

# Low Cost Zinc Sulfide Missile Dome Manufacturing

*Develop and demonstrate advanced manufacturing methods and processes that will provide a capability to produce affordable multi-mode windows and domes for the new generation of sensors for missiles, munitions, and surveillance systems.*

## OBJECTIVE / SOLUTION

The existing material choice for long wave-infrared (LWIR) and semi-active laser domes is multispectral zinc sulfide (ZnS), but current manufacturing processes are expensive and time consuming, resulting in major cost/lead time issues for missile systems that employ LWIR seekers. Variability of the current chemical vapor deposition (CVD) process limits repeatability of grown material.

Current processes [CVD and hot isostatic pressing (HIP)] are time-consuming, and yields are low. The objective of this effort is to develop and demonstrate manufacturing processes that are optimized for the production of durable, multi-spectral ZnS domes at a substantially lower cost and shorter lead time than currently available.

## ACHIEVEMENTS

Forecasted achievements are:

- Improved control of ZnS process parameters
- Improved zinc (Zn) flows
- Increased uniformity (ZnS thickness profile)
- Increased deposition rate
- Minimized size and concentration of inclusions and fibers in the ZnS domes due to improved dust exhaust management
- Improved yields by obtaining a more uniform deposition profile
- Minimized cracking by employing better tooling design
- Increased number of dome sites through better management of the Zn source
- Reduced cycle times for all processes

## BENEFITS

- Reduced dome cost by 50%
- Increased yields by 25%
- Increased strength by 40%
- Promotes competition among ZnS producers

## STATUS

- Initial trades complete and on schedule
- Project transitions to Non-Line-of-Sight Launch System (NLOS-LS) in FY09 and FY11

## WEAPON SYSTEMS / SECONDARY ITEMS IM-



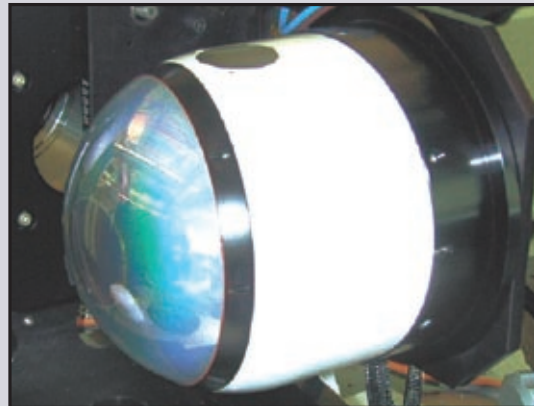
Non-Line-of-Sight (NLOS-LS) Launch System

## PACTED

- Non-Line-of-Sight Launch System (NLOS-LS)
- Small Diameter Bomb II—Air Force
- Joint Air-to-Ground Missile (JAGM)
- Military systems employing ZnS windows and sensors

## POTENTIAL COST AVOIDANCE

- Return on Investment of 19.4:1 with a cost benefit of \$156M



Laser Dome



Dome Optics