

Street bike used as platform to test propulsion parts for Lynx Suborbital Vehicle

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XCOR's innovative piston pump technology took a ride from Roswell, NM to Mojave, CA in April 2012.

"We debated how best to put many hours of wear time on the critical bearing components of our [rocket propellant](#) piston pump, that are subject to significant wear and tear," said Dan DeLong, XCOR Chief

Engineer. "This particular motorcycle, the Triumph Street Triple, develops about the same horsepower and has the same cylinder arrangement as the liquid oxygen and kerosene fuel pumps for the Lynx suborbital spacecraft. That makes it ideal for a long-life pump test platform. The bike is much less expensive to operate than the full up rocket pump test stand. We're adding hours of run time each ride, not just minutes."

The [motorcycle](#) was customized for the XCOR rocket piston pump technology and then shipped to Motion Performance in Roswell. There XCOR engineers finished modifying and testing the bike for the trip. After making presentations at local schools with the bike as part of XCOR's ongoing Science, Technology, Engineering and Mathematics (STEM) educational outreach efforts, the XCOR team was given a send-off by Roswell Mayor Del Journey and members of the Roswell-Chaves County Economic Development Corporation. The trip symbolically started at the Robert Goddard Museum which honors the father of modern liquid rocketry and his early pioneering work in Roswell.

"We put twenty hours--the equivalent of 400 Lynx flights--on the rocket pump bearings by driving from Roswell to Mojave taking periodic data readings along the way to make sure things were in good condition," remarked Dan. "The trip was a great success and the bike performed flawlessly. Plus we got to drive through some of the most spectacular parts of the American Southwest."

"XCOR continues to solidify its reputation as an innovative, nimble company when it comes to research and development practices," commented XCOR Chief Operating Officer, Andrew Nelson. "This test would have cost us over \$500 per minute had we operated it on a traditional pump test stand. The entire trip represented about half a million dollars in net savings in both time and money for the company. More importantly, it validated that our critical pump subassemblies will

have the ultra-long life needed to meet the safety needs of our customers and a vehicle that is designed to fly thousands of times over many years. Oh, and everyone had a lot of fun along the way!"

"We saw some amazing country," remarked XCOR Senior Engineer and principal driver Mike Valant, "we traveled through New Mexico, passing the Very Large Array, then turned northwards to Route 66, traveling as much of the old highway as possible. Meteor Crater was a highlight, as well as the towns of Holbrook, Seligman, Kingman, Oatman, all the classic waypoints on the Mother Road. We drove through sun, snow, rain and everything in-between. Personally for me, it was one of the greatest adventures I've had. It was challenging, and there was a lot of payoff. In addition to keeping the bike on the road through all the weather, we had to pay attention to how it was behaving and make sure there was no trouble."

"The data show no discernible difference in bearing wear between when we started and when we finished," remarked Dan DeLong. "I call that a success."

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