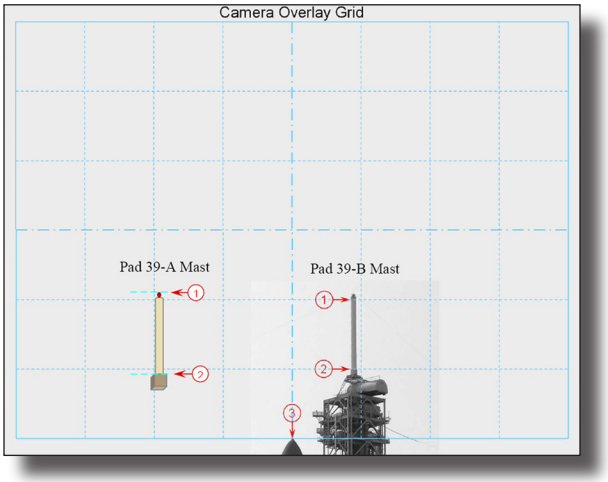
# Bird Vision System

*Spaceport/Range Situational Awareness*

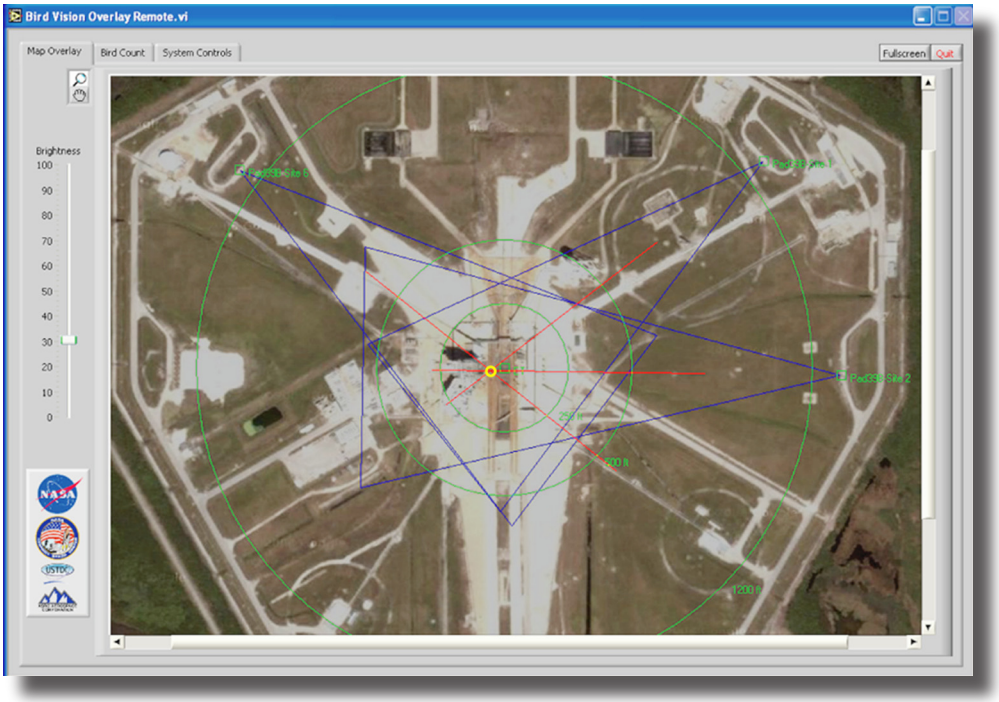
The Bird Vision system is a multicamera photogrammerty software application that runs on a Microsoft Windows XP platform and was developed at Kennedy Space Center by ASRC Aerospace. This software system collects data about the locations of birds within a volume centered on the Space Shuttle and transmits it in real time to the laptop computer of a test director in the Launch Control Center (LCC) Firing Room. The quality-controlled bird location data is also transmitted to the Firing Room bird tracking console, starting at the end of the T–9-minute hold. This data is available until T–60 seconds, when the tracker operators take control of the cameras and the Bird Vision application is terminated. This system uses the pad tracking cameras at three camera sites located about 1,200 feet from the pad, near the inside of the pad perimeter. The Bird Vision system backs up the Bird Radar system and includes the following features:

- 3-D Model Plot Mode (both local and remote overlay displays) provides real-time rotation, zoom, and translation of the 3-D view, using the mouse controls against a 3-D CAD model background and terrain map. There are several views for this display, including top view, side view, perspective view, and flyby view (rotating perspective view), which can be set via the 3-D Model Settings Tab.
- 3-D Overlay Plot Mode (both local and remote overlay displays) provides real-time rotation, zoom, and translation of the 3-D view, using the mouse controls.
- Triangulation (both local and remote overlay displays): For every pair of cameras set to Broadcast Mode, a circle is plotted on the 2-D overlay if the intersecting camera view lines pass within a maximum distance threshold, thus indicating a high probability of a bird at that location in 3-D space. The user may select the maximum distance threshold (the default is 2.5 m). A solid sphere is plotted in the 3-D Plot Mode where two camera view lines pass within this maximum distance threshold.
- The Bird Track (local overlay display only) generates a pseudo bird track by plotting a history of triangulated positions and then applying a fading-color function to the plot symbol. This feature is enabled when the number of history plots equals a nonzero value under the Bird Vision system control panel. The default value is 1.
- The system has the ability to record all processed data (camera view lines as well as triangulated positions) sent to the LCC Bird Vision remote display. This feature allows the test director to review all bird tracking data immediately following a launch or a scrub.

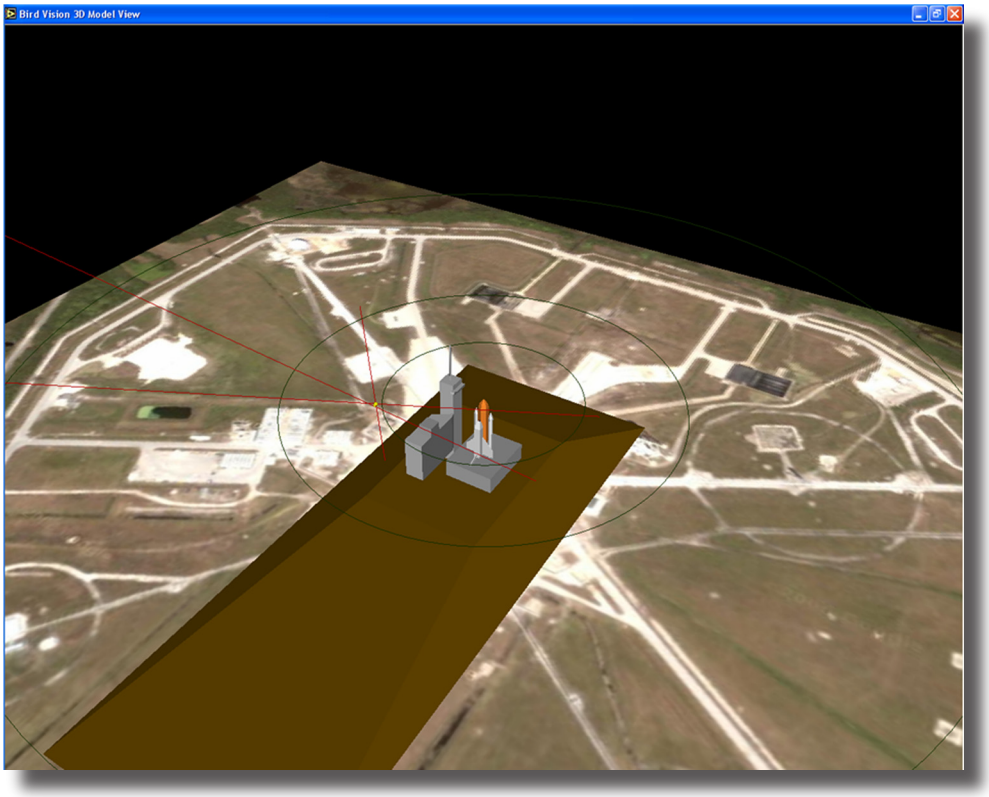



*Vision system calibration is accomplished by marking the top and bottom positions of the pad lightning mast structure.*


*Manually drawing exclusive regions of interest helps mitigate false detections from background noise.*




*Plot Overlay Mode, where a yellow circle represents the 3-D intersection of all pairs of two-camera view lines to a detected object (bird).*




*3-D Model Plot Mode.*

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