

Amine Swingbed Payload Project Management

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The International Space Station (ISS) has been designed as a laboratory for demonstrating technologies in a microgravity environment, benefitting exploration programs by reducing the overall risk of implementing such technologies in new spacecraft. At the beginning of fiscal year 2010, the ISS program manager requested that the amine-based, pressure-swing carbon dioxide and humidity absorption technology (designed by Hamilton Sundstrand, baselined for the ORION Multi-Purpose Crew Vehicle, and tested at the Johnson Space Center in relevant environments, including with humans, since 2005) be developed into a payload for ISS Utilization. In addition to evaluating the amine technology in a flight environment before the first launch of the ORION vehicle, the ISS program wanted to determine the capability of the amine technology to remove carbon dioxide from the ISS cabin environment at the metabolic rate of the full 6-person crew. Because the amine technology vents the absorbed carbon dioxide and water vapor to space vacuum (open loop), additional hardware needed to be developed to minimize the amount of air and water resources lost overboard. Additionally, the payload system would be launched on two separate Space Shuttle flights, with the heart of the payload –the swingbed unit itself – launching a full year before the remainder of the payload. This paper discusses the project management and challenges of developing the amine swingbed payload in order to accomplish the technology objectives of both the open-loop ORION application as well as the closed-loop ISS application.