

Applying Space Traffic Management in Policy & Regulatory Design

*Dr. Fatheya Al Sharji**

Abstract

The importance of Space Traffic Management (STM) has increased in the international space community and has become widely recognized. This might be due to the increasing need to enhance space safety and security. Today, STM is still a controversial issue and there is no internationally agreed standard, definition, or framework in this regard. Recently, states are realising the importance of the topic and the need for further international collaboration. Therefore, several states, international organizations and individuals started to dive deep into this topic. The UAE Space Agency has conducted a study on the application of STM to national policies and regulatory designs. This study reviewed some of the international studies such as the IAA Cosmic Study of 2017. It also reviewed some domestic regulations and policies such as the 2018 U.S. policy on STM. The study in general focused on certain areas such as the definition of STM, provisions in the international space treaties that are relevant to STM, elements of space traffic management, and whether if these elements covered by the UAE Space Policy, draft Law, and Regulations. The UAE Space Agency, has interest in STM in general. The study has taken into consideration the main elements and standards of STM, when developing the domestic regulations and processes. The UAESA has and will continue also to join other global efforts towards developing a suitable international regulatory framework for STM. In this paper, the study's elements and comparisons will be described, along with concluding remarks. In addition, it will indicate how these conclusions about STM were integrated into the National Space Policy and various Regulations within the UAE Space Regulatory Framework.

* Space Policies and Legislations Department, UAE Space Agency, Masdar City, Abu Dhabi, United Arab Emirates, F.Alsharji@space.gov.ae.

1. Introduction

STM is widely recognized as an increasingly important international topic. The UAE Space Agency has a deep interest in the topic. As a consequence, when developing its domestic policy, regulations, and processes, it was keen to take into consideration the main elements and standards of STM. Therefore, the UAE Space Agency conducted a study on this topic. The study aimed to clarify the definition of STM, the importance of STM, and its elements. It finally clarified whether the UAE space policy, UAE Draft Law on the Organization of the Space Sector, and its Regulations adequately dealt with STM.

2. Definitions

According to the IAA Cosmic Study 2017, STM is “a set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and return from outer space to earth free from physical or radio-frequency interference.”¹ The United States of America (U.S) also defined the STM in its 2018 U.S. Policy, as “planning, coordination, and on-orbit synchronization of activities to enhance the safety, stability, and sustainability of operations in the space environment.”² It is clear from both definitions that the main aim of STM is to promote the safety of space activities and indirectly to protect the environment of outer space, which will lead to stability and sustainability of space operations.

3. Topics and Traffic-Related Provisions in the Space Treaties³

Several topics relevant for STM are addressed in the international space treaties, such as registration, notification, responsibility and liability, jurisdiction and control, harmful interference, non-governmental space activities, consultations, and personnel of spacecraft. But there are also topics that the international space treaties do not clarify. For instance, the term ‘space object’ is not clearly defined in international space law. Also, no distinction is drawn between publicly financed and privately financed space objects. Moreover, there are no technical or safety requirements for space

1 Space Traffic Management: Towards a Roadmap for Implementation, IAA Cosmic Study, 18, 2017.

2 Space Policy Directive-3, National Space Traffic Management Policy Infrastructure & Technology, Sec 2,b, (USA, June 18, 2018).

3 Space Traffic Management: Towards a Roadmap for Implementation IAA Cosmic Study, 51, 2017.

objects, and finally, no physical object parameters that would be contrasted with operational rules.

4. The Importance of STM

STM is a very important subject from different perspectives, such as the following:

Economy: planning for a space activity will not be efficient without coordination between states. For example, coordination will enable satellite operators to use fuel more efficiently.

Science: science facilitates more science missions, thus attracting and encouraging more scientists to innovate in the space sector.

Security: with an increasing number of satellites in space, it is crucial that security matters are protected and addressed.

Safety: addressing the safety of humans and spacecraft is of huge importance.

Commerce: cutting costs will attract more business, and indeed, high efficiency will lead to less risks.

Environment: space debris mitigation can help to preserve the space environment.

5. Elements of STM

In order to understand STM, it is important to identify its elements. Through the study, several elements of STM were identified, including:

Sharing Information: the sharing of space situational awareness (SSA) data must be timely and accurate.

Safety: this refers to technical and safety requirements for space objects and humans on board spacecraft.

Personnel of a Spacecraft: it is important to have rules that organize the relationship between astronauts, spaceflight participants and space tourists. For example, the obligation for astronauts to render all possible assistance to each other must be addressed.

International Consultations: states must conduct appropriate consultations in order to avoid harmful interference.

Forbidden Payloads: several payloads are not allowed in space, such as nuclear weapons and other weapons of mass destruction.

Authorization: space activities must be authorized by the state.

Debris: space debris mitigation is very important. Moreover, more and more international organizations and states are convinced that in order to maintain a safe space environment it necessary to remove space debris. Therefore, steps must be undertaken to create an active debris removal system.

Sustainability: the long-term sustainability of operations in the space environment for the benefit of humanity must be ensured.

Liability: states need to have a clear understanding about their potential international liability for damage resulting from their space activities.

Insurance: the requirement for private entities to obtain third-party liability insurance is important to protect states from liability claims.

6. STM Elements in the UAE Space Policy, the UAE Law and Regulations

The following tables identify each STM element and indicate whether it is covered or not in the legal framework of the UAE, which includes the UAE space policy, the UAE Draft Law on the Organization of the Space Sector (“UAE Draft Law”), the Regulation on Registration, the Regulation on Authorization, and the Regulation on Human Space Flight Activities.

Table I: The STM Elements in the UAE Space Policy, the UAE Draft Law and Regulations.

STM Elements	Space Policy	UAE Draft Law	Registration Regulation	Authorization Regulation	Human Space Flight Activities Regulation
Registration	N/A	✓	✓	✓ ¹	N/A
Notification	N/A	✓	✓	✓	✓
Non-appropriation	✓	✓	N/A	✓	N/A
Forbidden payloads	✓	✓	✓	✓	✓

APPLYING SPACE TRAFFIC MANAGEMENT IN POLICY & REGULATORY DESIGN

International Consultations	✓	✓	N/A	✓	✓
Personnel of a spacecraft	N/A	✓	N/A	✓	✓

Table II: The STM Elements in the UAE Space Policy, the UAE Draft Law and Regulations.

STM Elements	Space Policy	UAE Draft Law	Registration Regulation	Authorization Regulation	Human Space Flight Activities Regulation
Sustainability	✓	✓	N/A	✓	N/A
Debris	✓	✓	N/A	✓	N/A
Safety	✓	✓	N/A	✓	✓
Sharing information	✓	✓	✓	U/C	N/A
Exploration	✓	✓	N/A	✓	N/A

Table III: STM Elements in the UAE Space Policy, the UAE Draft Law and Regulations.

STM Elements	Space Policy	UAE Draft Law	Registration Regulation	Authorization Regulation	Human Space Flight Activities Regulation
Responsibility and liability	✓	✓	N/A	✓	✓
Insurance	✓	✓	N/A	✓	✓
Jurisdiction and Control	✓	✓	N/A	✓	✓
Prevent unintentional radio frequency interference	✓	✓	N/A	✓	N/A
Authorization	N/A	✓	N/A	✓	✓

7 Conclusion

In conclusion, for stable, sustainable and safe operations in space, the international community should work together. In reality, international space law needs the collaboration of states to enhance and improve STM. Until now, there is no international definition of STM. Moreover, not all STM elements are clearly identified internationally. Therefore, the international community should work together to identify the most important STM elements. In fact, understanding what STM is will help in setting goals and priorities that need to be achieved. Furthermore, STM is significant from several perspectives. For instance, it is important for science, security, economy, safety, and environment. Several elements of STM were identified in the study, such as sharing information, safety, international consultations, authorization, debris, and sustainability.

The UAE supports the concept of STM through its policy, law, and regulations. There are no conflicts between STM elements and the UAE legislations. More importantly, almost all STM elements are explicitly covered in the UAE law and regulations.