

Formulation Refinement and Access to Space for the ST8 Mission

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Abstract—NASA’s The New Millennium Program (NMP) approach to space flight validation of advanced technologies is to alternate between subsystem and system flight validations¹. Candidates for each NMP project (subsystem or system) are competed through a NASA Research Announcement process, and proposal selection is determined by NASA Headquarters. Space Technology 8 (ST8) is the second NMP subsystem project. It will host four technology experiments selected from technology capability areas:

- The SAILMAST, a light-weight, deployable boom for potential solar sail structural applications
- The Next Generation Ultraflex (NGU), a lightweight, deployable solar panel
- The Environmentally Adaptive Fault Tolerant Computing (EAFTC) experiment, a Commercial-Off-The-Shelf (COTS) electronics package for validation of high speed computing in a radiation environment
- The Miniature Loop Heat Pipe (MLHP), a small spacecraft thermal control subsystem experiment

The launch is planned for 2008 on a Pegasus XL launch vehicle.

Access to space for ST8 involves working with the technology experiment development activity to baseline a mission, procuring a spacecraft bus to host the experiments, and procuring appropriate launch services through NASA. Because of the competitive element of NMP, however, the mission concept and preliminary spacecraft bus requirements were developed in parallel with the independent development of the technology experiment proposals. This initial part of the mission formulation process and the interaction between the NMP project architects and the experiment selection process is described in an earlier paper².

The selection of the technology payloads is a key step towards developing the procurement of the spacecraft bus

and evaluating competing launch services approaches. An earlier “Space Technology Carrier” study confirms the feasibility of obtaining a spacecraft bus from among available commercial design concepts. Additional steps used to proceed are:

- Confirmation of capabilities and cost projections.
- Development of top level requirements on the bus.
- Evaluating competing launch services options
- Developing materials to support the procurement activity

This paper tells the story of the these steps in the formulation refinement of the ST8 mission leading to its establishment as a formal flight project, with some insights and comments on the benefits and risks of the approach.