current problems and ultimately producing a system capable of continuous operation at moderate temperatures that can be scaled over a large capacity range depending on the ISRU process.

The goal of the LGA research project is to design, build, and test a new type of greenhouse that could be used on the moon or Mars. The LGA uses super greenhouse gases (SGGs) to absorb long-wavelength radiation, thus creating a highly efficient greenhouse at a future lunar or Mars outpost. Silica-based glass, although highly efficient at trapping heat, is heavy, fragile, and not suitable for space greenhouse applications. Plastics are much lighter and resilient, but are not efficient for absorbing long-wavelength infrared radiation and therefore will lose more heat to the environment compared to glass. The LGA unit uses a transparent polymer “anthec” that surrounds part of the greenhouse and encases the SGGs, thereby minimizing infrared losses through the plastic windows. With ambient temperatures at the lunar poles at ~50 °C, the LGA should provide a substantial enhancement to currently conceived lunar greenhouses. Positive results obtained from this project could lead to a future large-scale system capable of running autonomously on the Moon, Mars, and beyond.

The software for both applications needs to run the entire units and all subprocesses; however, throughout testing, many variables and parameters need to be changed as more is learned about the system operation. The software provides the versatility to permit the software operation to change as the user requirements evolve.

This work was done by Stephen Perusich, Thomas Moss, and Anthony Muscatello of Kennedy Space Center. Further information is contained in a TSP (see page 1). KSC-13539

Monitoring Areal Snow Cover Using NASA Satellite Imagery

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The objective of this project is to develop products and tools to assist in the hydrologic modeling process, including tools to help prepare inputs for hydrologic models and improved methods for the visualization of streamflow forecasts. In addition, this project will facilitate the use of NASA satellite imagery (primarily snow cover imagery) by other federal and state agencies with operational streamflow forecasting responsibilities.

A GIS software toolkit for monitoring areal snow cover extent and producing streamflow forecasts is being developed. This toolkit will be packaged as multiple extensions for ArcGIS 9.x and an open-source GIS software package. The toolkit will provide users with a means for ingesting NASA EOS satellite imagery (snow cover analysis), preparing hydrologic model inputs, and visualizing streamflow forecasts. Primary products include a software tool for predicting the presence of snow under clouds in satellite images; a software tool for producing gridded temperature and precipitation forecasts; and a suite of tools for visualizing hydrologic model forecasting results. The toolkit will be an expert system designed for operational users that need to generate accurate streamflow forecasts in a timely manner.

The Remote Sensing of Snow Cover Toolbar will ingest snow cover imagery from multiple sources, including the MODIS Operational Snowcover Data and convert them to gridded datasets that can be readily used. Statistical techniques will then be applied to the gridded snow cover data to predict the presence of snow under cloud cover. The toolbar has the ability to ingest both binary and fractional snow cover data. Binary mapping techniques use a set of thresholds to determine whether a pixel contains snow or no snow. Fractional mapping techniques provide information regarding the percentage of each pixel that is covered with snow. After the imagery has been ingested, physiographic data is attached to each cell in the snow cover image. This data can be obtained from a digital elevation model (DEM) for the area of interest. If