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INFORMATION FUSION IN STAR SENSOR SYSTEMS

Abstract

The development of space technology shows, that the application of star sensors is of extraordinary importance. This is valid for deep space missions as well as for LEO missions. The reason consists in the high accuracy and reliability of star sensors. Accuracy and reliability can be essentially enhanced by the application of multiple star sensor configurations. The design of a star sensor system depends on various issues, that are arrangement and alignment, selection of components, the use of proven units, interfaces and bus systems, concepts of redundancy. Suitable information fusion allows to improve the accuracy of the system in attitude measurement and to consider the different error influences, such as single star accuracy, misalignment of the sensors and level of information processing. Three fusion levels can be used, the star vector level, the level of pre-processed star vectors and the level of output quaternions. The structure of the star sensor system depends on the level of information fusion and the selected redundancy concept. Mainly star sensor systems with three star cameras are applied. The contribution contains simulation results of the error behaviour under the conditions of the fusion level, sensor orientation, misalignment. The advantages and disadvantages of different structures are discussed.