ITALIAN COMMERCIAL SPACE TRANSPORTATION POLICY AND ONGOING ACTIVITIES

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I. Introduction and national background

Italy has a consolidated “attitude” for space activities

ISS

GALILEO

VEGA

ROSETTA

IXV

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I. INTRODUCTION AND NATIONAL BACKGROUND

Near future space travel implications:
- winged vehicles,
- horizontal take-off and landing from/to runways
- aviation airspace engagement
- humans and goods transportation services

ENAC, the Italian Civil Aviation Authority, has considered it necessary to start a progressive involvement in the matter.

FAA – ENAC “Memorandum of Cooperation on Commercial Space Transportation Development” [March 12th, 2014]

ENAC – Italian Air Force Letter of Intent for the developing of procedures and standards to support flight test activities [March 17th, 2014]
II. Space operations regulatory and legal framework

EUROPEAN UNION

To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications [ESA Convention, Art. 2]

European agency with regulatory and executive tasks in the field of civilian aviation safety [Regulation (EC) No 216/2008].

ITALY

ENAC is the unique national authority for technical regulation, certification, surveillance and control in the civil aviation sector.

[Italian Air Navigation Code (ANC), Art. 687]

Italian Air Force (ITAF) holds significant technical and operational expertise and resources in space operations and capabilities to conduct experimental activities
II. Space operations regulatory and legal framework

According to the ICAO definition, spaceplanes are “aircraft” in the lower segment of a sub-orbital mission: horizontal take-off and climb (the ones not carrier-assisted), re-entry and landing.

Aviation law applies in principle to spaceplanes operations

BUT

No EU regulation applicable to civil spaceplanes has been issued yet

AND

Current EU civil aviation safety standards cannot be considered fully adequate and are recognised to be too demanding for the initial development of commercial space transportation
II. Space operations regulatory and legal framework

Any option at European Union Member States level?

PROBABLY YES,

if EU Regulation EC 216/2008 Annex II (b) applies to spaceplanes
[ i.e. aircraft specifically designed or modified for research, experimental or scientific purposes, and likely to be produced in very limited numbers ]

BUT

(for commercial air transportation) still, Italian ANC requires air operators to hold a licence and an AOC i.a.w. European regulations

UNLESS

an ad hoc regulatory regime is established for spaceplanes operations,
[e.g.: so far, for aerial works both licence and AOC are i.a.w. Italian regulations]
III. **Spaceplane safety and airworthiness aspects**

Concepts of “airworthiness” should apply to spaceplanes – to be designed, manufactured and maintained to be fit for its intended purpose.

**Which standards should be applied in EU?**

**CONSIDERATIONS**
- Specific (EASA) standards not established yet
- Existing (EASA) commercial aviation standards too demanding, at least at this stage
- Spaceplanes will be mainly US manufactured and operated, initially
- FAA AST has in place a working regulatory system

As start-up at national level (applying EU Reg. 216/2008 - Annex II), **Italy is:**
- familiarizing with AST standards and licensing process, in the frame of the MoC with FAA
- defining a policy and a methodology for developing a regulatory system that will allow operations of commercial space vehicles in Italy, mainly based on the FAA AST licensing system recognition
- Identify regulatory differences an US operator should comply with to operate in Italy.
III. **Spaceplane Safety and Airworthiness Aspects**

Due to the lack of certification codes and technical requirements, a **global risk based assessment** covering design, manufacturing, maintenance and operation activities could be an alternative option for initial operations.

**SAFETY OBJECTIVES need to be set** (examples)
- Uninvolved people and properties on ground and other airspace users - same as aviation operations
- Spaceplane and occupants: at an “acceptable” level

Operator should manage risks associated to spaceplane design, production, maintenance and operations within a comprehensive

**Safety Management System (SMS).**

Possible **critical issues**:
- Italian national standards might pose additional compliance burden
- SMS data and spaceplanes design/manufacturing data might be under USA ITAR segregation
- Future EU regulation might not be harmonized with this approach

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IV. AIRSPACE MANAGEMENT AND REQUIREMENTS

- Any spaceflight mission will necessarily impact airspace below 50,000 ft
- Nature and maturity of spaceflight operations impose conservative standards for separation with other airspace traffics
- In order to minimize the risk to uninvolved parties on ground, low or no flexibility in designing low altitude routes, paths and trajectories
- Spaceplanes will be unable to comply with ICAO Annex 2 standards of the air (e.g.: precedence, ability to manoeuvre)
- Very low number of spaceflight operations in coming years

Segregated airspace would be the most adequate mean for safe operations in the near term
IV. AIRSPACE MANAGEMENT AND REQUIREMENTS

Segregation of airspace:

- in line with USA policy for spaceplanes operations
- common approach in Italy for RPAS experimental activities management

There should be at least a spaceport connected to a segregated airspace structure; they both need to be adequate to safely support the operations of a given spaceplane.
V. Spaceports Management and Requirements

Identification of a suitable spaceport is a necessary condition to allow spaceplane operations from Italy

Spaceport main requirements (horizontal take-off only):

1. **Spaceplane operating criteria**
   (runway length 2750 m minimum)

2. **Meteo conditions**
   (VMC statistics + prevalent winds characteristics)

3. **Uninvolved people/properties safety factors**
   (low density populated areas, segregated airspace structure integration)

4. **Logistic issues**
   (capability of manage rocket propellant and good ground/sea transport connections for general supply related issues)

5. **Environmental aspects**
   (emissions and noise related to rocket engines, use of hazardous materials)

**PLUS** Harmonization with standards already adopted for licensed space launch sites (FAA AST, ESA, NASA)

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V. **Spaceports management and requirements**

Feasible options and near term plans:

- **Brand new spaceport construction deemed unrealistic** (also due to lack of applicable European standards). Evaluation of existing (civil or military) Italian aerodromes is under way.

- Preliminary analysis identify **coastal and insular sites in the South of Italy** as possible candidates.

- Benefit of ENAC-ITAF cooperation could result in a **military aerodrome “converted” for spaceplane operations** as an option for initial activities, at least experimental; ITAF has already stated its interest in such activity.

- Another solution could be an **airport already designated for experimental RPAS activities** complying with spaceport ad-hoc requirements.

- FAA AC 431.35-1 **“Expected Casualty Calculations for Commercial Space Launch and Reentry Missions”** should be taken into consideration.
VI. CONCLUSIONS

I. A Draft Italian Regulatory Policy for Commercial Space Transportation is ready to be issued

II. A national specific regime for spaceplanes operations needs to be set (impact at Italian Air Navigation Code level/ENAC regulation level ?)

III. In the lack of spaceplanes certification codes, global risk based assessment approach could be an option (design – manufacturing - operation - maintenance)

IV. Identification of a spaceport connected to a segregated airspace structure is mandatory

V. Need to understand, familiarize and harmonise with FAA AST standards set for licensing launch sites and spaceplanes operators

VI. Provide flexibility for future European spaceplanes regulations
VII. ITAF Feasibility Study

ITAF developed a spaceplane flight test feasibility study in the Italian airspace.

Maj Ferdinando Dolce of Italian Air Force - Flight Test Wing is going to present it.