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Floating pressure conversion and equipment upgrades of two 3.5KW, 20K, helium refrigerators

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Two helium refrigerators, each rated for 3.5KW at 20K, are used at NASA's Johnson Space Center (JSC) to provide cryo-pumping within two large thermal-vacuum chambers. These refrigerators were originally commissioned in 1996. Equipment refurbishment and upgrades of the controls of these refrigerators were recently completed. This paper describes some of the mechanical and control issues that necessitated the equipment refurbishment and controls change-over. It will describe the modifications and the new process control which allows the refrigerators to take advantage of the Ganni Cycle "floating pressure" control technology.

The upgrades have greatly improved the performance, stability, and efficiency of these two refrigerators. The upgrades have also given the operators more information and details about the operational status of the main components (compressors, expanders etc.) of the refrigerators at all operating conditions (i.e., at various loads in the vacuum chambers).

Capabilities, configuration, and performance data pre, and post, upgrading will be presented.

Proposed for workshop session (see call for abstracts): 1- Operation 2- Maintenance 3 - Safety 4 - Control

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