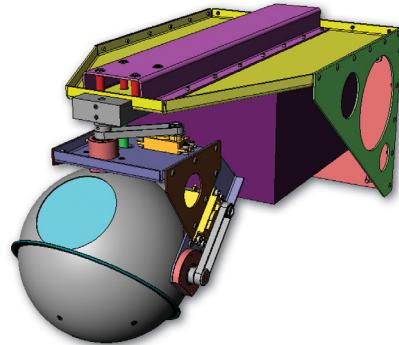


Case Study

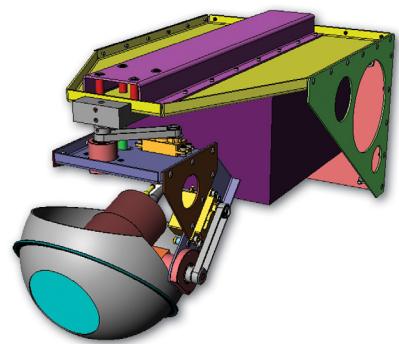
Infrared Sensor Package Prototype

OVERVIEW

A defense prime contractor awarded ATA Engineering a contract to design the packaging for an infrared sensor to be used on an unmanned aerial vehicle. During preliminary analysis, it was determined that the aerodynamic pressure on a fixed sensor window during flight would require a very costly, high-strength material that would have an unacceptably adverse effect on the window's transmissivity at wavelengths of interest. The solution that ATA developed was an innovative "eye-ball" concept, which rotates the window into position to view and track the target and adequately protects it during the rest of the launch and flight phases. Selecting off-the-shelf components where possible, ATA designed a pan-and-tilt mechanism, tray structure, and the mounting configuration for the sensor assembly inside the nose cone.



Stowed configuration



View and track mode

TASKS PERFORMED & KEY OUTCOMES

- Developed a low-cost window system that could better withstand electromagnetic interference (EMI) launch and flight environments, and maximize IR transmissivity.
- Designed a pan-and-tilt mechanism and the sensor module tray structure.
- Developed finite element models and analyzed the design to verify structural integrity when subjected to maximum launch, maximum flight, and transportation loads.
- Manufactured two prototypes, which were delivered to the contractor for system integration. Prototype assemblies weighed less than 50% of the design goal specified by the contractor.
- Developed manufacturing cost estimates for mass-production units.