

IAF STM Technical Committee Sub-Group 1 - Terminology

Context & Draft Outline

- The table below summarizes context & guidelines to date.
- The following pages present a draft sectional outline for our report task.
- The sectional outline without content is display afterward.
- Supplemental content follows.

This document courtesy of Robert J. Rovetto (RR) (work time: 7 hours), with input/contributions by Mark Skinner.
This document located on the IAF STM web-based portal: <https://iafastro.directory/iac/folder/tc/spacetraffic/>
Visit the DropBox webpage for collaborative editing.

Context	Goals	Action Items
<p>The International Astronautical Federation Space Traffic Management Technical Committee (IAF STM TC) sub-group 1 is tasked with the topic of terminology. In [1], we read:</p> <p>“Terminology – Common understanding and definitions”</p>	<p>“The goal for each sub-group should be to create a concise examination of the topic with a focus on key points that drive the importance of each area to safe, reliable STM.” [2]</p> <ul style="list-style-type: none">• outline document• (the document, below)• ~ 10-page report• ~ 1-page executive summary	<ul style="list-style-type: none">• <i>Sub-group 1 members—please contribute to the design & content of the draft outline. A DropBox link invitation is being sent to you via email for online collaborative development.</i>• Recommendations about adding or changing sections is welcome. Corner brackets (< ... >) should be replaced by new section headers or section content.• Add your name next to each section you would like to contribute to.• Below is a draft report outline with candidate (sub)sections, which we can modify. I’ve added some content below. <p>- RR</p>
<p>Definition of the commonly used terms Numerous definitions are currently used, slightly different: concepts of Management, Coordination, Control, Synchronization, Regulation, Harmonization, even Environment</p> <p>[1]</p>		
<p>[1] Spreadsheet document "IAF_TC.26_Sub-groups_181120.xlsx" [2] Microsoft Word Document "IAF_TC.26_Modus-Operandi_031220" Visit the IAF STM online portal to view [1], [2], and this document.</p>		

Note: Each section header is then described within brackets [...], followed by content for the section. Please contribute to design & content. Thus far, I’ve added some initial content. Overall, if an alternative style or approach is desired, please indicate. – RR

Draft Outline for Report

IAF STM TC Sub-group 1 - Terminology

Version: 1.0
Date: 22 December 2020

1. Background / Introduction

[This section can present contextual information to the topic and our task. Do we need sub-sections?]

<... Add content ...>

1.1 Importance (of terminology/vocabulary)

[This sub-section can present the value of having a terminology (in general), or commonly understood terminology, and/or the value of having that for STM.]

Terminology, and having a shared understanding, is important for these reasons:

- to clarify understanding. to prevent misunderstanding
- to foster communication and comprehension among various parties;
- for transparency (of meaning, of intent, of ...)
- to support collaborative engagement and coordination of activities among various parties
- <...Add more here...>

1.2 Context

[This sub-section can present background context for our task, and the report. Combine with 1.1.?]

The IAF STM TC sub-group 1 is tasked with the topic of terminology. The concept of space traffic management (STM) is currently an evolving one with a significant degree of uncertainty and open questions. Given the lack of a clear understanding of STM as such, there is no formal or international vocabulary of STM. The understanding of common concepts and the potential formation of a shared vocabulary will help in the development and maturation of the STM concept (and vice versa). It will also make communication easier among parties currently interested in STM, and among actors in a potential future STM ecosystem.

1.3 <...Add additional sections if needed...>

2 Technical Description

[This section can present a description of the topic, providing a more detailed rationale as well]

2.1 Current state of STM terminology/vocabulary

[This sub-section can present the present state of terminology for STM, including activities]

[Short version of content]

- No official international vocabularies/terminologies of STM
- The STM concept is evolving with fuzzy boundaries
- At least 17 definitions of ‘stm’ (AIAA STM WG TG1 preliminary [report](#))
- Various related or relevant terms from other overlapping disciplines
- Glossaries and locally-defined (or locally-used) terms in various publications/documents
- Interest by some parties: IAF STM TC, AIAA STM WG, Robert Rovetto (e.g., term catalog), CCSDS, EU ECSS, ISO (SC 20, TG13/14)
- <...Add here...>

[Long version of content (candidate narrative for the report)]:

There is no (inter)national vocabulary or standard for terminology of STM. This may be because the concept of STM itself is currently evolving, and has not been formalized (inter)nationally. In effect, both the term ‘space traffic management’, its cognates, and any future STM system(s) are being born.

Rather, other disciplines present us with some terms that may be related to STM. That is, there are phrases or vocabularies from various sectors and various astronomical and astronautical sources that overlap or are otherwise associated with the concept of STM. Various interested parties may have their own related spaceflight terminology used internally. Similarly, distinct publications may list glossaries of defined terms used in the context of that document. Some of these terms are relevant for STM. The scope and boundaries of a potential STM vocabulary is therefore an open question.

Some parties have interest in examining, improving and potentially developing STM terminology. For example, the IAF STM Technical Committee has sub-group 1 (formed 2020), and the AIAA STM Working Group has task group 1 on Terminology (formed 2019). The latter is co-led by Mr. Rovetto, who has prior and on-going work on the same topic. He is developing a living catalog of various key terms in astronautics with specific focus areas (ssa, orbital debris, stm/stc, etc.): the project aims to provide a collection, as well as neutral, systematic conceptual analysis and development in order to improve existing definitions & terms, and make

suggestions for greater precision and consistency (ideally with computational applications)(<https://github.com/rrovetto/Astronautics-Terminology>). The Consultative Committee for Space Data Systems (CCSDS) has a web-based search platform that displays phrases used in its standards documents (<https://sanaregistry.org/>). The international Organization for Standardization has a web-based search platform (<https://www.iso.org/obp/ui/#home>) for its documents. The European Cooperation for Space Standardization (ECSS) has a web-based search platform and glossary for its documents (<https://ecss.nl/glossary/>).

2.2 Current state of terminology/vocabulary development (in general)

<...do we need this section?...>

2.3 Limitations / Challenges / Problem statement

[This sub-section can present example problems and how terminology and common understanding may resolve them. It may also present generic limitations to developing a vocabulary, and challenges to the task.]

- Aspects of terminology (in general)
 - Agreeing on terminology and definitions is often a difficult task.
 - Terms and definitions often change over time
 - Terms and their meaning are often context-specific & understood in-context.
 - Natural language is fluid and dynamic
 - Ambiguity is sometimes desired
 - Ambiguity is sometimes an obstacle
- There are no formal terminologies/vocabularies in (inter)national spaceflight community
- Ambiguity is present in existing spaceflight treaties. Many terms undefined.
- Provide example of problem in terminology, or problem caused by terminological challenges.
 - *Question:* Are there concrete examples, in the spaceflight sector?
 - Examples of harm caused by unclear terminology, lack of terminology, contradictory terminology, etc.
 - If so, then this will provide us with a use-case, and potential reason to form an STM terminology.
- <...Add more content...>

2.3 <...Add additional sections if needed...>

3. Next Steps

[This section can present what actors in STM can do to make terminology support STM.]

4. Recommendations

[This section can present recommendation by our group]

- A vocabulary/terminology catalog?
 - e.g., the above-mentioned living [catalog](#) by RR.
- <...add here...>
- <...add here...>

4.1 <...Add more sections if needed, e.g., Recommendation 1,...>

5. References

[This section will list references, e.g., documents, projects, persons, etc.]

-- End of outline --

Sectional Outline without content

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1.2 Context

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2. Technical Description

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2.1 Current state of STM terminology/vocabulary

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2.2 Current state of terminology/vocabulary development (in general)

2.3 Limitations / Challenges / Problem statement

[This sub-section can present examples problems STM terminology and common understanding may solve. It may also present generic limitations to developing a vocabulary, and challenges to the task.]

2.3 <...Add additional sections if needed...>

3. Next Steps

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4. Recommendations

[This section can present recommendation by our group]

4.1 <...Add additional section if needed...>

5. References

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-- End of outline --

Supplemental

Below are examples of STM characterizations.

From within the European Union:

Space Traffic Management can be represented at the crossroad of these three complementary functions.

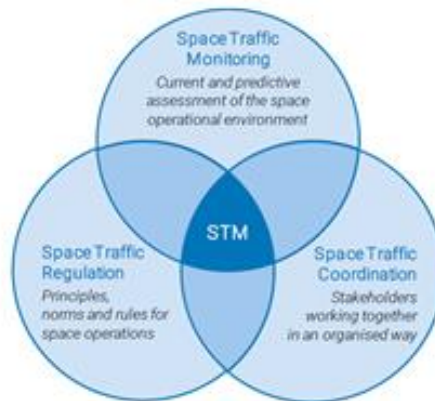


Figure 2: Core functions of Space Traffic Management

To fulfil these functions, any approach to Space Traffic Management must address three main elements:

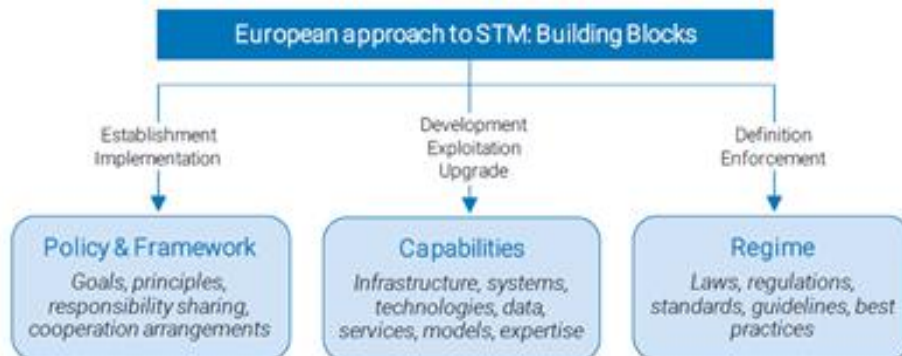


Figure 3: Core components of an approach to Space Traffic Management

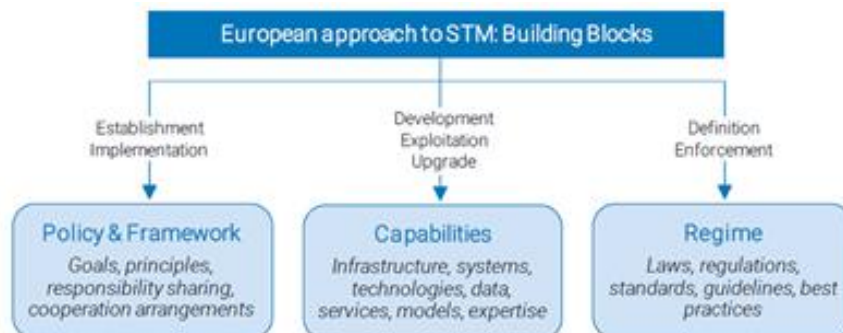
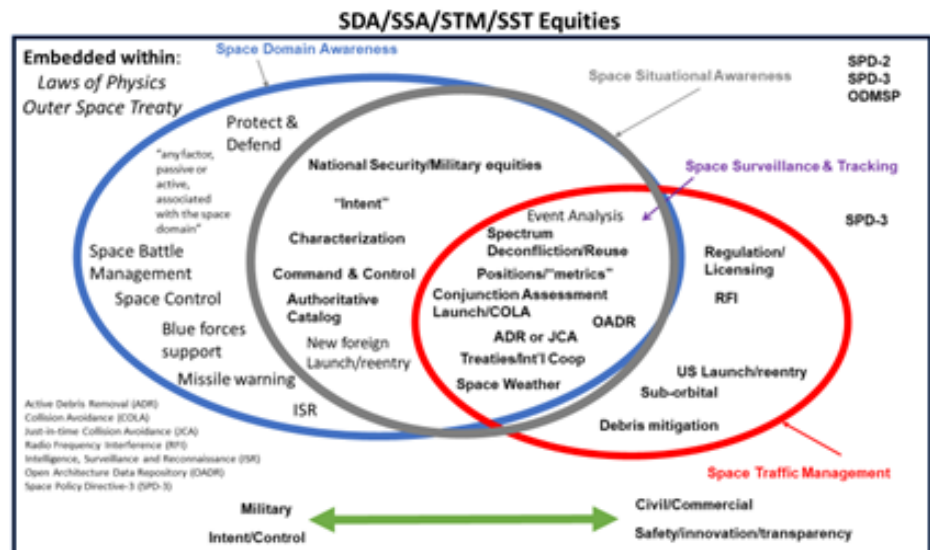


Figure 3: Core components of an approach to Space Traffic Management

Source: "ESPI Report 71 - Towards a European Approach to Space Traffic Management - Full Report"
January 2020

From within the USA:



Source: Mark Skinner

<...Add other examples from other countries...>

<...add other supplemental content...>