Introduction

- **Traditional** requirements engineering tools lack access to the system architecture model, resulting in duplication & imprecision.
- **Integration** with the architecture model defined in SysML contributes to the Authoritative Source of Truth (ASoT) while facilitating Verification & Validation (V&V) activities.

By encoding the Guide to Writing Requirements [5] into SysML, a reusable Profile with embedded documentation, examples, and metrics becomes available to enrich requirements engineering.

Methods

- **Structured requirements** [1][4] provide consistency and improve quality by using a standard template:

  - Requirement Satisfaction Matrix enabled direct verification against Rules, with tooltip descriptions, and Violate relation to calculate compliance
  - Customizable Relation Map diagrams revealed deep model relationships
  - Requirement Allocation Matrix provided color-coded requirements structure at-a-glance

**SysML** (meta-)modeling defines stereotypes, value types, enumerations, relationships and grouping so modelers have ready access to:

- Rules
- Attributes
- Characteristics
- Organization-tailored Need & Requirement

**Matrix, Decomposition, Relation Map, Requirement Diagrams** and **Tables** present tailored views and exhibit model element relationships in a customizable and exportable manner.

Conclusions

- **Continued development** and feedback from project stakeholders needed to fully validate this INCOSE-grounded MBSR approach.
- This approach was used to **revise over 100 Mars Sample Return requirements** at NASA JPL.
- **Initial feedback** at JPL indicates that consistent terminology provided by *model-canonical names* & defined terms using *SysML-enabled glossaries* facilitates team alignment and positively influences the systems engineering culture.

References