

USACA NEWSLETTER

WASHINGTON OPERATIONS REPORT



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OCTOBER, 2007

Senate Provides Major Funding Increases For Defense ManTech

In its FY2008 Defense Appropriations Bill, the Senate provided a total of \$25 million for the new Office of Secretary of Defense ManTech program. This finding is \$15 million above the \$10 million requested by the Pentagon for the new program. However, in the process of adding the extra funds the Senate cut \$5 million out of the \$10 million requested for the ManTech line. The Senate did not specify the nature of the funding cut, but the \$5 million reduction places in jeopardy the \$5 million budgeted in the ManTech line for the Industry Wide Propulsion Initiative.

The Senate Defense Appropriations Subcommittee added two programs to the

OSD ManTech line that were authorized by the Senate Armed Services Committee. \$10 million was provided for High Performance Defense Manufacturing Technology Research and \$10 million was provided for Disruptive Manufacturing Technologies Research. Both of these projects had support from multiple Senate offices, including senators from Ohio, Pennsylvania, New York, Connecticut, Maine, Massachusetts, Michigan, Rhode Island and Virginia. The Senate also provided an additional \$30 million for an Industrial Base Innovation Fund which was also authorized by the Senate Armed Services Committee.

On the whole, the Senate

support for manufacturing technologies is good news for the advanced ceramics community. However, we are still very concerned about the risk to the Industry Wide Propulsion Initiative resulting from the Senate cut to the planned OSD ManTech program. The House of Representatives zeroed out the new OSD ManTech program and provided no funds for the other new manufacturing technology initiatives funded by the Senate. The two versions of the defense appropriations bills will be reconciled in conference committee later this year.

USACA will be working to support in conference full funding for new OSD ManTech program (*Cont. p.4*)

USACA Submits SBIR Cluster Topics on Ceramics to JSF

USACA responded in October to the invitation from Dr. Jim Alper, S&T Team Lead for the JSF, at the USACA May 2007 Technical conference to submit ideas for SBIR cluster topics related to advanced ceramics. Three topics were submitted by USACA to the JSF program office for consideration for the 2008.2 and 2008.3 SBIR solicitation

rounds. USACA also understands that General Electric, Pratt and Whitney, and Rolls Royce submitted ceramics related cluster topics for consideration. The SBIR program office will review the cluster topics submitted by JSF and we are hopefully that at least one cluster topic on ceramics will be included in one of the upcoming solicitations.

USACA contacted members in September to solicit topics ideas for submission to Dr. Alper. Members responded with recommended cluster topics and the following three were submitted to JSF.

TITLE: Cost reduction for manufacturing ceramic matrix composites (CMC). (*Cont. p.2*)



Site of the USACA Fall Meeting:
The Capitol Hill Club

SPECIAL POINTS OF INTEREST:

- *New Member Profile*
- *Student Page Sponsorship Program*
- *Industry Job Listings*

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JSF SBIR CLUSTER (CONT).

DESCRIPTION: Low density and improved durability of some ceramic matrix composites make them candidate materials for designing various components for advanced military turbine engines. Because manufacturing efforts are relatively immature, this class of materials tends to be far more expensive than comparably sized metal parts. Automated methods and innovative process approaches need to be developed to minimize costs, while maintaining or improving structural properties. A detailed understanding of engine component requirements and teaming with composite manufacturers/engine designers is recommended.

TITLE: Quality Testing of Interface coated Fiber reinforcements.

DESCRIPTION: Surface coated fiber reinforcements are used to control the interfacial bonding between fiber and matrix in high-density matrix CMCs. Very often the coatings are boron nitride based coatings which are applied to silicon carbide fiber reinforcements, though other coatings on other fibers are being developed. Typically, the coated fibers are subjected to an array of characterization methods, which range from weighing the reinforcement before and after coating, to FESEM examination to verify coating uniformity and Scanning Auger Microscopy to verify coating chemistry. These methods can be time consuming and expensive, but still do not predict coating performance. Currently, the only sure way to assess quality a lot of coated reinforcement is to fabricate and mechanically test a composite. An inexpensive and relatively quick testing procedure is needed to qualify coated reinforcements prior to manufacturing CMC components.

TITLE: Environmentally stable interface coatings ceramic matrix composites.

DESCRIPTION: Interface coatings are selected and designed to control bonding between fiber reinforcement and matrix. The chemistries used for interface coatings vary widely. Non-oxide reinforced com-

posites often make use of carbon or boron nitride layers, while oxide fiber reinforced – oxide matrix composites use either no interface coating or an oxide layer that is non-reactive with the fiber reinforcement. When no coating is used in oxide-oxide composites the matrix is typically very porous which limits the mechanical properties of the composite. Although non-oxide reinforced composites have been used successfully in turbine engine applications, boron nitride based coatings are often susceptible to corrosion by moisture and high temperature oxidation. There is a need for more robust interface coatings for both oxide and non-oxide reinforced CMCs.

The topics submitted to JSF by the engine prime contractors are as follows:

TITLE: Automated Delamination Detection In JSF CMC Components

DESCRIPTION: The JSF employs CMC components, which are very expensive to produce. The current inspection technique is immersion ultrasound, which requires a thorough scanning of the part, followed by a drying procedure to remove all traces of fluid from the part. A dry method of inspection is sought which will inspect the components in less time, and not require a post-inspection drying cycle. The inspection method developed must be robust enough to be performed in a production environment and provide considerable cost savings and cycle time reductions. Commercialization plans and qualification requirements shall be established to offer the new technique to the aerospace industry for production transition and qualification in Phase III.

TITLE: Ceramic Matrix Composite (CMC) Structures for Exhaust Nozzle Components

DESCRIPTION: Requirements for advanced propulsion systems call for significant increases in performance. CMCs offer a huge potential to increase the performance of gas turbine engines by enabling increased engine tempera-

tures. However, today's cost of CMCs make wide implementation impractical. Advanced manufacturing techniques can reduce the cost and cycle time to implement advanced CMCs in gas turbine engines for vanes and exhaust nozzles. Particular areas of interest include simulation of CMC manufacturing processes to enable the application of lean manufacturing, weaving process, coating processes, machining, quality control, nondestructive inspection, and effects of defects. Proposals shall demonstrate a reasonable expectation that new manufacturing approaches will lead to lower cost and/or cycle time for producing CMC. The ability to achieve mechanical properties suitable for the particular gas turbine engine application shall also be demonstrated. The potential cost savings and cycle time reductions of the demonstrated processes shall be validated. Commercialization plans and qualification requirements shall be established to offer these new techniques to the aerospace industry for production, transition, and qualification in Phase III.

TITLE: Oxidation Reaction Front Detection In JSF CMC Components and other CMC Materials

DESCRIPTION: Ceramic matrix composite materials (SiC/C, C/SiC and others) are used in hot sections of jet engines. CMC materials are well suited to the application because of their high temperature capabilities. Over time however, the exposure to elevated temperatures can cause an oxidation of the material, degrading the material properties and leading to part failure. Typically, the oxidation will occur on the surface of the composite laminate, and gradually migrate inward toward the center of the laminate. The progression of the oxidized region of the material presents an oxidation reaction front. As this front moves through the thickness of the laminate, the overall laminate bulk properties are reduced. An NDE technique is required to inspect the
(Cont. p. 3)

JSF SBIR CLUSTER (CONT).

laminates on the aircraft and determine to what extent the front has migrated into the laminate. With this information, engineers will be able to define when the part's margin of safety has been depleted to an unacceptable degree.

We expect that cluster topics will be of interest to other services for the next several years. USACA will work to compile cluster topics related to ceramics for Future Combat Systems and other system level program offices in anticipation of future SBIR topic calls. Please send your cluster topics ideas to Glen Mandigo at USACA. The following criteria should be considered when developing a cluster topic idea:

- System level application
- Applicable to a family of related technologies (e.g., material development, modeling, manufacturing)
- Prime contractor buy-in to cluster approach
- System level demonstration potential

Contact Information

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USACA@strategicmi.com
202-467-5459

USACA FALL MEETING IN WASHINGTON, DC

On October 25th USACA will be holding its fall meeting at The Capitol Hill Club— located two blocks from the capitol, at 300 First Street SE. The meeting format will be similar to the Spring Technical meeting starting with a USACA business meeting and then moving on to a set of invited speakers.

Planned Agenda

9:30 – 11:30 **USACA Board Meeting** (Members Only)

12:00 – 3:15 **Invited Speakers** (Open to all Invitees)

12:00 Working Lunch, Steve Atmur, Chairman of USACA and Ted Lynch, Executive Director of USACA
Welcome

12:30 John Garnier, Idaho National Lab
Armor systems development and deployment

1:10 Dennis Padilla, recently retired Director of Office of Naval Research Contracts office.
Federal contracting process outlook and contracting tips and advice

1:40 Paul Piscopo, The Piscopo Group, LLC
CMC/Ceramics Affordability and Producibility Program (CCAP) update

2:10 Speaker from Oak Ridge National Lab
Federal Energy Policy Act review related to materials with emphasis on sources of program funds

2:30 Arun Seraphin, Senate Armed Services Committee Professional Staff
Congressional update and comments about the new manufacturing technology initiatives pending authorization and appropriation by the Senate for FY '08

3:00 Adjourn and depart to Capitol Hill for Congressional office visits

Senate Funding (Cont.)

and the Industry Wide Propulsion Initiative that supports work on CMCs and ceramics technology. The Senate also fully funded the Joint Strike Fighter competitive engine program. This program, also referred to as the second source engine program, provides funding for General Electric and Rolls Royce to develop the F136 alternative engine for the JSF. The Senate's decision to fully fund this program in the appropriations bill is in keeping with the sentiment expressed in the defense authorization bill earlier this year. \$480 million dollars were included in the appropriations bill for the program; the sponsors of this special appropriation were Senators Bayh, Cochran, Kennedy, Leahy, McConnell, and Warner. Conference Committee on Defense Appropriations is expected in November. The House and Senate are in agreement on \$480 million for the 2nd source engine, so the program should move smoothly through conference.

Don't Forget
to Register for the
**2008 Annual Conference on
Composites Materials and
Structures**
28 January- 1 February 2008
Daytona Beach, FL
Please register on-line at
www.daytonabeachconference.com

CONFERENCE CALENDAR

October 25, 2007

Fall USACA Meeting

Capital Hill Club
Washington, DC

November 4-7, 2007

**International Symposium on
Advanced Ceramics and
Technology for Sustainable
Energy Applications**

Endorsed by ACerS
Taiwan

November 11-13, 2007

**Commercialization of
NanoMaterials 2007**

Sponsored by *ACerS Society
and TMS*

*Sheraton Station Square Hotel
Pittsburgh, Pennsylvania*

November 11-14, 2007

**7th Pacific Rim Conference
on Ceramic and Glass
Technology**

Endorsed by ACerS
Shanghai, China

**January 27 - February 1,
2008**

**32nd International
Conference & Exposition on
Advanced Ceramics and
Composites**

**Call for Papers Now
Available**

Hilton Daytona Beach Resort
and Ocean Center
Daytona Beach, Florida

February 24-27, 2008

**Materials Innovations in an
Emerging Hydrogen Economy**

*Co-organized by ACerS and ASM
International
Hilton Cocoa Beach
Cocoa Beach, Florida*

May 25-28, 2008

**10th International
Conference on Ceramic
Processing Science
(ICCP-10)**

Endorsed by The American
Ceramic Society
Inuyama International
Sightseeing Center Inuyama,
Aichi Japan

June 1-5, 2008

**The 15th International
Conference on Textures of
Materials (ICOTOM 15)**

*Organized by The American
Ceramic Society and The
Minerals, Metals & Materials
Society (TMS)
Carnegie Mellon University
Center
Pittsburgh, Pennsylvania USA*

June 29 - July 3, 2008

**2nd International Congress
on Ceramics**

Verona, Italy



Student Page Sponsorship Program

The U.S. Advanced Ceramics Association (USACA) invites its member companies to take advantage of a new and unique employee recruiting opportunity for ceramics engineers. Ceramic engineering students participate each year as pages at the annual USACA Conference on Advanced Composites, Materials, and Structures in Daytona Beach, FL. USACA will enhance the student page program at the upcoming Conference in January 2008 to create opportunities for student recruitment and networking. To that end, we are opening the student page program to enable sponsorship of students by USACA member companies, provide for one-on-one interactions at the Conference between students and sponsoring companies, and host a networking social function at the Conference for students and USACA members.

We all know how difficult it is to find capable ceramics engineers. We think the annual USACA Conference in Florida provides a unique forum to get students excited about careers in the high performance ceramics industry and to establish important links between good students and potential employers. We invite your company to sponsor one or more student pages at the upcoming USACA Conference in January 2008.

- **Student Sponsorship Program Details:**

Sponsorship cost is \$1,200 per student.

The Daytona Beach conference requires about 14 student pages each year.

One-on-one meetings will be scheduled at the USACA conference in Dayton Beach.

A student reception/dinner will be scheduled for Monday, January 28 to facilitate networking between students and USACA members.

- **Benefits Of Student Sponsorship Include:**

Unique recruiting mechanism to build relationships with potential new employees.

Opportunity to showcase to potential new employees your company's participation in the broader ceramics industry.

Access to a pool of qualified potential employees in an industry high-technology forum.

Enhances your company's relationships with particular university ceramics engineering programs by sponsoring students for an industry conference.

For more information and to express your interest in sponsoring one or more students for the Daytona Beach Conference in January 2008, please contact Glen Mandigo at USACA,

**(202) 467-5459,
Glen@Strategicmi.com**

New Member Profile:

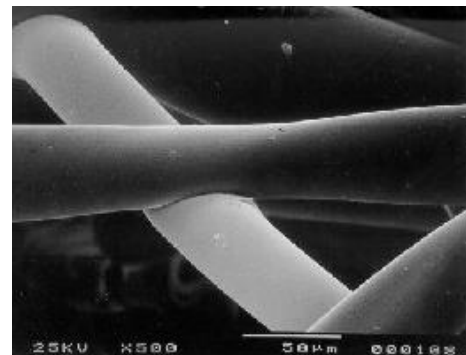
Matech Global Strategic Materials



Matech office in Westlake Village, CA.

Matech Global Strategic Materials, a ceramics composites company, is USACA's newest member. The company is based out of Westlake Village, California and is headed by Dr. Edward Pope. Matech is developing preceramic polymers to silicon carbide, silicon nitride/carbide, silicon oxycarbide, and hafnium carbide. The company is currently producing these preceramic polymers at a pilot level. The company also specializes in porous ceramic filters, continuous winding of preceramic fibers, structural ceramic fibers, and fiber mat strength and rigidity.

USACA welcomes Matech to the association and looks forward to working with them in the future.



Matech preceramic fiber technology.

JOB LISTINGS

Promote Your Company

by being a sponsor at one of our breaks during the Daytona Conference.

We will have an exhibit area setup in the ballroom with different food stations available.

Have your Company name & logo on a sign as the sponsor of the scheduled break.

Exhibit tables are available to your company at no charge. Sponsorship fees vary.

For more information contact:

Shelley Luehring at (202) 467-5459

Director of Manufacturing,

Advanced Ceramics

Company: Starfire Systems

Location: Malta, NY

Experience: BS degree in Engineering, Management or relevant field; 10 years production management; experience with six sigma, ISO 9001, and lean manufacturing methods desired.

Description: Senior management position, reporting to the CEO. Directs all manufacturing operations for ceramic and ceramic composite components and products made from Starfire's polymers; ensures all production, shipping, cost, quality, and safety goals are met; directs significant manufacturing projects such as Starfire's premier product line of friction products for automotive and related industries. The Director will work closely with a team of cross-functional managers in marketing, engineering, and technology, to assure this new product line provides the foundation for Starfire's growth/profitability.

Contact:

HR@starfiresystems.com

Brake Development

Engineer

Company: Starfire Systems

Location: Malta, NY

Experience: BS degree in Engineering or Materials Science related discipline; direct experience in automotive braking systems.

Description Develops and integrates the components of an automotive braking system using Starfire ceramic matrix composite (CMC) materials; designs the optimal configuration of rotor, pads and peripheral systems to meet customer requirements; assists in establishing manufacturing processes and procedures for CMC brake rotors; completes deliverables for government and commercial R&D projects.

Contact:

HR@starfiresystems.com

Advanced Materials

Engineer

Company: Starfire Systems

Location: Malta, NY

Experience: BS degree in Engineering or Materials Science related discipline; experience in manufacturing or research setting.

Description Fabricates and tests ceramic matrix composite materials and parts; completes deliverables for government and commercial R&D projects; develops and performs test method in laboratory environment.

Contact:

HR@starfiresystems.com

Send us your Openings!

To have your listings included, free of charge, send a brief description to:

USACA@strategicmi.com

or

202-467-5459