Manufacturing Technology for Advanced Nanocomposite Coatings

OBJECTIVE/SOLUTION:

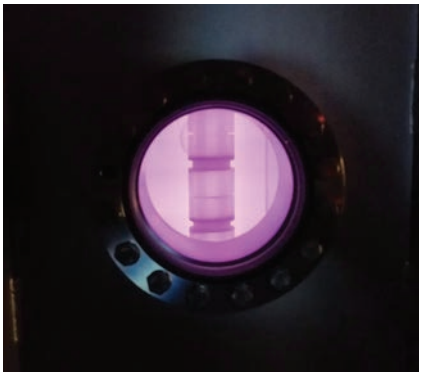
Develop a cost-effective Nano Coating manufacturing process to efficiently implement advanced nanocrystalline diamond and amorphous carbon coatings on performance-critical Army components. Accomplished through a specially developed manufacturing technique utilizing a plasma assisted chemical vapor deposition (PACVD) process that allows the application of carbon thin films on a wide range of substrates. Resulting in desired properties such as improved optical transmission and durability of infrared devices and increased surface hardness for improved corrosion resistance.

PNVS Turret Drive System AH-64 Apache

Predator Optomechanical Coatings

UH-60 Black Hawk Helicopter Rotor Head

Prototype Production System



Plasma Coating in Process

Achievements:

- Fourth year efforts and achievements include:
  - Increased part throughput — from 14 day to 8 day process
  - Reduced rework
  - Advanced database development
  - Control software refinement
  - Enhanced part tracking
  - Construction and Validation of Prototype Production System 3
  - Addition of coating requirement on 40+ optomechanical device drawings
- Multiple new production orders for DoD component coatings
- Automated component clean line that reduces throughput time and improves part quality

Benefits:

- Increased capacity through design and installation of large-scale manufacturing flexible deposition cells

Benefits (cont):

- Decreased Nano coating process throughput time on existing and future production coating systems through rapid fixture/tooling machining, improved part preparation and in situ monitoring
- Realization of manufacturing efficiencies through reduced vacuum chamber pump down time, data management standardization and a dedicated etch/rework chamber
- Reduction in cost as a result of increased coating capacity, throughput and quality control

Transition and Weapon Systems/Secondary Items Impacted:

- AH-64 Apache Pilot Night Vision System Turret Drive System
- Predator Optomechanical Coatings
- UH-60 Black Hawk Helicopter Rotor Head Components
- CH-47 IR Optical Coatings
- P-8 Brake Actuator Components

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