# IAF STM Technical Committee Sub-Group 1 - Terminology
## *Guidelines & Draft Outline*

Robert J. Rovetto

This page summarizes direction for the group. P.2 onward presents an outline for the report task.

## Context & Guidelines:

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:

> "Terminology – Common understanding and definitions"
>
> Definition of the commonly used terms
> Numerous definitions are currently used, slightly different: concepts of Management, Coordination, Control, Synchronization, Regulation, Harmonization, even Environment

### Goals for IAF STM TC:

"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]

- outline document (the document, below)
- ~ 10-page report
- ~ 1-page executive summary

**Sample sections for outline/report [2]:**

"

1. Background - why is this area important, what is the context, how does it relate to other aspects of STM, (this section will obviously be massaged as the other studies get accomplished).
2. Technical Description – current state of the art for this area, limitations, strengths, weaknesses, etc.
3. Next Steps – what are probable key developments that can or should take place in the next year and next ten years
4. Recommendations (Challenges and Expected benefits)
5. Key References – a list of references used in the study and good sources for the reader to get more details than provided in the study ".

**Sources:**

[1] Spreadsheet document "IAF_TC.26_Sub-groups_181120.xlsx" (https://iafastro.directory/iac/folder/tc/spacetraffic/)
[2] Document "IAF_TC.26_Modus-Operandi_031220"

## Action Items

- *Group 1 members—please contribute to the outline (draft below, online at this GoogleDoc).*
  If listing tasks to complete, please add your name (in parentheses next to the task) if you would like to work on that task.
- Below is a draft report outline with candidate sections & subsections, which we can modify. I've added some content below.
- I've set up a GoogleDoc so the group can collaboratively develop the outline document.

# Draft Outline for Report
# of
# IAF STM TC Sub-group 1 - Terminology


Version: 1
Date: 22 December 2020
Time spent: approx. 6 hours
Author: Robert J. Rovetto, rrovetto@terpalum.umd.edu



**Abstract**: Below is an outline for sub-group 1 and its future report. Each section header is followed by a brief description in parentheses, and then section content. Group members should contribute to design & content. I've added some initial content. The outline without content is display at the end.


## 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 section 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*:

- 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 (for the report?)*:

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

Rather, other topic areas and disciplines present us with terms related to STM. That is, there are overlapping phrases or vocabularies from various sectors and various astronomical and astronautical sources, which are associated with the concept and activities 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.

There is interest by some parties to understand and potentially develop 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 Robert Rovetto, who also has prior and on-going work on the same topic. Mr. Rovetto is developing a living catalog of various key terms (from many sources) in astronautics with a focus on space situational awareness, surveillance & tracking, orbital debris, spacecraft and their operations, and space traffic management (https://github.com/rrovetto/Astronautics-Terminology); the project aims to provide neutral and systematic conceptual analysis and vocabulary development in order to improve existing definitions & terms, recommend corrections, and propose more precise and consistent terms & definitions (with computational applications). 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 sub-section?)*

### 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.)*

- 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 here…>

### 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. Do we need this section? Merge with others?*)

## 4. Recommendations (by IAF STM TC sub-group 1)

*(This section can present recommendation by our group/)*

- A vocabulary/terminology catalog?
    - e.g., Mr.Rovetto's (https://github.com/rrovetto/Astronautics-Terminology)
- <…add here…>

### 4.1 <…Add additional section if needed, e.g., Recommendation 1, 2, … n>

## 5. References

*(This section will list references, e.g., documents, projects, persons, etc.)*

-- End of outline --

**Outline without content**

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## 1.1 Importance (of terminology/vocabulary)

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## 1.2 Context

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## 1.3 <…Add additional section 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)*

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

*(Do we need this sub-section?)*

## 2.3 Limitations / Challenges / Problem statement

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## 2.3 <…Add additional sections if needed…>

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## 4.1 <…Add additional section if needed, e.g., Recommendation 1, 2, … n>

# 5. References

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-- End of outline --

# Supplemental

Below are examples of STM characterizations.

*From within the European Union:*

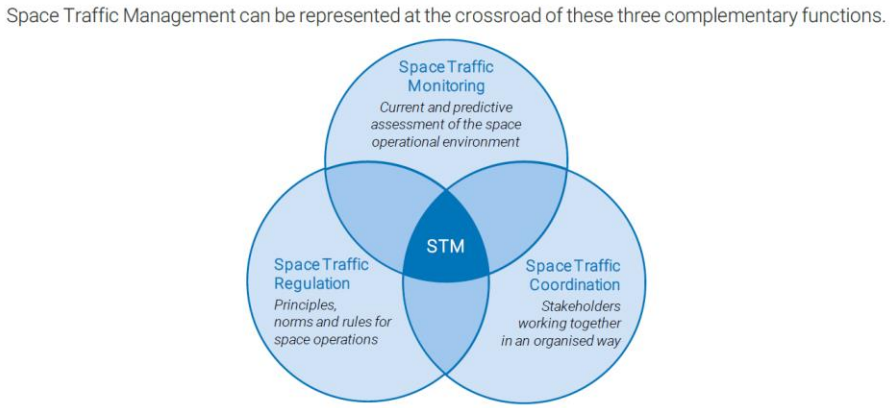



*Figure 2: Core functions of Space Traffic Management*

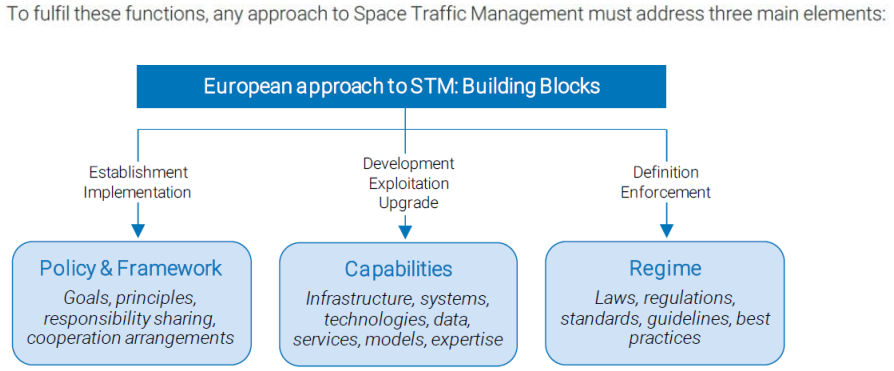
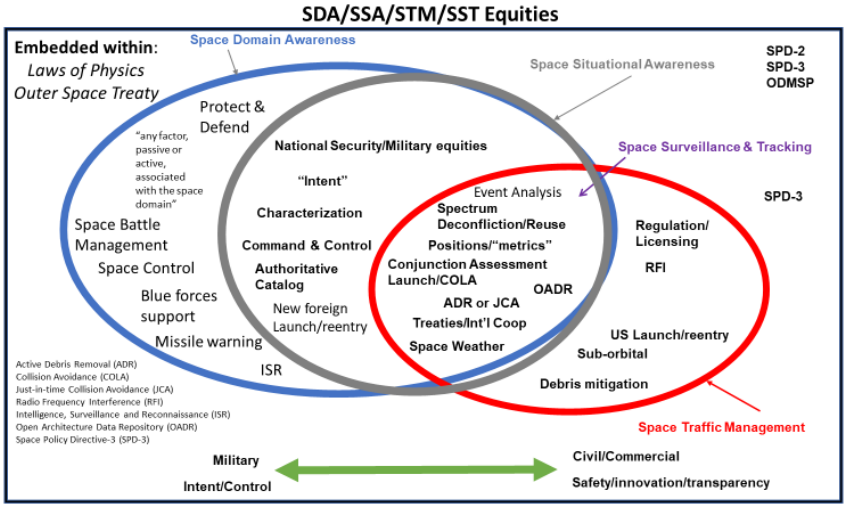



*Figure 3: Core components of an approach to Space Traffic Management*

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…>

<…other supplemental content…>