Example Transfers of Corn-Hybrid Polymer (CHP) Blasting Technology

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National Defense Center for Energy and Environment

The NDCEE is operated by: Concurrent Technologies Corporation
**Title:** Example Transfers of Corn-Hybrid Polymer (CHP) Blasting Technology

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Presentation Outline

- NDCEE Mission
- NDCEE Technology Transfer Approach
- CHP Technology Overview *
- CHP Demo and Transfer History
- Example Transfers
- Conclusion

* - for additional details, see JSEM presentation: B Yallay, “Corn Hybrid Polymer Media for Coatings Removal from Delicate Substrates”
National Defense Center for Energy and Environment (NDCEE)

**Mission**
- Serve as a national resource for researching, developing and validating environmental, safety and occupational health (ESOH) technologies and processes
- Advance technology transfer aimed at reducing total ownership costs in support of national defense

*The NDCEE was established to support DoD installations, ranges, weapons systems, and the warfighter in achieving performance advantages, enhanced efficiency, costs savings, and regulatory compliance.*
NDCEE Technology Transfer

Technology Transfer Definition:
- The activities necessary to field validated, cost-effective operational ESOH technologies for DoD installations and weapon systems
  - Focus on actual fielding of technologies for operational use
  - Activities can occur over long period of time – multiple years and tasks

Two Basic Types of Transfer Efforts:
- “Initial” transfer : Transfer at the first demonstration / validation site
- “Lateral” transfer : Transfer at other relevant sites throughout DoD after successful initial demonstration / validation
Corn-Hybrid Polymer (CHP) Blasting Technology Overview

**Description:** Low pressure blasting system for coating removal from delicate substrates using corn-hybrid polymer blast media

**ESOH Need:**
- Environmentally acceptable coatings removal
- Improved human health by replacing manual sanding

**Advantages:**
- No substrate damage, resulting in the elimination of unnecessary rework
- Blast medium is organic, nontoxic, biodegradable, classified as nonhazardous and generates minimal waste
- Meets MIL SPEC (MIL-P-85891) for Type VII plastic media
- Considered a “drop-in” replacement for many plastic media stripping systems (May eliminate the use of chemical strippers)
- Preliminary ECAM cost savings range: $20,000 - $1.5 million, for various components and facilities (results available upon request)
Corn-Hybrid Polymer (CHP) Blasting
Suggested Transfer Approaches

■ Potential Transfer Sites:
  – Sites with high labor cost for media blasting, manual sanding or chemical stripping
  – Interested sites: Navy (4), Army (3), Air Force (1), Marine Corps (1), NASA

■ Transfer Barriers:
  – Facility requires correctly sized, operational blast containment booths
  – For drop-in replacement, Military Service must accept CHP as meeting MIL SPEC for Type VII media

■ Lateral Transfer Approaches:
  – Installation level - address case-by-case interest:
    ■ Address media containment issues
    ■ Conduct site specific demonstrations as required
  – Command level - seek broad Command-wide acceptance:
    ■ Identify Program Office POCs for approval support on selected weapon systems
    ■ Conduct Command-wide, high visibility demonstration / validation (dem/val) as needed
    ■ Seek funding support for dem/val from a variety of sources
## CHP Demo and Transfer History

<table>
<thead>
<tr>
<th>DoD Site</th>
<th>Example Blasting Applications</th>
<th>Proof of concept</th>
<th>Dem / val</th>
<th>Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warner Robins ALC</td>
<td>C-130 radome, F-15 speed brake, other components</td>
<td>2005</td>
<td>2006</td>
<td>2008</td>
</tr>
<tr>
<td>NS Mayport *</td>
<td>Ship radome, antenna, Seahawk chopper</td>
<td>2006</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>NSB Kings Bay *</td>
<td>Periscope, sonar composites</td>
<td>2006</td>
<td>N/A</td>
<td>2006</td>
</tr>
<tr>
<td>Ft. Rucker (Contractor site)</td>
<td>H-60 parts, HMMWV hoods</td>
<td>2006</td>
<td>N/A</td>
<td>Open option</td>
</tr>
<tr>
<td>Ft. Bragg (Simmons AAF)</td>
<td>Aircraft composite and Al components</td>
<td>2006</td>
<td>N/A</td>
<td>Open option</td>
</tr>
<tr>
<td>NADEP Jacksonville *</td>
<td>Aircraft composite and Al components</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>Corpus Christi Army Depot</td>
<td>H-60 blades, rotors, stabilators and other components</td>
<td>2008</td>
<td>2008</td>
<td>2008 (TBD)</td>
</tr>
</tbody>
</table>

* - To be described in more detail
Successful Transfer Example – NS Mayport

- **Testing effort:** Both proof of concept and acceptance dem/val tests
- **Applications:** Composite components and full airframe - UH-60 Seahawk
- **Status:** Appeared to be successful transfer, but site role as a Southeast Maintenance Center is changing – privatization now expected

- **Key Transfer Outcomes:**
  - Provided initial chance to evaluate CHP on-site
  - Labor savings: 55.5 hours/ large part (e.g. hand sanding a ship radome)
  - Led to idea for a potential “regional implementation” concept, using either Service staff (civilian or military) or a Service Contractor
Successful Transfer Example – NSB Kings Bay

- **Testing Effort:** Only proof-of-concept tests
- **Applications:** Periscope ferrings, composite sonar window, other composites
- **Status:**
  - Rapid conversion from plastic to CHP, drop in replacement
  - Workforce: Navy staff (civilian)
- **Key Transfer Outcomes:**
  - First submarine application
  - No dem/val required – immediate transfer

Coating removed from NSS window with no visual damage
Successful Transfer Example – Fleet Readiness Center SE (NADEP Jacksonville)

- **Testing**: Both proof-of-concept and acceptance demo/val tests
- **Applications**: P3 composite radomes, other A/C composite components
- **Status**:  
  - Operational for radomes and other parts  
  - Workforce: Navy staff (civilian)
- **Key Transfer Outcomes**:  
  - Modified existing blast booth to accommodate CHP media  
  - Considering expansion to other aircraft parts
Conclusion

- CHP illustrates both successful vertical and lateral transfer practices – *aided by core NDCEE CHP team actions over nearly 3 years*

- Technology Transfer requires leadership, the right conditions and a persistent commitment to action
  - A committed end-user with a valid ESOH need
  - A mature, appropriate, usable technology solution
  - Attention to unique hurdles to be overcome in each situation
  - Appropriate and sometimes leveraged funding or information
  - A Service transfer champion (at appropriate level, e.g. depot, Command, Headquarters)

- Further potential exists for more widespread use of CHP throughout DoD

- Technology Transfer is a Contact Sport
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