Transitioning SBIR to Manufacturing
Anthony Mulligan, CEO Hydronalix

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Past Case Studies

• Advanced Ceramics Research
  – Performing R&D service phase III’s hundreds of thousands to a million dollars
  – Technology Licensing: Several Millions of Dollars
  – Subcomponent Manufacturing for large Prime Supplier: $15+ Million
  – Manufacturer of Entire Product for user and for Primes: $135 Million
Hurdles to Transition to Manufacturing

• Most important is leadership commitment
  – Focusing leadership effort on finding or providing the resources to fund transition to manufacturing
  – Ability to overcome fear of letting your customer come in and help you set up your process correctly
  – Prioritizing the effort
  – Belief and trust in team effort concept, you must get past why it might fail and focus on why it will succeed

Hurdles to Transition to Manufacturing

• Initially Stick to your best option for low volume specialty niche high value production, then work your way up to higher and higher volumes at lower prices
• Manufacturing requires far more administrative and documentation support than performing an SBIR
• Ask for all the help and assistance you can get from others. Leverage all your programs for supporting your transition to manufacturing. Not just for facilities to do more SBIR research.
• Large Primes are not evil, you just must take time and effort to document who is responsible for what and who gets what. If you leave nothing to chance and make no assumptions you will always do as well as they do.
Case Studies

• NASA SBIR Mirror polishing technology to production of consumables for polishing PC hard drive disks – at one point 40% of world market.
• NAVY SBIR for water soluble tooling polymer to 40,000 foot factory producing parts for Airbus and Boeing.
• Navy SBIR for engine technology transitioned to full scale production of fuel injection systems for Honeywell GMAV UAV.
• NAVY STTR for Small UAV. Transitioned to full scale manufacturing of aircraft and subsystem support equipment. Led to acquisition by BAE systems.

Ways We Resource Manufacturing Transition

• In working with Primes we were successful in receiving significant financial and expertise support to set up production.
• One Prime funded our ISO certification process.
• At times Primes would have more manufacturing expertise in our building than we had.
Basics for Technology Transition

Productization: Converting the technology into that product that will sell.

- Right features
- Manufacturable
- Right price/cost
- On-time to market

Productization assistance from MEP centers includes
- Requirements definition and prioritization
- Product concept definition
- Product concept validation
- Guidance on design for manufacturability, cost, quality
- Guidance on processes to manufacture
- Development of a plan to productize the technology including guidance on project management and risk management.

Manufacturing Strategies

Required Investment, potential risk & skill levels

<table>
<thead>
<tr>
<th>Process “Scaling” Skills</th>
<th>Mfg Skill &amp; Expertise</th>
<th>Equipment Capital Investment</th>
<th>Sales &amp; Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture “In-House”</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Manufacture &amp; Assemble</td>
<td>Med</td>
<td>High</td>
<td>Med</td>
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<tr>
<td>Manufacture Outsource</td>
<td>Low</td>
<td>Low</td>
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<td>License</td>
<td>Low</td>
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Ways We Resource Manufacturing Transition

• You need to receive funding to support the cost to set up production lines.
• Each Volume Expansion can actually cost more per unit until you reach stable or consistent production volumes.
• Going to the next production level requires pulling efficient workers to train new inexperienced ones. This brings efficiency down. You need more funds to finance this.

Ways We Resource Manufacturing Transition

• The key to getting proper financial support for manufacturing set-up and operations is to include your customers in house expertise to assist with planning the ramp up or expansion.
• Their involvement in the planning process makes them internal champions for the resources needed as they now understand why funds are needed.
• Remember that as a small business you do have lower rates which is why they will use you. You just need to agree to do things the way they believe is the best.
The Results

End