

## **EXPLORATION MEDICAL SYSTEM TRADE STUDY TOOLS OVERVIEW**

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ExMC is creating an ecosystem of tools to enable well-informed medical system trade studies. The suite of tools address important system implementation aspects of the space medical capabilities trade space and are being built using knowledge from the medical community regarding the unique aspects of space flight. Two integrating models, a systems engineering model and a medical risk analysis model, tie the tools together to produce an integrated assessment of the medical system and its ability to achieve medical system target requirements. This presentation will provide an overview of the various tools that are a part of the tool ecosystem. Initially, the presentation's focus will address the tools that supply the foundational information to the ecosystem. Specifically, the talk will describe how information that describes how medicine will be practiced is captured and categorized for efficient utilization in the tool suite. For example, the talk will include capturing what conditions will be planned for in-mission treatment, planned medical activities (e.g., periodic physical exam), required medical capabilities (e.g., provide imaging), and options to implement the capabilities (e.g., an ultrasound device). Database storage and configuration management will also be discussed. The presentation will include an overview of how these information tools will be tied to parameters in a Systems Modeling Language (SysML) model, allowing traceability to system behavioural, structural, and requirements content. The discussion will also describe an HRP-led enhanced risk assessment model developed to provide quantitative insight into each capability's contribution to mission success. Key outputs from these various tools, to be shared with the space medical and exploration mission development communities, will be assessments of medical system implementation option satisfaction of requirements and per-capability contributions toward achieving requirements.