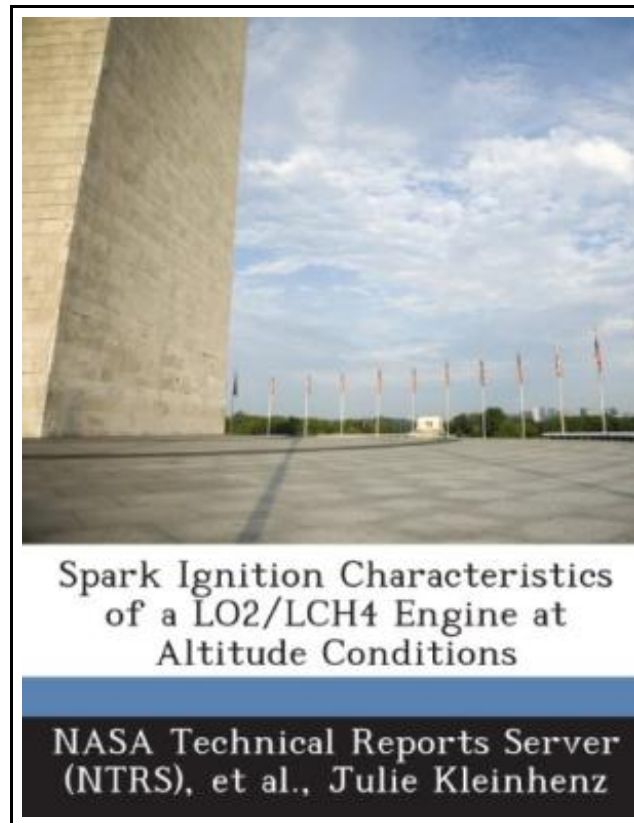


## Spark Ignition Characteristics of a Lo2Lch4 Engine at Altitude Conditions



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Bibliogov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 24 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. The use of non-toxic propellants in future exploration vehicles would enable safer, more cost effective mission scenarios. One promising green alternative to existing hypergols is liquid methaneliquid oxygen. To demonstrate performance and prove feasibility of this propellant combination, a 100lbf LO2LCH4 engine was developed and tested under the NASA Propulsion and Cryogenic Advanced Development (PCAD) project. Since high ignition energy is a perceived drawback of this propellant combination, a test program was performed to explore ignition performance and reliability versus delivered spark energy. The sensitivity of ignition to spark timing and repetition rate was also examined. Three different exciter units were used with the engines augmented (torch) igniter. Propellant temperature was also varied within the liquid range. Captured waveforms indicated spark behavior in hot fire conditions was inconsistent compared to the well-behaved dry sparks (in quiescent, room air). The escalating pressure and flow environment increases spark impedance and may at some point compromise an exciter's ability to deliver a spark. Reduced spark energies of these sparks result in more erratic ignitions and adversely affect ignition probability. The timing of the sparks relative to the pressureflow conditions also impacted the probability of ignition. Sparks occurring early in the flow could trigger ignition with energies as low as 1-6mJ, though multiple, similarly timed sparks of 55-75mJ were required for reliable ignition. An optimum time interval for spark application and ignition coincided with propellant introduction to the igniter and engine. Shifts of ignition timing were manifested by changes in the characteristics of the resulting ignition. This item ships from La Vergne, TN. Paperback.



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