

AUTOMATED MULTIPLE OBJECT TRACKING & RECOGNITION SYSTEM

Identification & Significance of Innovation

The Automated Multiple-Object Optical Tracking and Recognition System is a digital imaging system for recording rockets and space vehicles for the 120-second period following their launch. It is designed to record events in which the rocket breaks up into multiple object, with the specific goals of (1) establishing the 3D trajectories of up to 50 different objects, allowing the accurate prediction of their landing points, and (2) identifying each such object in terms of its size and shape. A single tracking station equipped with a high-resolution digital camera allows a 2D (Alt/Az) recording of an object's trajectory. Data from two separated stations can be processed to provide 3D trajectory information. A major component of the overall system, developed during this Phase I effort, is an algorithm by means of which separate objects can be recognized and tracked based on their digital images. Data from multiple frames can thus be used to establish separate trajectory data (3D position, velocity, and acceleration) for each of the observed objects. A second algorithm generates object shape data based on multiple frame images. This system will provide NASA with a valuable new tool for use in diagnosing accidents and in recovering and identifying debris components.

