National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696

October 18, 2011

Reply to Attn of: EG-DIV-11-49

Jacobs Technology, ESCG
Attn: Mr. J. D. Frick
Manager, On-Orbit GN&C Section
P.O. Box 58447
Houston, TX 77258-8447

Dear Mr. Frick:

Re: On the Spot Award – Mark Orr

The purpose of this letter is to formally and publicly commend Mr. Mark Orr for the outstanding accomplishments he has made in support of the Flight Mechanics Laboratory (FMLab) in three key areas. First, Mark developed a Graphical Interface to display real-time information on the status of the Galaxy computer cluster and the environmental conditions in the laboratory. Second, Mark facilitated the incorporation of a "C to Fortran" interface enabling insertion of the PredGuid Skip-Entry/Aerocapture algorithms into the Simulation to Optimize Rocket Trajectories (SORT) program; and third, Mark then facilitated an innovative technique to reduce run-time requirements for completing complex optimization problems.

The Status Monitor web-based Graphical Interface is a great asset to the FMLab and is immediately valuable to all users and managers for determining loads on the Galaxy CPU cluster and application license key checkout. The interface tool provides a graphical display of node availability to insure optimal usage of the Galaxy cluster, as well as MATLAB, compiler, and debugger license availability. Also made available is a built-in real-time plotting capability of laboratory cluster environment parameters such as temperature, relative humidity, light and sound levels, and water sensor output.

The rapid completion of a "C-to-Fortran" interface and PredGuid guidance logic into SORT facilitated the generation of an innovative new research into Aerocapture technology. This interface permitted Mark to coordinate and implement the installation of two major guidance algorithm upgrades into the FMLab toolset: the PredGuid Skip-Entry and the PredGuid Aerocapture algorithms. The PredGuid aerocapture algorithm was then used to complete a groundbreaking extension of Aerocapture technology defining thresholds for utilization of delta-V minimization or apogee targeting.

Mark then continued to far exceed expectations and coordinated an approach for reducing the required run-time for a multi-stage stochastic dynamic program by converting inefficient MATLAB code into FORTRAN. This permitted the application of advanced parallel processing techniques enabling the completion of a task believed impossible within the schedule constraints. Additionally, Mark has pro-actively determined the advantages of parallel processing for reducing SORT Monte-Carlos, and has begun reconfiguring and upgrading the existing SORT source code to FORTRAN-90 standards, which will enable parallel processing capability in SORT Monte-Carlos.

Mark Orr's outstanding skills, motivation, work ethics, and commitment to excellence far exceed all requirements and expectations for his assigned laboratory support tasks. His efforts have been extremely productive and have greatly benefited both the administrative and technical efficiency of the FMLab and assuredly deserves acknowledgement through this On The Spot Award.

Sincerely,

Steven G. Labbe
Chief, Aeroscience and Flight Mechanics Division