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Title: Regeneratively Cooled Liquid Oxygen/Methane Technology Development Between NASA MSFC & PWR
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The National Aeronautics & Space Administration (NASA) has identified Liquid Oxygen (LOX)/Liquid Methane (LCH4) as a potential propellant combination for future space vehicles based upon exploration studies. The technology is estimated to have higher performance and lower overall systems mass compared to existing hypergolic propulsion systems. NASA-Marshall Space Flight Center (MSFC) in concert with industry partner Pratt & Whitney Rocketdyne (PWR) utilized a Space Act Agreement to test an oxygen/methane engine system in the Summer of 2010.

PWR provided a 5,500 lbf (24,465 N) LOX/LCH4 regenerative cycle engine to demonstrate advanced thrust chamber assembly hardware and to evaluate the performance characteristics of the system. The chamber designs offered alternatives to traditional regenerative engine designs with improvements in cost and/or performance. MSFC provided the test stand, consumables and test personnel. The hot fire testing explored the effective cooling of one of the thrust chamber designs along with determining the combustion efficiency with variations of pressure and mixture ratio.

The paper will summarize the status of these efforts.