INTRODUCTION: The Environmental Control and Life Support System (ECLSS) is considered critical for all human spacecraft. Design validation, performance testing, and certification are significant activities for these systems prior to flight. These can be even more challenging if the overall system, its components, and/or the working fluids behave differently in a micro- or partial-gravity environment. This presentation provides an overview of recent proposed or developed flight experiments in support of advancing ECLSS technologies for future spacecraft. The benefits of potential suborbital flight tests are considered. Recommendations for future collaboration are also provided.

EXAMPLE ECLSS FLIGHT EXPERIMENTS: Provided below are example flight experiments to be discussed, which all exhibit gravity-sensitive traits. This listing represents the minimum content to be included in the presentation:

Immobilized Microbe Microgravity Water Processing System (IMMWPS) Flight Experiment – technology demonstration of a microbial water processor for microgravity use,

Two-Phase Extended Evaluation in Microgravity (TEEM) – demonstration of a closed-loop, two-phase system for extended on-orbit operations,

Water Offset Nutrient Delivery Experimental Research (WONDER) – technology demonstration of components for a microgravity vegetable production unit, and

International Space Station (ISS) Water Processing Assembly (WPA) KC-135 Testing – testing of sensors to be used on the ISS WPA in Node 3 to ensure water quality.

REFERENCES: The list below represents initial references for the presentation:


