and ATS/ATC.

This preliminary impact assessment will be used by SACAA in order to develop a coherent strategy for the safety regulation of UAS communications. More in particular the preliminary impact assessment shall identify and analyse perceived problems and determine general, specific and operational objectives to overcome or minimise them, together with a description of related indicators. Different main policy options shall be considered and will be analysed in detail and compared in terms of their potential impact and relevant credible indicators, specifically with regards to:

- Safety;
- Economy;
- Social impact;
- Use of electromagnetic spectrum (in fact ground-ground communications typically require much less spectrum, if any, than air-ground communications);
- Global interoperability;
- Impact on other existing ATM rules.

5.4 The final report should demonstrate that the various alternatives have been carefully analysed. In particular the following features will need to be considered:

- Analysis of the context, of the situation in the AFI region, as well as possible comparison with other regions/countries of the world;
- Identification of the emerging challenges for civilian UAS operations, with particular emphasis on the needs for communications for the safety of flight in non-segregated airspace classes;
- Comparison of the advantages and disadvantages of each identified option and subsequent selection of the most promising one.

The SACAA will have to monitor the said preliminary assessment and receive advice for future actions. The results of the preliminary assessment will be forwarded to ICAO so as to support ATNS and ICAO to determine future UAS ATM requirements.