

## “Space Architecture” discipline name / callsign evolution

Due to the disciplinary, semantic, terminological and ontological ~~discrepancy-ambiguity~~ of the term ‘Space Architecture’, the SACoS members identified the opportunity to ~~enhance the field of architecture~~ ~~contribute to the discipline by and provide~~ ~~providing a few replacement options as an official term to supplement this term in for~~ the professional environment, ~~with an official term~~ while keeping the “Space Architecture” term as an ~~informal or~~ casual callsign.

The goal is to reduce ambiguity, and provide a precise term and definition ~~of for~~ the ~~architecture~~ discipline. Please review and select the most suitable option for an official term and provide written explanation for your agreement or disagreement with the other terms. Consider the term “architecture” according to currently prepared AIAA SACoS standard S-153 provided in the Appendix A of this document.

**Question 1 (select Agree or Disagree):** Should this term (Option A - C) be used as an official name of the discipline?

**Question 2 (use the comments field for clarification):** For Example - What should be the intended meaning of the concept of *space architecture*? That is, what idea should a corresponding term communicate and what scope should it describe?

### Option A: “Space Architecture” (current name of the discipline)

~~The Term-term~~ “space” has various meanings and uses, ~~and does not define the purpose, meaning nor the scope of the domain.~~ It is not a primitive term.

Definition of “space” by e.g., Merriam Webster ([link](#)) includes meaning related to environment beyond Earth’s atmosphere only as number 5 meaning and pointing out its multiple meanings.

~~SACoS (chair and selected members) recommend not to use this term in official documentation or communication and keep this term as a casual callsign / name of the domain.~~

Radiobutton

**Do you agree with the use of “Space Architecture” as an official name of the discipline?**

Agree

Disagree

**Comment [rr1]:** I thought the field of spaceflight architecture.

**Comment [rr2]:** PROBLEM: This is double-quotes, but earlier single-quotes was used. SOLUTION: be consistent throughout with formatting and usage. Choose (and ideally state) one for mentioning terms.

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**Comment [rr3]:** This introduces a bias.

**Comment [rr4]:** I’m not sure we need to include a dictionary definition. But I do recommend we write that the reader should consult various dictionary definitions for background knowledge.

**Comment [rr5]:** These sentences should not be in the questionnaire. They introduce a bias that can influence the reader. Questionnaires need to be neutral for ethical and other reasons, as you know.

Comment here: 300 characters

### Option B: “Astronautical Architecture”

Term “astronautical” has a clear definition e.g., MWD ([link](#)): **“the science of the construction and operation of vehicles for travel in space beyond the earth's atmosphere”**

Although this term conveys very clear message about the field it does not specify that the discipline deals with accommodations of human condition in universe.

It does not exclude human accommodation, either. It is higher-level, encompassing both:

Astronautical

Manned/Human ...

Unmanned...

In terms of scope it covers manned and unmanned vehicles. In terms of semantics “astra” = “star” which also deviates from the scope of the discipline we are attempting to name (reason: astronauts are not traveling only to the stars).

“astra” does not detract from the meaning of the full term. The intended meaning is the science of spaceflight, which (as you also wrote) includes both manned and unmannded aspects.

~~SACoS chair recommends not to use this term in official documentation or communication and keep this term as an alternative **name** of the domain.~~

Radiobutton

**Do you agree with the use of “Astronautical Architecture” as an official name of the discipline?**

Agree

Disagree

Comment here: 300 characters

### Option C: “Human Spaceflight Architecture”

Term “spaceflight” has a clear definition e.g., MWD ([link](#)): “**flight beyond the earth's atmosphere**”

This term describes the meaning, scope and focus on architecture related to human spaceflight.

The word ‘Human’ provides that specialized sense, but not ‘spaceflight’. ‘Spaceflight’ is like ‘astronautical’—both are generic covering both manned and unmanned modes of spaceflight.

I agree that this option, C, is sufficient.

But this would suggest a dichotomy: having also a non-human (unmanned) spaceflight architecture concept. So we can have this typology (intendation indicates subsumption):

Astronautical Architectre (most general)

Human Spaeflight Architecture

Unmanned Spaceflight Architecture

~~SACoS chair recommends to use this term as an official name of the domain.~~

**Do you agree with the use of “Human Spaceflight Architecture” as an official name of the discipline?**

Radiobutton

Agree

Disagree

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Option D - not applicable for a discipline name due to its limited scope. This option is listed only to provide you a contextual viewpoint: “Space Vessel Architecture” or “Spacecraft Architecture”

Term “space vessel” is suggested to be a name of a spacecraft that enables human presence (having a life supporting function). The term “spacecraft” has a clear definition e.g., MWD [\(link\)](#): “a vehicle or device designed for travel or operation outside the earth's atmosphere”. This definition does include also architecture of unmanned probes, spacecrafts and rovers.

Both terms do focus on vehicle only, limiting thus scope of the discipline, not considering external to spacecraft, broader context of the human spaceflight. ▲

~~*SACoS chair does not recommend to use either term as an official name of the domain.*~~

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## Appendix A

### ARCHITECTURE CLASSIFICATION

Derived from **IEEE 610.12** and **DISA JTA**<sup>1</sup> (modified and synthesized by SACoS)

Architecture Classification is a categorization of the types of architectures according to their scope and purpose. There are three types of architectures by DISA (3-5) and two by SACoS (1-2) to encompass hierarchy of human-systems and related phenomena and entities. The five types are listed hierarchically based on the level to which a mental and physical realizations are of a concern in a human-system architecture:

1. **Fundamental Architecture** – A description of the natural or artificial system purpose and relationships including ideological values, rules, principles regarding its environments (natural, artificial, physical, mental, social) to enable formation of the Enterprise Architecture
  - Example:
    - Societal, individual rules, values, preferences and cultures
    - State, federal frameworks and governance rules
    - (Co)existential motivations

***Alternative terms and concepts potentially used in other communities:***

*May be referred to as “Architecture Theory”, “Architecture Ideology”, “Ideology”, “Fundamentals of Architecture”*

2. **Enterprise Architecture** – A description of all components (human, hardware, software) of an economically productive human-organizational environment designated to definition of goals, strategy, products, services and required infrastructure in current and future states based on the input from the Architecture Ideology to enable Operational, System and Technical Architectures. Enterprise Architecture comprises of three fundamental parts:
  - Architecture Framework
  - Architecture Implementation Plan
  - Architecture Management Plan
  - Example:
    - Corporations architecture
    - Governmental entities
    - International organizations

***Alternative terms and concepts potentially used in other communities:***

*May be referred to as “Organizational Architecture”, “System of Systems Architecture” although Enterprise architecture incorporates both and other additional components.*

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<sup>1</sup> DISA JTA ([HTTP://www-jta.itsa.disa.mil/jta/sect1.html#S1\\_1\\_3](http://www-jta.itsa.disa.mil/jta/sect1.html#S1_1_3))

3. **Operational Architecture** – Description of the operational elements, assigned tasks, and information flows required to accomplish or support the **Enterprise** function. It defines the type of information, the frequency of exchange, and what tasks are supported by these information exchanges
- Example:
    - Space Mission Architecture (describing specific functions of the mission as a line of business or a vertical silo of an Enterprise Architecture)
    - Group of activities or a program
    - System of Systems Architecture

***Alternative terms and concepts potentially used in other communities:***

*May be referred to as "Space Mission Architecture", "Mission Architecture".*

4. **System Architecture** – A description of the system and interconnections providing for or supporting functions. This architecture defines the hardware (physical) and/or software (virtual) connections, location and identification of the key nodes, circuits, siteworks, platforms, etc., and specifies its performance parameters. It is constructed to satisfy the operational architecture requirements per standards defined in the technical architecture. It shows how multiple systems within a subject are linked and interoperate.
- Example:
    - Vehicle Architecture, Spacecraft Architecture
    - Building Architecture
    - Product Architecture
5. **Technical Architecture** – set of rules and relations governing the arrangement, interaction, and interdependence of the parts or elements whose purpose is to ensure that a conformant system satisfies and specified set of requirements. The technical architecture identifies the services, interfaces, standards, and their relationships."
- Example:

Vehicle, building or products types specified by the configuration and types of their subsystems