Massachusetts Institute of Technology
Center for Space Research

Coral Reef Mission

Ref. 43-01101.02
February 28, 2003

Monthly Progress Report
February 2002

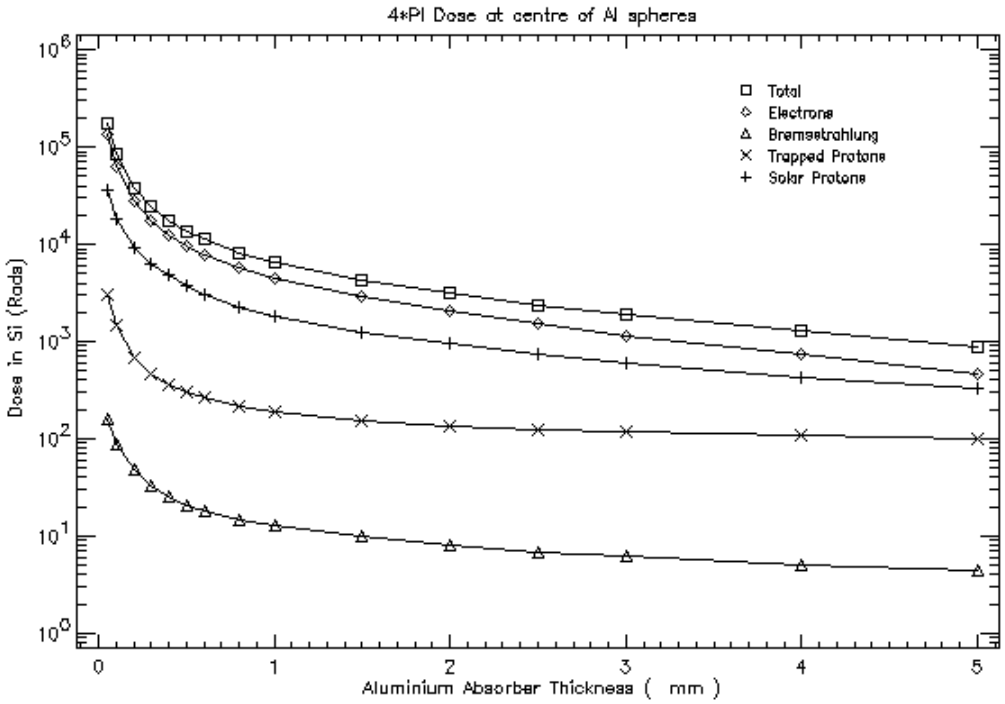
We are circulating document 43-04002.01, Solicitations of Industrial Partners, for internal MIT and PCRF review. (Since the spacecraft vendors of the world seem to put a lot of effort into industrial espionage and take it personally if they think one group has an advantage over the other, we're keeping this a rather closely held document until its release in mid-March.) It is an opus in three parts: a mission overview, a terse statement of the requirements and (design) goals, and program considerations the prospective vendors should have in mind when responding to this solicitation – *e.g.*: a funding and launch schedule to use as a straw man.

We have released document 43-09001 Rev 01, Mission Safety, Reliability and Quality Assurance for internal MIT review. This will be ready to go out with the above Solicitation – ahead of our original schedule – thanks to Brian Klatt. On the one hand it is a serious attempt to convey to the spacecraft vendors the kind of program we want them to run; on the other hand every organization has its system in place, and one can at best choose from a menu with very limited options.

The mission organization chart, 43-01001, has been updated to include the MIT SR&QA function. This was clearly an oversight on our part in previous versions, but reviewing the SR&QA Plan brought the matter home.

On a purely engineering note, we did some work studying the radiation environment of various orbits. Lower is better (of course, one is tempted to say) and, since we have to fly a hydrazine tank anyway – for initial orbit acquisition and subsequent maintenance – we looked at the numbers for a 500Km sun-synchronous orbit. Most earth resources missions choose to use a higher orbit, 600 to 700Km, since there is substantially less drag there. One also gets more time to downlink data to a given ground station. But our driving concern is to limit radiation damage to our CCD detectors. John Doty points out that, at 500Km, the spacecraft will start to have problems meeting our pointing accuracy requirements in the presence of aerodynamic drag. It will be enlightening to see how the spacecraft vendors respond to this challenge.

The radiation program we use is provided on the web by ESA: the Space ENVironment Information System (SPENVIS). The following graphic shows the various contributors to our radiation problem as a function of shielding for a single year at 500Km. There is a fair way to go from pictures to lifetime predictions, but we're starting to go down the path. This is part of the data we need to trade lifetime, operations complexity, stability, *etc., etc*.



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