Technology Transfer and the Civil Space Workshop

Sandia National Laboratories
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Technology Transfer and the Civil Space Workshop

Sandia National Laboratories has identified technology transfer to U.S. industry as a laboratory mission which complements our national security mission and as a key component of the Laboratory's future. A number of technology transfer mechanisms -- such as CRADAs, licenses, work-for-others, and consortia -- are identified and specific examples are given. Sandia's experience with the Specialty Metals Processing Consortium is highlighted with a focus on the elements which have made it successful. A brief discussion of Sandia's potential interactions with NASA under the Space Exploration Initiative was included as an example of laboratory-to-NASA technology transfer.
The role of the national labs is changing as the national needs change

**Declining Importance**
- Threat from "Evil Empire"
- Nuclear weapons
- Go where we have never gone before
- Prolong life at any cost
- Large quantities of low-tech products
- Long product life cycle

**Increasing Importance**
- Threat from evil people
- High-Tech weapons
- Get there faster, cleaner, cheaper
- Reduce health care costs
- Custom products
- Short product life cycles

Sandia's Technology Transfer Program

**Mission focus:**
- Enhance U. S. economic competitiveness
- Focus on market pull for rapid commercialization
- Apply lab strengths to problems of national importance
- Emphasize partnerships with industry and universities

The technology transfer mission complements Sandia's national security missions.
Recent/Ongoing Technology Transfer Successes

- Combustion Research Facility - User Facility
- Semiconductor Equipment Technology Center - SEMATECH WFO
- Specialty Metals Processing Consortium - Consortia Agreement
- SANDAC Computer - Honeywell Corp. - Direct Transfer via Contract
- Semiconductor Bridge Technology - SCB Inc. - Commercial License
- Microcellular Foam - Permacharge Inc. - License/CRADA

CRF - Industry collaborations increase U.S. competitiveness

<table>
<thead>
<tr>
<th>General Motors</th>
<th>Flame chemistry codes, diagnostic techniques</th>
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<tbody>
<tr>
<td>Gas Research Institute</td>
<td>Natural gas combustion, pulse combustion</td>
</tr>
<tr>
<td>Exxon</td>
<td>Flame chemistry, soot formation, diesel technology</td>
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<tr>
<td>AT&amp;T</td>
<td>Turbulent reacting flows</td>
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<tr>
<td>EPRI</td>
<td>Flame-formed silica</td>
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<td>John Deere</td>
<td>Coal combustion</td>
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<tr>
<td>Technor</td>
<td>Rotary engine velocimetry, Industrial Fellow</td>
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<tr>
<td>Conoco</td>
<td>Reduction of NOx from exhausts</td>
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<td>General Electric</td>
<td>Coal combustion diagnostics</td>
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<tr>
<td>Cummins Engine</td>
<td>Turbulent reacting flows</td>
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<td>Unocal</td>
<td>Diesel particulates, Industrial Fellow</td>
</tr>
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<td>Lennox Industries</td>
<td>Engine knock diagnostics</td>
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<tr>
<td>Mobil</td>
<td>Pulse Combustion, Industrial Fellow</td>
</tr>
<tr>
<td>Ford, Chrysler</td>
<td>Diesel fuel auto-ignition</td>
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<tr>
<td>Combustion Engineering</td>
<td>Fiber-optic spark plug technology</td>
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<td>Mineral- matter deposits</td>
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Objective:
Develop and apply tool design model and methodologies to enhance the reliability and operation of U.S. semiconductor manufacturing equipment

- Sponsored by SEMATECH
- Uses established facilities and expertise
- Transfers technology to member companies

Sandia Technology Transfer

SANDAC Computer
A high-performance, ruggedized, parallel processing computer weighing only seven pounds that can run on batteries while offering supercomputer-like computing power for such things as high-speed navigation, guidance, and control – transferred via contract to Honeywell Avionics Division for production.

Silicon Bridge Igniter
A microchip-sized explosive igniter that can ignite an explosive powder about 1000 times faster than traditional hot-wire igniters and requires much less energy – licensed to SCB Technologies, Inc., based in Albuquerque, to develop SCB igniters for automotive air bags. The company has issued a sublicense for SCB air bag manufacture to Thiolok Corporations Tactical Operations Division in Elkton, Maryland.

Microcellular Foam
A low-density, porous material that is very uniform with a high surface area has been licensed to Permacharge Corporation, a small Albuquerque-based company, which will be using it in high-efficiency particulate air filters for use in hospitals, semiconductor and computer clean rooms, and other facilities requiring extremely particle-free environments.
## Specialty Metals Processing Consortium

- Sandia has developed Advanced diagnostic and control techniques for forming high quality special metal alloys.
- The specialty metals industry affects microelectronics to jet engines.
- Products include high-strength, high-performance lightweight alloys.
- The consortium will help meet the challenge of foreign competition.

### PARTICIPANTS:

<table>
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<tr>
<th>Company</th>
<th>Technology</th>
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<tr>
<td>Allegheny-Ludlum</td>
<td>Pratt &amp; Whitney</td>
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<tr>
<td>Cartech</td>
<td>Special Metals</td>
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<tr>
<td>Cytemp</td>
<td>Teledyne Alivac</td>
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<td>INCO Alloys</td>
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COST-SHARE CONSORTIA (SMPC MODEL)

Elements -

* Market pull: Industrial $ 
  Industry involvement in R&D program

* Well-defined technical agenda including short-term benefit to industry

* Catalyzed around existing lab facility and technical capability

* Flexible cooperative agreement

* Laboratory and industrial champions

* Involves small and medium-sized companies

* Involves both suppliers and end-users

* Pre-competitive technology development

* Threatened Industry

SMPC Program Rules

- Work managed through Project Letter Agreements

- Stringent U.S. preference conditions set by SMPC

- Commercial-value information protected up to 3 years

- Sandia holds all intellectual property -- SMPC members get royalty-free rights under most situations.
• Has been elevated to mission status

• Has new, more responsive mechanisms in place

• Focuses on strategic industry partnerships especially consortia aimed at dual use technologies

• Seeks to match capabilities at Sandia with industry/market needs

• Is actively soliciting industry participation

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**Space Exploration Initiative**

**Supporting Technologies**

- 1) Heavy lift launch capability
- 2) Nuclear thermal propulsion
- 3) Nuclear electric surface power
- 4) EVA suit
- 5) Cryogenic fuel issues
- 6) Automated rendezvous and docking
- 7) Zero-g countermeasures
- 8) Radiation effects issues
- 9) Telerobotics
- 10) Closed loop life support
- 11) Human factors for long duration missions
- 12) Lightweight materials and manufacturing
- 13) Nuclear electric propulsion
- 14) In situ resource utilization

Sandia participation: • major • significant • minor or none