



## WORKING PAPER

### THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

#### COMMITTEE A

#### Agenda Item 5: Emerging issues

#### 5.5: Other emerging issues impacting the global air navigation system including unmanned aircraft systems (drones), and supersonic and commercial space operations

#### OTHER EMERGING ISSUES IMPACTING THE GLOBAL AIR NAVIGATION SYSTEM

(Presented by the Secretariat)

| EXECUTIVE SUMMARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <p>This paper presents an overview of emerging issues that may impact the global air navigation system. It provides details on two new types of operations: the growing sector related to commercial space transport (CST); and the reintroduction of supersonic transport (SST) for civil use. While they are not yet fully operational, it is important to consider and monitor their development as these operations may become regular before the next thorough revision of the Global Air Navigation Plan.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>Action:</b> The Conference is invited to agree to Recommendations 5.5/x — Supersonic Transport (SST) and 5.5/x — Commercial Space Transport (CST) in paragraph 3.1.</p>                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>Strategic Objectives:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>Financial implications:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><i>Impact for the aviation community:</i></p> <p>States that will engage in commercial space operations, but have no current space launch capabilities, will need to invest significantly in their regulatory programmes and take into account skill sets that are not normally available to civil aviation authorities (e.g. space launch experts). The industry will need to participate in the collaborative processes established within civil aviation to ensure that all airspace users are provided equitable access. Some existing airspace users may be negatively affected by commercial space operations.</p> <p><i>Impact for ICAO (relative to the current Regular Programme Budget resource levels):</i></p> <p>The resources necessary to implement the recommended actions in paragraph 3.1 can be accommodated within the current regular budget resource levels allotted to the Safety and Air Navigation Capacity and Efficiency Programmes. States and stakeholders would, however, need to provide experts to the ICAO effort in highly specialized areas associated with commercial space operations.</p> |
| <i>References:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Doc 7300, <i>Convention on International Civil Aviation</i></p> <p>A39-1 — <i>Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise and local air quality</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## **1. INTRODUCTION**

1.1 Since the Twelfth Air Navigation Conference (AN-Conf/12), ICAO has been studying and monitoring several emerging issues that may impact the global air navigation system. At the time of writing, two specific items were seen as requiring the attention of the Conference, namely commercial space transport (CST) and supersonic transport (SST). While not yet fully operational they are in varying stages of maturity, from developing to testing to operational (albeit not frequently), and may indeed become regular before any future air navigation conference is held.

## **2. DISCUSSION**

### **2.1 Supersonic transport**

2.1.1 As at the time of writing, several initiatives were under way internationally on the development of supersonic transport aircraft. One manufacturer in particular informed the Second Global Air Navigation Industry Symposium (GANIS/2) (Montréal, 11 to 15 December 2017) that they would finish building their model for demonstration in 2018.

2.1.2 While the timeline for the eventual re-emergence of this sector is still difficult to estimate, ICAO and regulators should closely monitor the developments and, when necessary, engage their respective regulatory mechanisms to ensure that the necessary policies are in place before supersonic operations become regular again.

2.1.3 It should be noted that the 39th Session of the ICAO Assembly adopted Resolution A39-1 on “Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise and local air quality”, which included Appendix G on “Supersonic aircraft — The problem of sonic boom”.

### **2.2 Commercial space transport**

2.2.1 Over the past decade, progressive developments in the commercial space transportation industry sector have resulted in an increase in the frequency of suborbital and other space launches. This trend is expected to continue. While at the current time most launches are managed through segregation of mostly domestic and high-seas airspace, the frequency of operations will become more regular and the geography of their trajectories will transcend national boundaries. To that end, the important issues related to this sector in general, and to its safe accommodation in international airspace in particular, must be studied and addressed.

### **2.3 Current ICAO activities**

2.3.1 In 2014, ICAO conducted a Survey on Suborbital Commercial Space Transportation and Airspace Integration (State Letter AN 1/64-14/41 refers) which requested States and stakeholders to nominate experts to assist the Secretariat in examining this emerging mode of transport. In total, more than sixty experts were nominated and they currently meet regularly as the Suborbital Commercial Spaceflight Learning Group, an informal group tasked by the Secretariat to study the subject.

2.3.2 The scope of the group has been to undertake specific studies and subsequently develop informal recommendations to facilitate the conduct of suborbital commercial spaceflight (SCS) operations and their safe accommodation into airspace and aerodromes and/or spaceports.

2.3.3 As a priority, the group studies the impact on activities at aerodromes and in airspace of: SCS operations; landing of CST vehicles at aerodromes; and the concept of air/space ports.

2.3.4 As the main deliverable, the group is developing informational material based on the current regulations, practices and experiences of States that are engaged in the CST sector.

### ***Work with the United Nations***

2.3.5 It is important to note that the successful identification and resolution of CST-related issues involve both aviation and space sectors. To that end, ICAO closely cooperates on this subject with the United Nations, specifically its Office of Outer Space Affairs (UNOOSA). The main deliverable of that collaboration was a series of three jointly held aerospace symposiums.

2.3.6 Information on the symposiums, including a set of observations, was developed into Conference Room Papers (CRP) for consideration by the United Nations Committee on the Peaceful Uses of Outer Space (COPUS) which are available at: [http://www.unoosa.org/oosa/oosadoc/data/documents/2018/aac.105/aac.1051155\\_0.html](http://www.unoosa.org/oosa/oosadoc/data/documents/2018/aac.105/aac.1051155_0.html).

### ***Potential issues identified to date***

2.3.7 Through the symposiums and the work of the Learning Group, it has become increasingly clear that there are a number of potential issues that would need to be addressed in order to ensure the long term sustainability of the CST sector. These include, but are not limited to:

- a) challenges and risks posed by space debris and space weather to space flight and space operations, as well as to aviation;
- b) airspace management and utilization, and the protection of space systems and aviation systems taking into account the expected growth of both the CST and aviation traffic;
- c) effective management of safety in the transition through airspace, either to or from space;
- d) better coordination at the intergovernmental level with: 1) the Committee on the Peaceful Uses of Outer Space on issues related to potential overlaps between Air and Space law; 2) the International Telecommunication Union (ITU) on issues related to spectrum protection; and 3) others as appropriate;
- e) development of international policies and guidelines, including effective oversight of public safety, as well as due consideration for region-specific aspects of CST;
- f) the possible future establishment of a space traffic management regime, which would need to be safely interoperable with the existing global air traffic management system and supporting infrastructure;
- g) consideration of performance-based Standards to address risks associated with CST to allow for the flexibility of future technological development, increased predictability and transparency, enhanced implementation and effective management of safety; and
- h) recognition of the wide range of different “vehicles”, both manned and unmanned, and the challenges faced with their proper classification as a space object, an aircraft, or possibly both.

*Next steps*

2.3.8 While no specific need for the development of global CST-related Standards, i.e. uniform application necessary for the safety and regularity of international civil aviation, has been identified, there have been calls for ICAO to establish a more formal framework within which continued work on CST issues can be undertaken.

**3. CONCLUSION**

3.1 As outlined above there have been developments in the commercial space and supersonic transport sectors that should be closely monitored by the international aviation community as these types of operations may become regular before any future air navigation conference. Therefore, the Conference is invited to agree on the following recommendations:

**Recommendation 5.5/x — Supersonic Transport (SST)**

That the Conference:

- a) note the developments related to the re-emergence of the Supersonic Transport sector, including the work related to Appendix G of Assembly Resolution A39-1; and
- b) request ICAO and States to closely monitor the developments and, when necessary, engage their respective regulatory mechanisms to ensure that the necessary policies are in place before supersonic operations become regular again.

**Recommendation 5.5/x — Commercial Space Transport (CST)**

That the Conference, in recognizing the issues related to Commercial Space Transport (CST) operations potentially affecting international civil aviation, including the safe accommodation of CST operations into airspace and the joint use of aerodromes and other aviation infrastructure:

- a) note ICAO activities in the commercial space transport field and the need for ICAO to coordinate its work with the United Nations Office for Outer Space Affairs;
- b) request States and industry to support ICAO activities in the commercial space transport field through the contribution of relevant expertise; and
- c) request ICAO to establish a means to facilitate the sharing of information between States on practices relevant to the commercial space transport field.

— END —