## **Science Traceability Matrix Template**

**Table 1:** Example science traceability matrix

| **Scientific Objective***A specific line of investigation that supports the overall Mission Goal* | **Scientific Measurement** | **Scientific Instrument** |
| --- | --- | --- |
| **Measurement Objective***Description of a observable physical phenomena that is key to understanding the Scientific Objective* | **Measurement Requirement***Definition of the minimum measurement characteristics required to meet the Scientific Objective* | **Instrument***Name of the tool that is required to conduct the measurement.* | **Instrument Requirement***Definition of the minimum instrument performance metrics to meet the measurement requirement.* |
| Quantify the “sloshing” phenomena during fluid transfer in micro-g | Force transferred to the fluid chamber during filling in micro-g | Average force (N) in the direction of fluid transfer | Parallel beam type load cell | 0-500 N range0.1 N resolution1 kHz sampling rate |
| Quantify the impact of flowrate on “sloshing” forces | Amount of fluid flowing through the test chamber during filling in micro-g | Average fluid flow rate (L/min) through the test chamber | Flowmeter | 0-20 L/min range0.5 L/min resolution1 kHz sampling rate |
| Explore the impact of slat design on “sloshing” forces | Compare forces from fluid cells with different slat geometries | Use 2 different slat designs, plus a control design. | N/A | Experimental design must include 2+1 slat geometries |

| **Mission Requirements***Describe the scenario that must occur to result in a successful measurement for the mission.* |
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| The Mission Specialists must initiate the experiment after entering micro-g. Fluid must be forced through the test chamber during the period of micro-g. Load cell and flowmeter data must be sampled during this period and saved for post-processing. Three replicates for each of the experimental conditions must be captured for analysis. Fluid transfer must be completed within 20 sec, and should be completed in less than 15 sec.  |