

Preference is for an **oral** session
Paper is probably best suited to **Group 3, session B** (Atomic Clock for Space Applications)

GPS TIME TRANSFER AND STATE MEASUREMENT FOR PARCS

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This paper will describe a science-quality space GPS receiver implementation being studied for the Primary Atomic Reference Clock in Space (PARCS) mission. The PARCS flight experiment is an International Space Station (ISS) payload that will conduct investigations into the laser cooling of atoms, time interval measurement, and fundamental physics. The receiver will conduct GPS carrier phase observations essential to several mission science goals. Major aims are the transfer of relative time measurements made by other PARCS subsystems to the ground, and the determination of PARCS' precise state (position and velocity), to allow gravitational and second-order Doppler frequency shifts to be evaluated.

The receiver design is based on JPL's BlackJack radiometric instrument, a veteran of multiple spaceflights. The BlackJack is a dual frequency, codeless receiver design that can accept inputs from one or more antennas and perform a variety of on-board data acquisition, processing, and housekeeping functions. The major challenges for its use on PARCS are the ISS environment, which poses issues for antenna fields of view and introduces multipath and electromagnetic interference sources, and the use of GPS ground networks and data analysis techniques to provide a total measurement system adequate to meet PARCS' requirements.

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