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NASA's New Millennium ST6 Project

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NASA's New Millennium Program is intended to validate advanced technologies in space and thus lower the risk for the first mission user. The New Millennium ST6 project has developed two advanced, experimental technologies for use on spacecraft of the future. These technologies are the Autonomous Sciencecraft Experiment and the Inertial Stellar Compass. These technologies will improve a spacecraft's ability to: 1) Make intelligent decisions on what information to gather and send back to the ground 2) Determine its own attitude and adjust its pointing.

The significance of these technologies is in making the space missions less dependent on operators on the ground and shift the decision making to the spacecraft itself. Future missions using these technologies will be able to reduce the size of the ground crew lowering the mission cost or allowing to deploy resources on other aspects of the mission. Autonomous pointing and science gathering will also allow the spacecraft to react to ephemeral events that otherwise could not be detected in time due to long communication times from deep space.

Sciencecraft technology involves feature and change detection, continuous planning technology, and robust execution. It is equipped with software that checks spacecraft performance and has resources to prevent errors. The Inertial Stellar Compass will enable a spacecraft to continuously determine its attitude and recover its orientation after a temporary malfunction or power loss. This is done by the "marriage" of a miniaturized star camera and gyro system. Compass technology uses an active pixel sensor in a star-tracking camera and a three-axis system of microelectromechanical gyros.

These technologies will revolutionize future NASA spacecraft and allow mission resources to focus on science goals.