

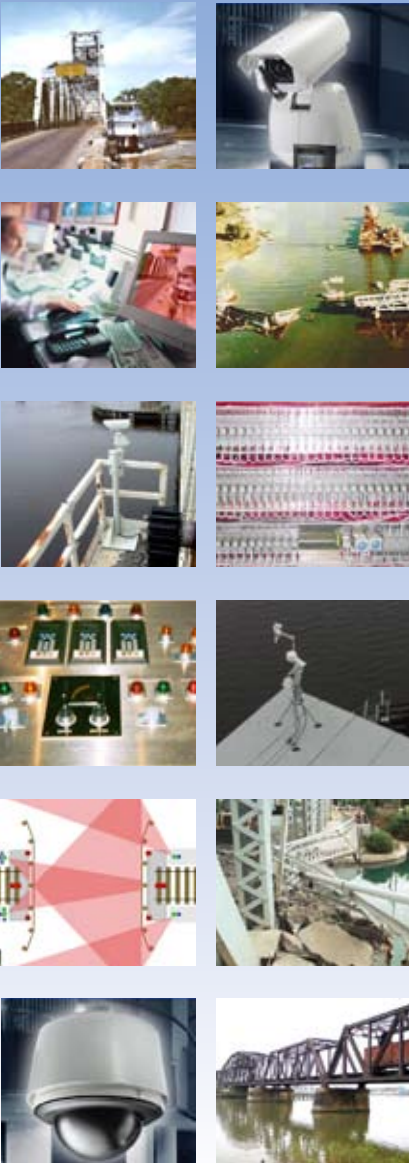
# case study



## Collision Alert Monitoring and Impact Analysis (**camia**™)

Articulating rail bridges are the frequent recipients of river traffic collisions. Some of these result in greater damage to the errant vessel than to the bridge. Others (depending on mass and velocity) can inflict significant damage to the bridge structure, sometimes to the extent that the bridge cannot operate, or in the most extreme cases, bear rail traffic.

**Rail Bridge,  
Texas, USA**



### CHALLENGE

Rail bridges typically employ no capability to detect and/or document river traffic collisions. This particular rail bridge in Texas was identified for collision alert and impact analysis hardening in that it was subject to significant recurring collision damage, and the cost of repairs was impossible to assign to be responsible party.

### SOLUTION

The **camia**™ system consists of color, day/night, high resolution fixed and pan/tilt/zoom (PTZ) cameras in conjunction with accelerometers and acoustic sensors positioned strategically about the bridge. Using the field of view of the fixed cameras, a virtual perimeter is established around the bridge waterway. A combination of Duos **praesidium**® “smart” sensor detection suite software, hardware and motion sensors activate the system any time a vessel enters camera field of view. **camia**™ then automatically records marine traffic passing under the bridge. At the same time, the microphone/accelerometer system begins “listening” for bridge collisions. Continuous, highly reliable automatic detection, processing and recognition of data allow the system to differentiate between a collision and any other normally occurring seismic event, and to analyze and document force of impact. Sensors are positioned to determine the distance to the event, thus calculating the actual magnitude of the energy source. Train traffic, wave action, and other normally expected sounds are filtered to prevent false alarms. When a collision occurs, an alarm is automatically transmitted and the information processed into a user-friendly Graphical User Interface (GUI). PTZ cameras are utilized to zoom in to and investigate events in real-time. Video is indexed and synchronized with accelerometer and acoustic sensor data, and events are automatically digitally recorded, time stamped, and stored for later retrieval. A powerful video search engine (searched by several criteria including, time, date, camera number, and location) allows for easy retrieval of stored video files. If it is not possible to characterize the event, event video will remain available for later human analysis and for fine tuning future alarms. This system is typical of Duos’ approach to critical high-risk bridge security/surveillance projects.

### BENEFIT

The **Collision Alert Monitoring and Impact Analysis (camia**™) system significantly increases the probability of cost-of-repair assignation.

