

Contracts Final Presentation 19-20 Feb. 2004

1. Title of the presentation

Floating bare tether as upper-atmosphere probe

2. Speaker

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3. Abstract

A feasibility analysis on use of a conductive tether, left uninsulated and electrically floating in LEO, as an autonomous e-beam source producing artificial auroras for upper atmosphere studies, is carried out. The optimal geometry of the tether (a tape, its length, width and thickness); dynamical issues; and use of an Ion Thruster instead of the tether itself for its periodic reboost in case of short missions, are discussed. A simple model serves to determine beam broadening, the energy and pitch-angle evolution of beam electrons, and the ionization they produce in the E-layer. Auroral processes, observational options, and the optics system required for observations are discussed. A detailed analysis of the tomographic reconstruction of the vertical profile of the neutral density from observed auroral luminosities, is developed.