

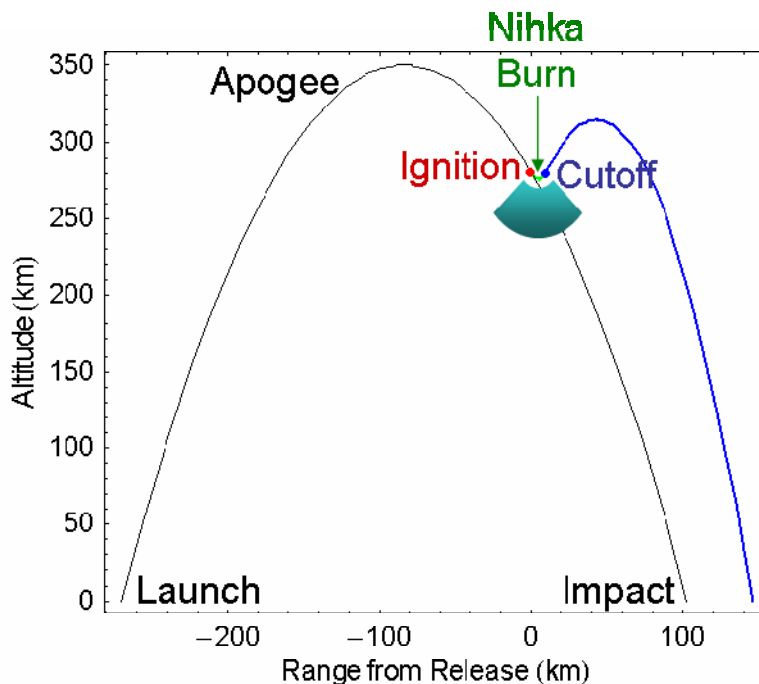
An Update on the Charged Aerosol Release Experiment (CARE)

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Abstract. The radar scatter from an artificial dusty plasma in space will be studied using a chemical release during the Charged Aerosol Release Experiment (CARE) in August or September 2009. CARE will be launched from Wallops Island, Virginia on a trajectory that takes the care release module to an apogee of 360 km altitude for a release on the downleg at 280 km altitude. 110 kg of aluminum oxide particulates will be injected from a 2-meter long canister with the exit port pointed to the nadir. A 60 degree $\frac{1}{2}$ angle cone of dust will be injected with a velocity of between 2 and 3 km/s. The dust will become charged in the ionosphere to form negatively charged dust particles. The streaming dust will provide a source for turbulence due to charge separation electric fields and to two-stream instabilities. Ground radars operating at HF, VHF and UHF frequencies will probe the release region looking for enhanced backscatter. The HF radar and digital ionosondes will be located near the launch site. The VHF radar will be located on Bermuda looking perpendicular to the magnetic field lines. The UHF radar will be located at Millstone Hill in Massachusetts. At late times, the particles will form an artificial dust cloud that will settle to about 100 km altitude. The measurements during this later phase will provide data on the transport of charged dust by lower-thermospheric winds.



Trajectory of the CARE release with a downward injection of dust from a rocket motor.