

HCAT Program Overall Objective

Conduct demonstration/validation or research & development on advanced surface engineering technologies that will eliminate or mitigate environmental problems while improving materials performance that will lead to reduced life-cycle costs in military weapons systems

The following are projects completed or being performed by HCAT:

- *HVOF thermal spray to replace hard chrome plating on external surfaces (five projects) (ESTCP w/ JG-PP or PEWG)*
- *Plasma spraying using miniature guns for hard chrome replacement on internal surfaces (SERDP)*

Additional HCAT Project Areas

- *Electrospark deposition for localized repair of coatings or non-coated components (ESTCP with PEWG)*
- *Nanocrystalline Co-P alloy plating for hard chrome plating replacement on internal surfaces (ESTCP)*
- *Electrolytic plasma processing for surface cleaning and cadmium plating replacement (SERDP)*
- *Supersonic particle deposition technology for repair of magnesium aircraft components (ESTCP) (FY06 new start)*

Program on Qualification of HVOF Coatings as Hard Chrome Replacement

OBJECTIVE: *Demonstrate and validate high-velocity oxygen-fuel (HVOF) thermal spray coatings as an environmentally acceptable and cost-effective alternative to electrolytic hard chromium (EHC) in most maintenance operations at Navy, Air Force, and Army aircraft depots and in manufacturing operations at Defense Department OEMs*

- *Establish superior performance of thermal spray coatings to hard chrome, leading to increased time intervals between required maintenance*
- *Demonstrate reduced turnaround times for repair of components using thermal spray, enhancing weapons systems readiness*

Five projects related to replacement of chrome plating with HVOF coatings

HVOF Projects

Landing Gear:

- *ESTCP funding ended in March 2003*
- *Final Report published as archival NRL Report in March 2004 (available on HCAT web site)*
- *HVOF WC/Co and WC/CoCr being widely implemented by commercial and military OEMs and in repair/overhaul operations*

Propeller Hub Components:

- *ESTCP funding ended in March 2003*
- *Final Report published as archival NRL Report in March 2004 (available on HCAT web site)*
- *HVOF WC/Co fully qualified by OEM; expect insertion at Navy/Air Force repair/overhaul facilities*

HVOF Projects

Gas Turbine Engines:

- *ESTCP funding ended in March 2004*
- *Final Report published as archival NRL Report in May 2005 (available on HCAT web site)*
- *Pratt & Whitney issued Engineering Change for replacing hard chrome with WC/Co on TF33; OC-ALC moving towards technology insertion*
- *Navy using HVOF coatings in selected applications*

Hydraulic Actuators:

- *ESTCP funding ended in 2005*
- *Final report published*
- *Extensive actuator qualification testing being conducted by Air Force; intent is to implement HVOF WC/CoCr coatings in repair operations*

HVOF Projects

Helicopter Dynamic Components:

- *ESTCP funding through 2006*
- *Materials testing near completion*
- *Component testing at Bell Helicopter successfully completed*
- *NAVAIR component tests planned for 2007*

HCAT

Program description, reports, meeting presentations, test data all available at www.hcat.org or www.materialoptions.com

Final reports on completed projects available without need to enter username and password

Future Plans

*This is most likely the last HCAT meeting
Tentative plan is to incorporate HCAT into
activities resulting from Metal Finishing
Workshop held in May 2006 in DC with follow-
up meeting at SERDP/ESTCP Symposium in
November 2006 (Keith Legg to brief this and
discuss meeting in Ogden, UT in May 2007)
SERDP/ESTCP to continue supporting
implementation of new technologies in DOD
manufacturing and repair/overhaul operations*

Future Plans

Potential names for new organization:

Surface Finishing and Coatings Team (SFACT)

Material and Process Alternatives Team (MAPAT)

Address Following Issues:

- *Environment and Worker Safety*
- *Productivity*
- *Product performance*
- *Life-cycle costs*