# December 2011 MSS/LPS/SPS Joint Subcommittee Meeting
# ABSTRACT SUBMITTAL FORM

The submission of an abstract is an agreement to complete a final paper for publication and attend the meeting to present this information. Complete all information requested in the author and co-author information sections; the first author listed will receive paper acceptance notices and all correspondence. Abstracts must be submitted electronically; submittal instructions are located in the call for papers. **The abstract deadline date is June 13, 2011.**

## ABSTRACT INFORMATION

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## MANAGEMENT APPROVAL

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# ABSTRACT SUBMITTAL FORM

## Unclassified Abstract

*(250-300 words; do not include figures or tables)*

Pratt and Whitney Rocketdyne (PWR), a NASA subcontractor, is executing the design, development, test, and evaluation (DDT&E) of a liquid oxygen, liquid hydrogen two hundred ninety four thousand pound thrust rocket engine initially intended for the Upper Stage (US) and Earth Departure Stage (EDS) of the Constellation Program Ares-I Crew Launch Vehicle (CLV). A key element of the design approach was to base the new J-2X engine on the heritage J-2S engine with the intent of uprating the engine and incorporating SSME and RS-68 lessons learned. The J-2S engine was a design upgrade of the flight proven J-2 configuration used to put American astronauts on the moon. The J-2S Fuel Turbopump (FTP) was the first Rocketdyne-designed liquid hydrogen centrifugal pump and provided many of the early lessons learned for the Space Shuttle Main Engine High Pressure Fuel Turbopumps. This paper will discuss the design trades and analyses performed for the current J-2X FTP to increase turbine life; increase structural margins, facilitate component fabrication; expedite turbopump assembly; and increase rotordynamic stability margins. Risk mitigation tests including inducer water tests, whirligig turbine blade tests, turbine air rig tests, and workhorse gas generator tests characterized operating environments, drove design modifications, or identified performance impact. Engineering design, fabrication, analysis, and assembly activities support FTP readiness for the first J-2X engine test scheduled for July 2011.