NAVY Transition Assistance Program

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N04-234 - CeraNova Corporation

Hypersonic Alumina Infrared Domes

NEED & CUSTOMER REQUIREMENT

Need: Domes and windows on missiles and aircraft must be high optical quality and durable to protect the IR sensor from harsh conditions, e.g., aerothermal heating, rain/sand erosion. Current and future hypersonic missile systems depend on aerodynamic and conformal transparent shapes.

Value to the Warfighter: More durable windows and domes improve the success of missions. Aerodynamic missile domes enable higher speeds and longer flight duration. Ogive domes result in reduced drag compared to hemispheres, and offer improved rain impact resistance and a greater unvignetted filed of view.

Operational Gap: Sapphire domes are limited to simple machinable shapes, and by thermal shock resistance. Single crystal sapphire domes display anisotropic optical and mechanical properties.

Customer Specifications: The same high transmittance and low scatter as sapphire in the midwave IR (3000-5000nm wavelength) is required, as are minimal total integrated optical scatter and enhanced mechanical properties. Highly aspheric shapes with high optical quality are becoming increasingly critical.

Technology Description: CeraLumina(TM)transparent alumina from CeraNova matches the high transmittance of sapphire and has low scatter and isotropic optical properties in the MWIR. Net shape forming reduces fabrication time and cost. Optical quality domes and windows for missile applications have been produced.

SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

Transition Target: AIM9X Sidewinder, AMRAAM, future systems

Original Sponsoring Program: PEO(W) / PMA 259 Air-to-Air Missiles

TPOC Phone Number: 760-939-1649

TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Phase II - Year 2	3	Moderate	Hemispheric domes for preliminary qualification testing	Winter 2010
Phase II - Option	3	Moderate	Full scale ogive blank; good optical quality	Fall 2008
Phase II - Option	4	High	Optically finished ogive dome	Summer 2010
Phase II - Option	6	Moderate	Production and bench testing of hemispheric domes	Summer 2010
Phase II - Enhancement	4	High	Apply metrology to ogive	Winter 10/11

Open contract: N68936-06-0018 / N68936-08-C-0048 (Ph. II.5) ending 17 June 2010

TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:
armor and ballistic protection (personal protective and transparent), cutting tools, applications requiring high hardness / wear resistance / erosion resistance, IR transparent furnace windows.

Business Model:
Manufacture and supply domes and windows to prime contractors.

Objective:
CeraNova seeks the following: 1) Partners for qualification testing of hemispherical IR domes; 2)Phase III funding partners for continued development of aerodynamic domes; 3) Application partners for IR domes and windows, armor, or other DoD and commercial applications for fine-grained polycrystalline alumina.

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