Echo Rocket Series

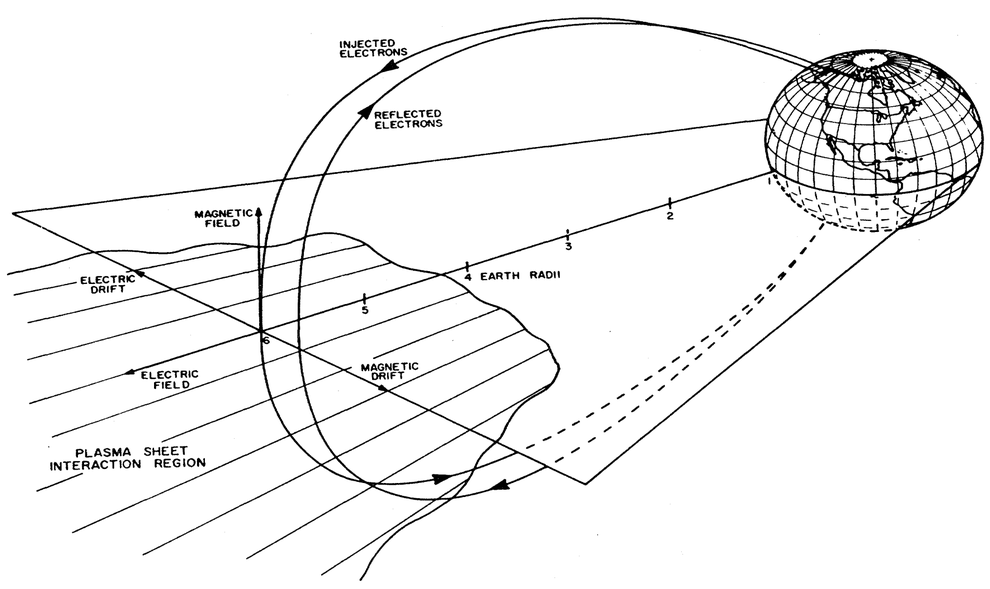
Echo 6

Basic objective: To inject electrons to be magnetically guided along field lines to the conjugate point in the southern hemisphere. At this point they are reflected back to the region near their origin either by magnetic mirroring or by backscattering off of the atmosphere.

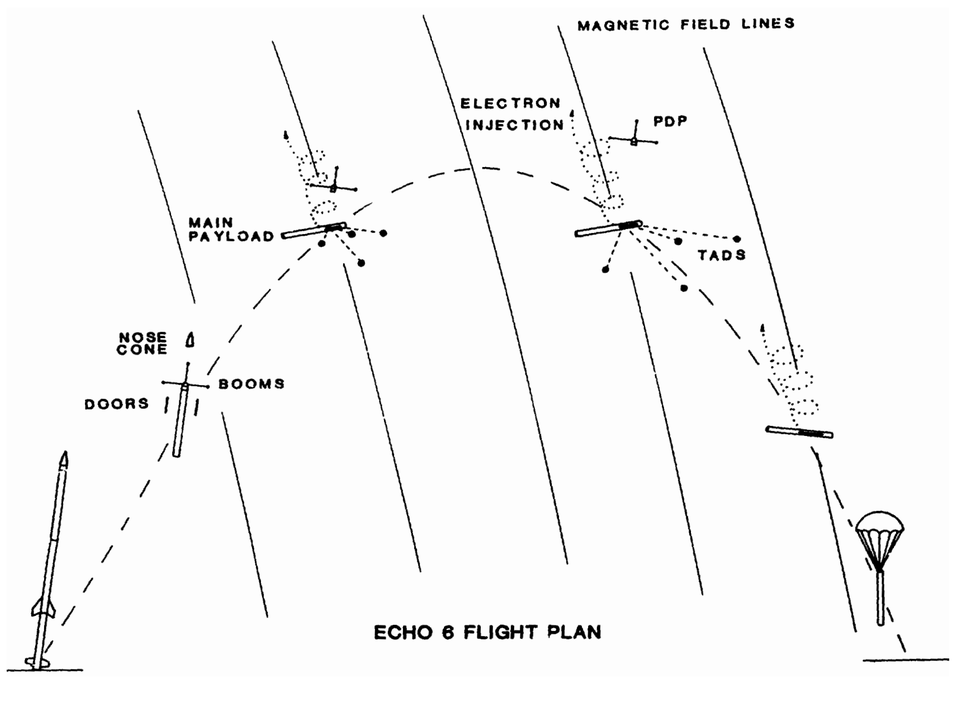
Mission Goal: Analysis of the detected echoes provides valuable information about the structure of the distant magnetosphere and the mapping of its electric field into the Ionosphere.

Launch Date: March 30, 1983
Launch Location: Poker Flat Research Range, Fairbanks, Alaska
Trajectory: North-northeastern across auroral arcs
Electron beams: Two onboard electron accelerators which injected electron beams of up to 40 KeV in energy.

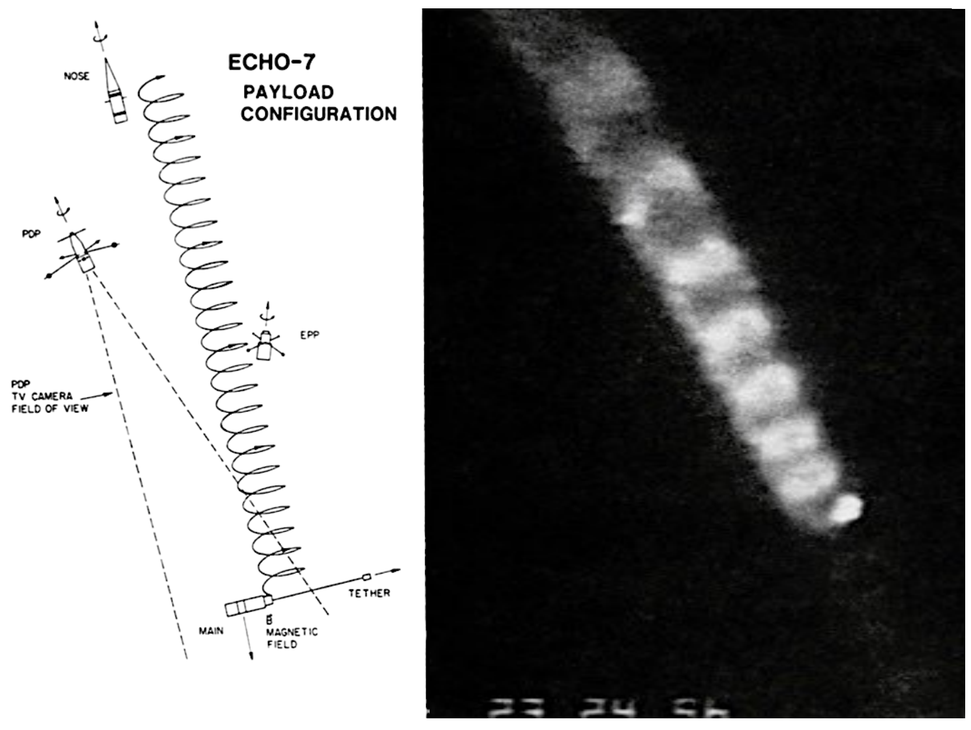
Primary emphases of Echo 6: Echo detection using Throw Away Detector System (TADS) and electric field analysis using a free-flyer forward experiment designated the Plasma Diagnostics Package.



Schematic of the Echo experiments. Electron beams injected from high-latitude ionosphere are reflected from the southern hemisphere conjugate point after possible interactions near the equatorial plane and are analyzed on return as magnetosphere probes.



Layout of Echo 6 Flight Plan. A rigorous and detailed sequence of payload events was required for the flight plan, because of the short-lived nature of the scientific event, the brevity of the flight, complexity of the payload, the requirement of the precise placement of the TADs in space, and the necessity of accurate injection of the electrons relative to the magnetic field lines.



Images of Echo electron beams. Artificial auroral streak is produced by beam. Here, the beam is surrounded by a diffusive glow, which increases the apparent beam diameter to at least a meter, and it executes a Larmor spiral about Earth's field with a radius of 12 m.