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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

UNITED STATES SUBORBITAL REGIME AS IT RELATES TO THE USE OF CIVIL AVIATION AIRSPACE

(Presented by the United States)

EXECUTIVE SUMMARY

This paper presents suborbital spaceflight from the United States (U.S.) perspective, and addresses U.S. regulations for suborbital commercial spaceflight vehicles by providing an overview of the U.S. suborbital regime.

1. INTRODUCTION

Suborbital Flights: A Topic of Discussion

1.1 On 5 May 1961, Alan Shepard became the first American in space on a suborbital flight. Ever since this remarkable accomplishment in human spaceflight, the United States continues to pursue a space policy that supports technological advancement, scientific discovery, security, and economic growth. Since the passage of the Commercial Space Launch Act (CSLA) of 1984, the U.S. is licensing and encouraging the commercial (non-governmental) space sector to develop launch vehicles, re-entry vehicles, and launch sites.

1.2 Prospects for commercial spaceflight seem promising as capabilities continue to expand for suborbital space transportation. U.S. companies are exploring innovative concept designs in the development of suborbital space vehicles. They are making significant investments with innovative technologies to explore certain capabilities in the space environment.

1.3 There is a perception in the international aviation community that all suborbital vehicles must be treated in the same manner as other emerging technologies, specifically unmanned aircraft systems (UAS) and certain high altitude balloons. This is not necessarily the case. Suborbital vehicles accustomed to conduct flights for rocket powered launch and re-entry have not been universally or globally accepted as aircraft used in pursuit of an aviation activity. Although suborbital space vehicles

transit through navigable airspace, these space activities are not recognized as aviation activities under the U.S. legislative and regulatory structure. Suborbital space vehicles already have a space regime that has served as an oversight structure since 1961. Additionally, there are different views based on delineations between aviation and space vehicles. Delineations based on vehicle design (e.g. does the vehicle have wings?) lead to different conclusions from delineations based on vehicle function (e.g. does the vehicle go to space?).

1.4 Unlike aircraft, UAS, and balloons, suborbital space vehicles fall under the separate domain of space operations in the U.S. A suborbital rocket means a vehicle, rocket-propelled in whole or in part, intended for flight on a suborbital trajectory, and the thrust of which is greater than lift for the majority of the rocket-powered portion of its ascent. Suborbital vehicles are handled in a way that is unique relative to other vehicles (airplanes, helicopters, balloons, etc.), while managing airspace for potential operational hazards (e.g. point of instantaneous impact). Thus, these vehicles are regulated as licensed space activities consistent with international obligations.

1.5 Suborbital spaceflights are a resurgent topic of discussion around the world in various forums. Questions on whether suborbital vehicles fall under air law or space law are frequently raised, causing potential confusion for States. While the U.S. examines suborbital spaceflights as space activity and not aviation, it welcomes these discussions as the industry, technology, and law evolve. This paper presents suborbital spaceflight from the U.S. perspective, and addresses U.S. regulations for suborbital commercial spaceflight vehicles by providing an overview of the U.S. suborbital regime.

2. DISCUSSION

Commercial Space Transportation: A Matter of Innovation

2.1 The genesis of commercial space transportation in the United States began in the 1980s when U.S. national space policy recognized the commercial space sector. With infinite opportunities in the space sector, companies began pioneering new concept designs and technologies to enable humans to travel to space. Innovative concepts and designs are leading the development of an array of experimental vehicles, including state-of-the-art technologies. New suborbital vehicles in development are designed for local flights (same departure and landing site), not point-to-point transportation. Commercial space transportation, at this stage, continues to be a matter of industry innovation and transformation with unique and changing sets of emergency and safety characteristics.

The Office of Commercial Space Transportation

2.2 The Commercial Space Launch Act (CSLA) of 1984, as amended and codified as Title 51 United States Code, Subtitle V, Chapter 509, paved the way for the United States to encourage the commercial sector to get involved in commercial space launch activities. The CSLA, along with Executive Order 12465, authorized the U.S. government to create a single agency authority in the Department of Transportation (DOT) for commercial space vehicle launches and re-entry. Regulatory responsibility and promotion authority was given to the Office of Commercial Space Transportation (AST), which is now in the Federal Aviation Administration (FAA).

2.3 Since the enactment of the original legislation to regulate commercial expendable launch vehicle operations and non-federal launch site operations, the U.S. Congress has expanded AST's authority to cover the emergence of reusable launch vehicles and private human spaceflight. The Office of Commercial Space Transportation is responsible for regulating and promoting the commercial space

industry. The responsibility of carrying out a dual mandate of regulating and promoting the commercial space industry is unique within the FAA.

2.4 The Office of Commercial Space Transportation's dual authority differs from aviation, whose authority under Title 49 United States Code, Subtitle VII, Part A, is to regulate aircraft and airmen, and to control certain airspace, not to promote the aviation industry. The Office of Commercial Space Transportation is authorized to license and regulate U.S. commercial space launch and re-entry activity, as well as to license and regulate non-federal launch and re-entry sites. The mission of FAA is to protect the public, property, and the national security and foreign policy interests of the United States during commercial launch or re-entry activities, as well as to encourage, facilitate, and promote U.S. commercial space transportation.

Suborbital Flights are Spaceflights

2.5 In the U.S., suborbital flights are spaceflights. Attempts to impose an established aviation regulatory regime could unduly influence the technology trajectory of legacy systems on commercial spaceflight industries, further hindering innovation, and technology development and capabilities for 21st century space travel. While some U.S. suborbital vehicles utilize various aviation technologies, the FAA neither mandates nor prohibits this, allowing designers and developers to optimize vehicle performance and minimize operational costs. The FAA does not currently attempt to harmonize high-level technical standards for suborbital vehicles and concepts with all types of airspace operations at an international level. Therefore, suborbital and orbital space vehicles are not required to be certified as aircraft by the FAA or any other U.S. government agency.

2.6 During operations, suborbital space vehicles quickly traverse airspace. The Office of Commercial Space Transportation coordinates launch and re-entry activities with the Air Traffic Organization within the FAA. Air traffic controllers manage aviation operations and the airspace when suborbital launch and re-entries take place. Current U.S. suborbital activity is contained in segregated U.S. airspace or other U.S. controlled airspace, without any significant safety impact to domestic and international flights.

U.S. Regulatory Framework

2.7 The commercial space transportation regulatory framework in the United States is the result of deliberate policy choices by the federal government. The legislation and regulations that spawned, reflects the outgrowth of U.S. air and spaceflight history. They are also the result of the U.S. government's belief that commercial enterprise has the acumen, will, and technical ability to make commercial spaceflight a successful and safe independent business. Furthermore, under U.S. law, space activities are not recognized as aeronautical activities. Space activities are legislated under a completely different part of the United States Code than aviation.

2.8 The U.S. regulatory framework on commercial space transportation is based on a space regime that includes U.S. space law and adherence to international space treaties and practices. The Outer Space Treaty of 1967 provides the basic legal framework for international space law. In the U.S., each government agency with a role in space is responsible for complying with U.S. law and international treaties. The U.S. regulatory structure for commercial spaceflight includes measures to comply with agreed upon international space treaties and obligations.

2.9 The U.S. regulatory framework limits the liability of the space vehicle operator to claims made by third parties only; those not involved in the flight. In efforts to assist in the development of the commercial space launch industry, the U.S. government enacted a shared risk liability arrangement with

space launch and re-entry companies for losses resulting from damages to third parties or federal property. This arrangement requires space launch companies to have a specific amount of insurance to cover the maximum probable loss for damages to third parties and federal property. The government partnership, with Congressional approval, shares indemnity with the manufacturers and operators for a fixed amount of damages if there is an award above the insurance cap.

2.10 The U.S. regulatory framework for commercial space differs from aviation in terms of oversight for vehicle and passenger safety. The U.S. requires an informed consent regime for commercial spaceflight operations, applicable only after a licence is issued. Unlike aviation, operators are required to notify crews and spaceflight participants in writing of the hazards and risks associated with the launch and re-entry of the vehicle that they wish to participate. Crews and spaceflight participants must agree to accept those risks. Operators are required to identify rules for their operations when conducting a licensed launch, as well as provide safety-related information to spaceflight participants. Additional protocols include training for emergency response, as well as general security requirements.

2.11 The U.S. regulatory framework is a key enabler for the commercial space industry. This framework allows the U.S. space industry to seek out and innovate with new concepts and designs for suborbital spaceflight, and it also allows for the efficient functioning of private capital markets to invest in emerging space firms. In efforts to continue to assist emerging sectors of the U.S. commercial space industry, the FAA is currently focused on streamlining its regulations and moving to a performance-based approach.

3. CONCLUSION

3.1 This paper presented suborbital spaceflight from the U.S. perspective, and addressed U.S. regulations for suborbital commercial spaceflight vehicles by providing an overview of the U.S. suborbital regime. The U.S. regulatory approach for commercial space transportation provides the commercial space industry with the flexibility to function under a space domain, while working together with aviation to coordinate airspace access for commercial space launch and recovery activities.

3.2 Emerging segments of the commercial space transportation industry are young, as are its regulatory overseers. Evolution in technology, operations, and regulations will occur. In the U.S., the FAA tracks developments and revises plans as necessary, ever mindful of the changing capabilities and limitations of the industry, while still fulfilling its safety obligations. Sovereign States are encouraged to pursue a similar approach as presented on this paper, or an approach that best suits their national frameworks concerning suborbital commercial space activities.

3.3 The Conference is invited to note the content of this paper.

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