NASA SBIR 2008 Phase I Solicitation

X13.02 Technology/Technique for Imaging Radiation Damage at the Cellular Level

Lead Center: JSC

New quantitative techniques need to be developed in order to assess astronautsâ€™ exposure to space radiation. Charged particles (protons and heavy ions) are of major concern for health risks because they cause chromosome damage. Current methods for measuring space radiation chromosome damage are time consuming and have limitations in sensitivity and accuracy. The Space Radiation Element within the Human Research Program seeks a sensitive, accurate method for assessing chromosome damage, while at the same time being less time consuming than current mFISH and mBand techniques.

Subtopic Requirements/Needs: Of particular interest are ground laboratory techniques using fluorescence in situ hybridization to detect various types of chromosome damage. The technique should be able to measure charged particle exposure at both ambient conditions in space (0.005 mGy/hr) and during a large solar particle event (1000 mGy/hr). The technique should be able to detect various types of chromosome damage such as inversions and deletions in various regions of chromosomes. The technique must be able to quantify chromosome abnormalities that persist after space flight.

Phase 1 Requirements: Phase 1 expectations include a report describing the fully developed concept with feasibility analyses and comparisons to existing methods.