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FEATURE

Winter Wonder Rocket Movie

1.15.2009

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Jan. 15, 2009: How can a rocket engine that generates scalding 5,000 degree steam and a whopping 13,000 lbs of thrust form delicate icicles at the rim of its nozzle?

It's cryogenic. NASA is using the Common Extensible Cryogenic Engine ("CECE" for short) to develop technologies for a next-generation lunar lander. CECE is fueled by a mixture of -297 F liquid oxygen and -423 F liquid hydrogen. The engine components are super-cooled to similar low temperatures--and that's where the icicles come from. As CECE burns its frigid fuels, hot steam and other gases are propelled out the nozzle. The steam is cooled by the cold nozzle, condensing and eventually freezing to form icicles around the rim.

Click on the image to launch a movie of CECE's surprising fire and ice:



Launch the movie!

Above: The Common Extensible Cryogenic Engine in action during a recent test. Image credit: Pratt & Whitney Rocketdyne. [[Larger image](#)] [[movie](#)]

Using liquid hydrogen and oxygen in rockets will provide major advantages for landing astronauts on the moon. Hydrogen is very light but enables about 40 percent greater performance (force on the rocket per pound of propellant) than other rocket fuels. Therefore, NASA can use this weight savings to bring a bigger spacecraft with a greater payload to the moon than with the same amount of conventional propellants. CECE is a step forward in NASA's efforts to develop reliable, robust technologies to return to the moon – and a winter wonder.

CECE has just completed a third round of intensive testing by Pratt & Whitney Rocketdyne in West Palm Beach, Florida. Get [the full story](#) from nasa.gov.

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Editor: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#)

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[Throttling Back to the Moon](#) -- (Science@NASA) Accelerating from 0 to 60 then slowing down for a stop light is no problem for an ordinary automobile. But if you were piloting a rocketship, it wouldn't be so easy. CECE is helping NASA engineers figure out how to perform this trick and touch down gently on the Moon.

[NASA Tests Engine Technology for Landing Astronauts on the Moon](#) -- NASA press release describing the latest round of CECE testing

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