



# NRO's Current Rideshare Mission:

GOVERNMENT RIDESHARE ADVANCED CONCEPTS EXPERIMENT (GRACE)

- GRACE (Government Rideshare Advanced Concepts Experiment) is the name of the NRO auxiliary payload that will carry a total of 13 CubeSats, nine sponsored by the NRO and four sponsored by NASA, to space as part of NROL-55, scheduled to launch October 8, 2015, from Vandenberg Air Force Base, CA.
- NRO's CubeSat Program Office partnered with the U.S. Army's Space and Missile Defense Command, NRO's Communication Systems Directorate (COMM), NRO's Advanced Science and Technology (AS&T) Directorate, and the Aerospace Corporation to manifest and launch nine NRO-sponsored CubeSats.
- Similar to our previous CubeSat rideshares, GRACE will reach orbit on an ATLAS V rocket, mounted to the Aft-Bulkhead Carrier, located on the aft (or back) end of the Centaur-upper-stage. The GRACE NRO-sponsored CubeSats were developed by Aerospace Corporation (AeroCube-5c and AeroCube-7), the Army's Space and Missile Defense Center (SNaP-3), Tyvak (PropCube) and SRI International (SINOD-D).
  - **AeroCube-5c and AeroCube-7** – technology pathfinders that weigh 1.5 kilograms each and will demonstrate tracking technologies, optical communications, and laser communication.
  - **SNaP-3** – A total of three CubeSats, weighing 4.5 kilogram each, whose mission is to develop user software-defined radios to provide beyond-line-of-sight communication for disadvantaged users in remote locations.
  - **PropCube** – Two 1-kilogram CubeSat performing dual frequency ionospheric calibration measurements.
  - **SINOD-D** – Two 2-kilogram CubeSats demonstrating software defined radio communications.
- The GRACE NASA-sponsored CubeSats were developed by the University of Alaska-Fairbanks (ARC-1), Salish Kootenai College (BisonSat), AMSAT (AMSAT Fox-1), and the Jet Propulsion Laboratory (LMRST-Sat).
  - **ARC-1 (Alaska Research CubeSat 1)** – 1-kilogram CubeSat whose mission is to measure thermal and vibration environment during launch, and increase the Technology Readiness Level on both their attitude control and determination system, as well as, the high bandwidth communication system.
  - **BisonSat** – 1-kilogram CubeSat whose mission is to train students on the design, construction, test, and operation of space hardware by using a specially designed light camera to calculate and test land cover classification, cloud cover, and cloud height measurements.
  - **AMSAT Fox-1** – 1-kilogram CubeSat features an amateur radio FM voice repeater that will provide easy portable satellite communications opportunities for amateur radio operators worldwide. The satellite will also test a MEMS Gyro and a low energy proton experiment.
  - **LMRST-Sat (Low Mass Radio Science Transponder – Satellite)** – 3-kilogram CubeSat which will demonstrate the Low Mass Radio Transponder in earth orbit to raise its Technology Readiness Level.
- Earlier NRO-sponsored rideshare missions
  - OUTSat (Operationally Unique Technology Satellite) on NROL-36, in August 2012.
  - GEMSat (Government Experimental Multi-Satellite) on NROL-39, in December 2013.
  - ULTRASat (Ultra Lightweight Technology and Research Auxiliary Satellite) on Air Force mission, AFSPC-5, in May 2015.

For more information on CubeSats, please reference the following NRO press releases as well as the NRO's official Facebook and Twitter pages:

NROL-36: [www.nro.gov/news/press/2012/2012-09.pdf](http://www.nro.gov/news/press/2012/2012-09.pdf)

NROL-39: [www.nro.gov/news/press/2013/2013-04.pdf](http://www.nro.gov/news/press/2013/2013-04.pdf)

AFSPC/ULTRASat: [www.nro.gov/2015/02-15.pdf](http://www.nro.gov/2015/02-15.pdf)

 : <https://www.facebook.com/NationalReconnaissanceOffice>

 : <https://twitter.com/NatReconOfc>