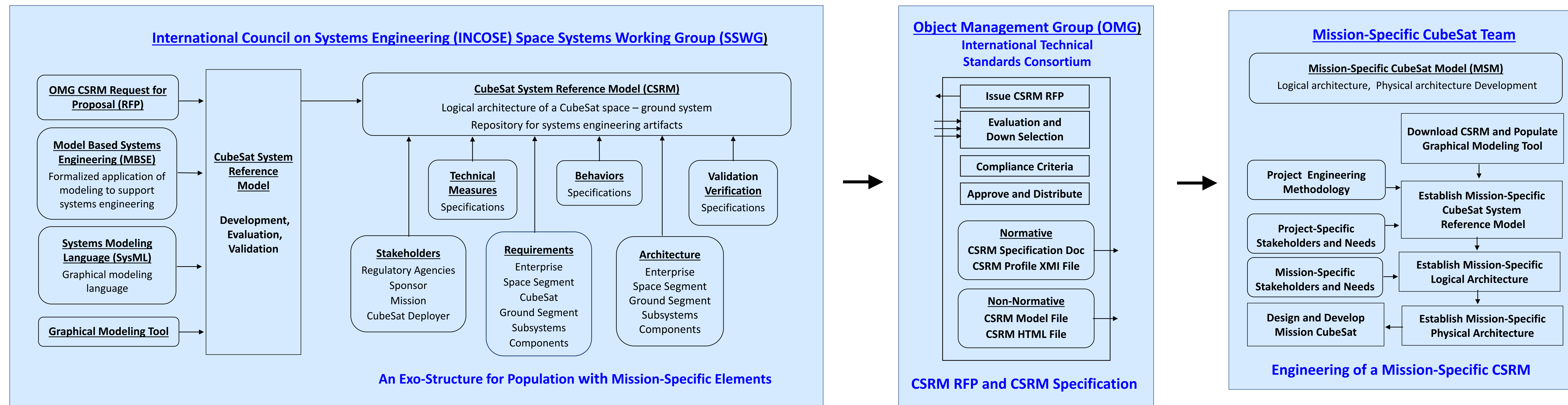


SSWG has been investigating the applicability of MBSE for designing CubeSats since 2011.

The first phase developed a SysML model of a CubeSat and applied it to the Radio Aurora Explorer. The second phase included modeling behaviors and the third phase included carrying out trade studies.

The current phase is the development of the CubeSat System Reference Model (CSRM).

The CSRM provides the logical architecture of a CubeSat space and ground system. The CSRM logical components are reused as a starting point for a mission-specific CubeSat logical architecture followed by the development of the physical architecture during CubeSat development. The mission-specific team is free to adopt a different logical architecture and modify the CSRM to accommodate the change.



**CSRM and Mission Engineering**  
The following activities are proposed

- Identify Mission Engineering MBSE methodologies
- Identify the key elements of terminology, and map/align with the CSRM terminology for each methodology
- Analyze the CSRM for additional artifacts which could be added that map to the mission engineering methodology
- Assess whether the CSRM is the right tool to support this aspect of the methodology
- Provide the results of the above analysis to INCOSE and OMG with recommendations for implementation

Carry-out a CSRM gap-like analysis relative to accommodating mission engineering threads

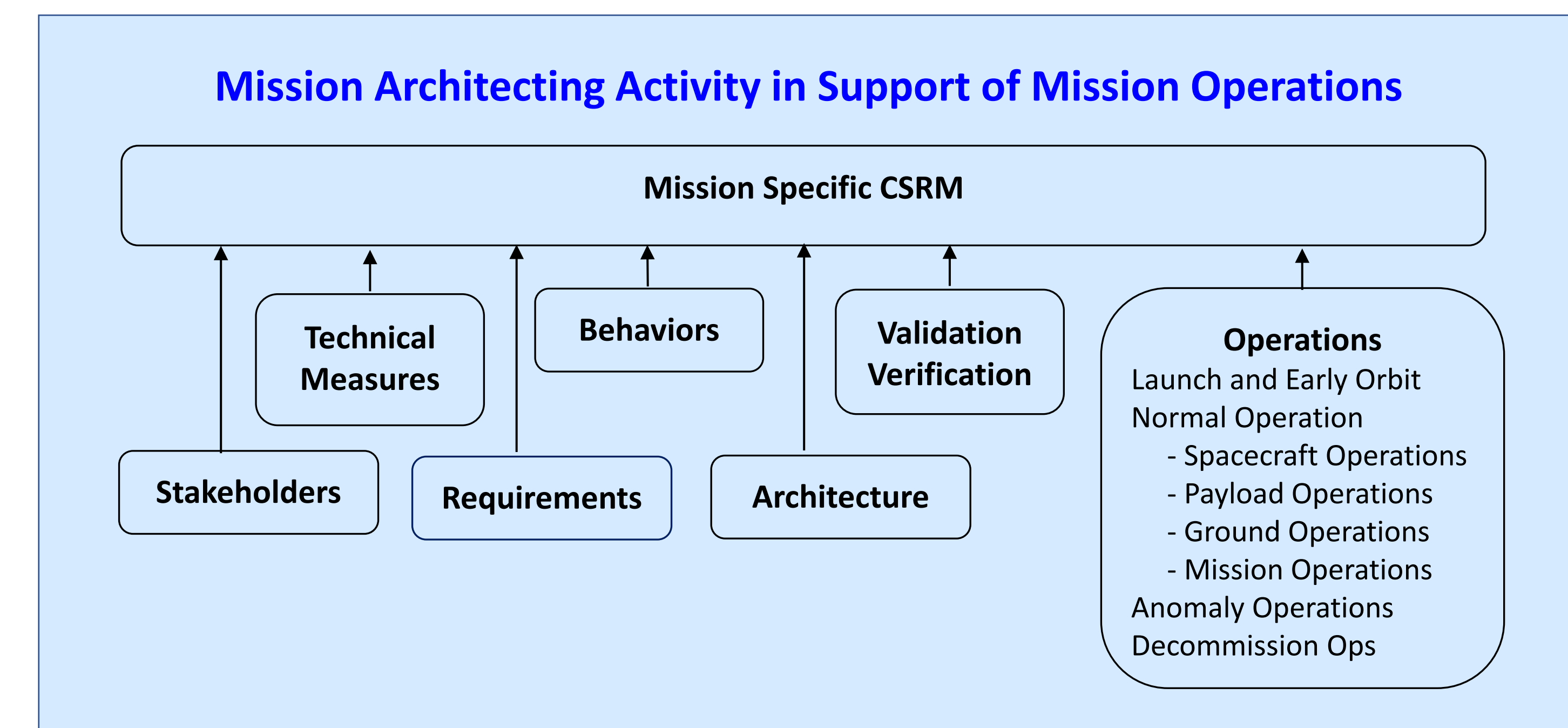
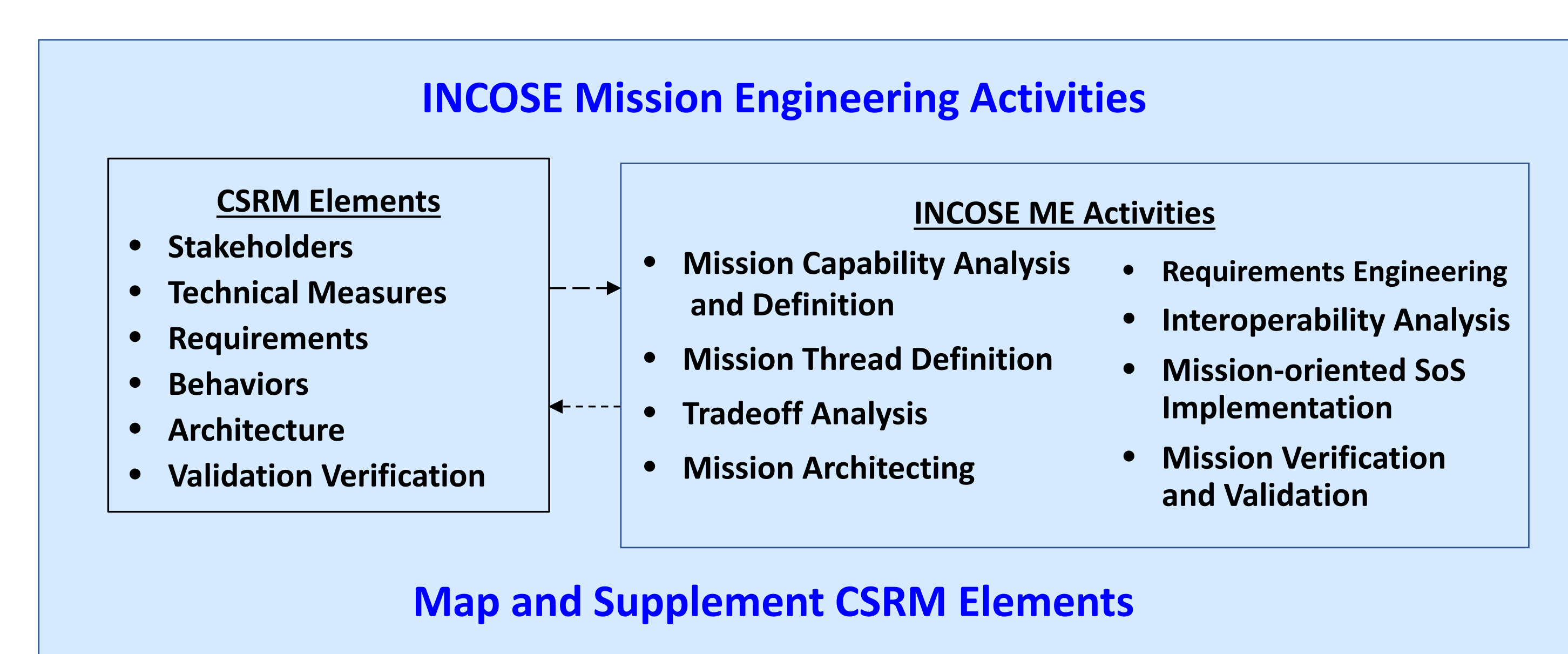
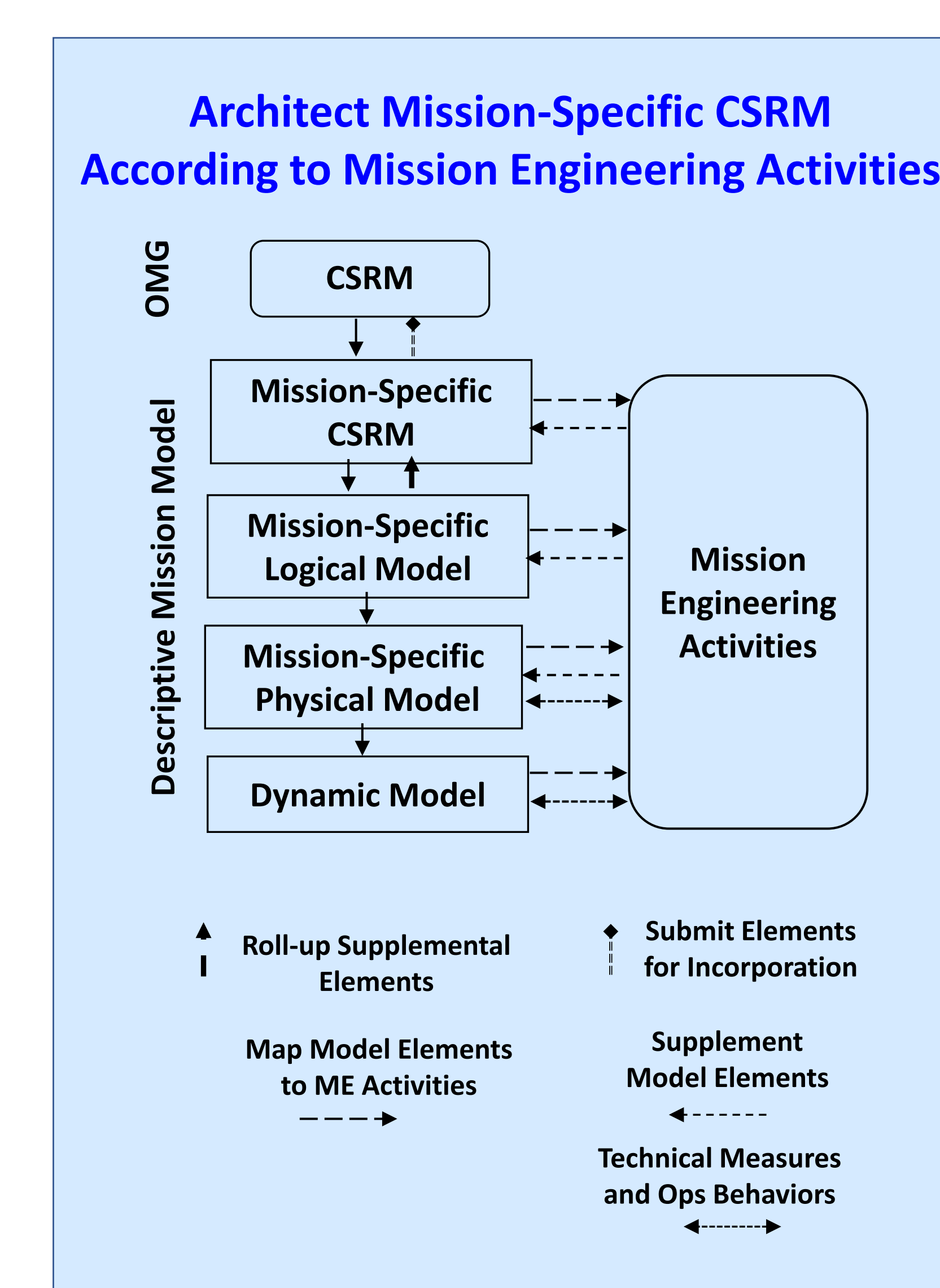
**Identify Mission Engineering Methodologies**

**Space Mission Engineering [1]**  
Space Mission Engineering is the refinement of requirements and definition of mission parameters to meet the broad objectives of a space mission in a timely manner at minimum cost and risk

**DoD Mission Engineering Handbook [2]**  
Mission Engineering is the deliberate planning, analyzing, organizing, and integrating of current and emerging operational and system capabilities to achieve desired warfighting mission effects

**INCOSE Systems Engineering Book of Knowledge [3]**  
Mission Engineering describes the application of systems engineering to the planning, analysis, and designing of missions where the mission is the System of Interest  
Mission Engineering analyzes the mission goals and threads, analyzes the available as well as emerging operational and system capabilities, and designs a mission architecture to achieve the mission goal

Different domains have different mission engineering methodologies. INCOSE Mission Engineering Activities will be used to kick-off this process.



**Follow-On**

Continue to evaluate the INCOSE list of Mission engineering activities

Solicit input from stakeholders on possible methodologies, conceptual frameworks, evaluation criteria or other strategies

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**References**

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 [2] DoD Mission Engineering Guide, November 2020  
 [3] INCOSE Guide to the Systems Engineering Body of Knowledge v2.3, October 2020