Detector Orientation Star Tracker MICHELLE NOWLING , LUIS VICTOR, MINH PHAM, TRI NGUYEN, University of Houston — Detector orientation has an invaluable role in the analysis of physical phenomena. People have developed numerous devices such as the GPS and star trackers to aid them in their quest for better attitude determination. However, the star tracker has proved so reliable that it is used in current space missions due to its ability to obtain full three-axes attitude, or orientation, with greater accuracy and flexibility in comparison to other attitude determining systems. As part of the Undergraduate Student Instrumentation Project (USIP) at the University of Houston, we aim to build a low-mass and low-cost star tracker. Through image segmentation and morphological image processing, our star tracker will be able to configure star coordinates by comparing and matching real-time data photos with an established star catalog. The star tracker will then determine the attitude of its body frame through quaternionic analysis, in which the angular changes of the initial orientation in 3-D space are found. This poster will present the general knowledge about star trackers including their operation, basic components, and the fundamental star-based attitude determination algorithms.

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