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**SUBORBITAL AND ACCESS TO SPACE
REGULATION AND SPACEPORT DEVELOPMENT IN ITALY**

(Presented by Italy)

EXECUTIVE SUMMARY

This information paper describes the work Italy has been carrying out in the sector of Higher Airspace Operations (HAO), including Commercial Space Transportation (CST), to develop a national regulatory framework for commercial suborbital, access to space and re-entry from orbit operations, and to support the building of spaceport facilities in Taranto-Grottaglie airport. The regulatory framework under development aims to ensure the necessary level of safety, security, environmental compatibility, and an efficient use of the airspace, while ensuring the New Entrants do not disproportionately affect the regularity and efficiency of aviation. All the above objectives are addressed by implementing an enhanced regulation based on a performance-based, operation-centric, and adaptive approach that will also benefit from Regulatory Sandbox validation methodologies.

<i>Strategic Objectives:</i>	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
<i>Financial implications:</i>	
<i>References:</i>	Doc 10140, <i>Assembly Resolutions in Force (as of 4 October 2019)</i> Resolution A40-7, <i>New Entrants</i>

1. INTRODUCTION

1.1 In recent years, the commercialization of space in the context of the New Space Economy, and the emerging of new and cost/effective technologies, have increasingly driven the need for a large variety of vehicles to transit through and operate within the so-called higher airspace above flight levels where conventional traffic takes place today. As a whole these New Entrants' operations, overlapping with space operations, are referred to in Europe as Higher Airspace Operations (HAO). They include space launches into orbit, re-entry from orbit, suborbital flights, hypersonic and supersonic flights, and high altitude platform systems (HAPS). In order to sustain this emerging sector the States are pushed to develop new regulatory models and approaches to allow safe and secure operations without disproportionately affecting the current aviation system. At the same time the States are supporting the development of the necessary ground infrastructures such as different types of spaceports.

1.2 Italy is currently engaged to create in the short-medium term, the conditions to allow commercial suborbital flights, air-launching into orbit and re-entry from orbit operations, through the implementation of a comprehensive national regulatory framework, and through the development of the spaceport facilities in Taranto-Grottaglie airport (LIBG). Italy is also contributing to the European concept of operation and to the future European regulatory framework within the ECHO project and the EASA HAO Task Force. This Information Paper describes the work Italy has been doing in this sector at national level.

2. BACKGROUND

2.1 Since 2014, ENAC (Ente Nazionale per l'Aviazione Civile), the Italian Civil Aviation Authority, has been involved in the Commercial Space Transportation (CST) sector by contributing to the ICAO-UNOOSA Space Learning Group, studying the relevant international experience and participating to the three ICAO SPACE Symposia¹. In 2016 ENAC issued the first policy document, *A Regulatory Policy for the Prospective Commercial Space Transportation Certification and Operations in Italy*. In 2017 the Italian government mandated ENAC to identify the criteria to select potential national sites able to host a spaceport, and to develop a flexible regulatory framework for the commercial suborbital transportation, to support the sustainable development of the sector. The regulation had to consider the international experience in order to facilitate the interoperability. It was also required that New Entrants' operations had not a detrimental impact on the civil aviation development.

2.2 The first step has been the definition of the criteria for the selection of candidate spaceport site giving priority to the existing infrastructures and taking into account the airspace structure and the traffic volumes. This led to the identification of Taranto-Grottaglie airport, in the South of Italy, as the first national spaceport site.

2.3 The preparatory work for the regulation was started by ENAC in cooperation with the relevant institutional and industrial stakeholders based on a detailed work programme² covering all the aviation domains, and with the definition of the initial *Reference Operational Scenario (ROS)*³ to be regulated, which was related to the horizontal take-off and landing (HTOL) suborbital operations. The scope of the regulation was subsequently extended also to the access to space and re-entry following an incremental step-by-step approach.

¹ ICAO-UNOOSA Space Symposium Montreal (2015), Abu Dhabi (2016), Vienna (2017)

² ENAC, Commercial Suborbital Transportation Task Force, *Commercial Suborbital Transportation Regulatory Framework Work Breakdown Structure*, Edition 1.0 Initial Issue of 8 Jan. 2018)

³ ENAC, Commercial Suborbital Transportation Task Force, *Reference Operational Scenario (ROS)*, Doc. N. CST-WG1-ROS-0.1 Edition 1.1 of Nov. 2018

3. NATIONAL REGULATORY FRAMEWORK

3.1 The national under development regulation for commercial HAO covers the following categories of operations: (i) suborbital flights; (ii) launching into orbit, e.g. by using aircraft platforms, and (iii) re-entry from orbit. The regulation is risk- and performance-based, operation-centric and technology-agnostic. It is based on a functionalist approach, according to which an operation is regulated and authorized based on its scope irrespective of the maximum altitude reached by the vehicle. In-orbit operations are considered out of the scope.

3.2 The regulatory framework foresees three regulations: (i) the Regulation for the construction and use of spaceports (aka Spaceports Regulation, issued in 2020), (ii) the Regulation for Suborbital and Access to Space operations (aka SASO Regulation), and (iii) the Regulation for the access and use of the higher airspace (aka HA Regulation).

3.3 The Spaceport Regulation provides requirements for the construction and use of a take-off/launch and/or landing/re-entry site co-located within a certified aerodrome, in accordance with ICAO Annex14 and Regulation (EU) 139/2014. The spaceport certification will cover specific pre-identified categories of vehicles and operations with the associated air and ground flight corridors.

3.4 The SASO Regulation contains requirements to issue a single operational authorization (a license or a permit to fly) based on an operation-centric approach, to carry out one or more flights with or without occupants on-board under the same operational scenario, vehicle configuration, and facilities. The requirements cover vehicle's design and flightworthiness, production, maintenance, operational procedures, personnel skill and training, medical requirements. Quantitative safety targets are set to protect third parties on ground, at sea and in the air, while flightworthiness requirements for occupant's safety have been set following a performance-based approach that specifies design-agnostic objective requirements to be used to develop detailed consensus standards. Specific interface requirements with Space Traffic Management (STM) are foreseen for those operations that fly above 150 km where there is a risk of collision with tracked space debris or active in-orbit objects.

3.5 The HA Regulation will regulate the access and use of national higher airspace, along with the related services and service providers. New services are expected for the airspace design, tracking and surveillance at high altitude; in this respect ENAC has developed specific high level requirements for developing simulation tools and system architecture⁴.

3.6 The national HAO regulatory framework will be flexible and adaptive, not developed once for all; though it will follow the evolution of the technology and the complexity of the operations by making use of a Regulatory Sandbox approach that will allow the authority to evolve the regulation based on data, while continuously ensuring safety, security, environmental compatibility, and minimum impact on the aviation system.

4. CRIPTALIAE SPACEPORT

4.1 According to the national airports strategy Taranto Grottaglie is an airport dedicated to industrial and research activities. In 2018 it was designated by the government as the first Italian spaceport and classified as national strategic infrastructure.

⁴ ENAC, Commercial Suborbital Transportation Task Force, *Air & Ground Risk Analysis Modeling and Simulation tool (AGRAMS-t) – High Level Requirements Specifications* Doc. N. CST-WG3-OPS-01 Ed. 1.0 of 14 November 2019

4.2 Since 2014 the Italian Airport National Plan had classified Taranto Grottaglie Airport as airport dedicated to industrial activity and to the research in the aviation field, also taking into account its location in an area with a low urbanization level. Moreover, Grottaglie Airport was designated, based on a selection procedure conducted by ENAC, as the first Italian Spaceport by Decree in 2018 and classified like National Strategic Infrastructure.

4.3 Accordingly, Grottaglie Airport's Master Plan 2030, includes a re-assessment of several areas to be exclusively dedicated to the spaceport activities, taking into account the constraints coming from the interaction between airport's operations and HAO. The Master Plan, after having obtained a positive evaluation of the Environmental Impact Assessment (EIA) and the Urbanistic Authorization by the competent Ministries, has been eventually approved.

4.4 Following the identification of the infrastructure needs associated to the types of operations expected to be carried out within the spaceport, Aeroporti di Puglia (the Puglia Region airports' operator) launched a tender for the design of the spaceport layout and a series of common facilities, such as hangars and cleaning room for vehicle's assembly, maintenance and inspection, pre- and post-flight controls, explosive storage facilities, offices and control rooms, training and medical screening facilities, but also parking areas, accommodation, buildings for R&D and start-up activities, aerospace museum and other ancillary services for the promotion of aerospace events.

4.5 The principles of environmental sustainability and infrastructure resilience will guide the spaceport's design of the new infrastructure, following the pivotal principle of making aerospace and environment compatible and sustainable. In this regards a preliminary risk analysis over the flight corridors is ongoing, in accordance with the actions followed by the Environmental Impact Assessment (EIA), in order to assess the potential impact of the operations on ground over the flight corridors in case of mishap. This preliminarily assessment will support the future risk analysis needed to certify the spaceport and to authorize the operations.

4.6 Eventually in July 2022, ENAC and Aeroporti di Puglia have found a new legal entity called Criptaliae Spaceport Foundation that will assume the role of spaceport operator. Other stakeholders are expected to join this entity, with the aim to foster the public-private partnerships in the sector. The governance of the Foundation intends to involve all the institutional entities dealing with aerospace, positively overcoming the duality that until now has opposed the development of the civil technology to the military one.

4.7 In order to start the preliminary design activity for the development of the Grottaglie spaceport infrastructure an international tender has been launched worldwide.

5. CONCLUSION

5.1 Italy, under the coordination of ENAC, is engaged to allow commercial HAO in the short-medium term, namely suborbital flights, air-launching into orbit and re-entry from orbit, from/to Taranto-Grottaglie spaceport, through the development of a coherent, flexible and operation-centric regulatory framework, and through the development of the ground facilities at Grottaglie spaceport, while promoting the international interoperability.