



Commercialization Experiences of DOE SBIR/STTR Grantees

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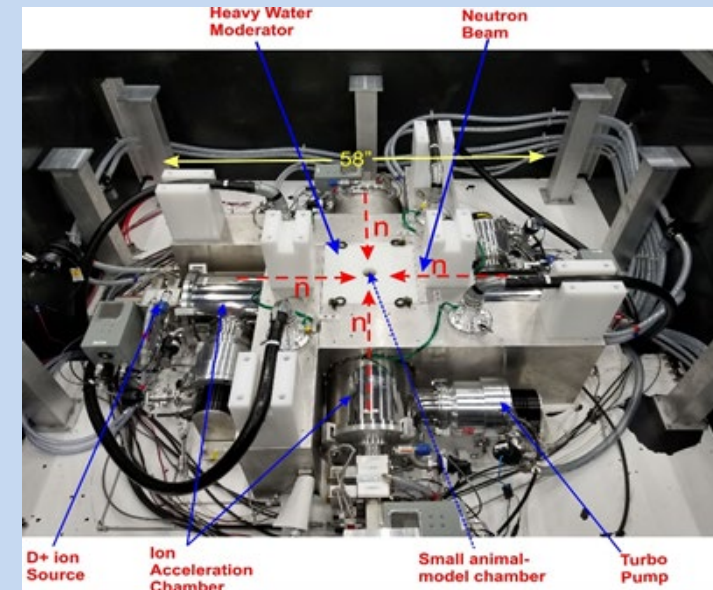
DOE Mission Areas & Commercialization Challenges

- Energy
 - Large, commodity markets
 - Requires large follow-on investments and time to penetrate established markets that may have many players
- Scientific Instrumentation & Nuclear Security
 - Smaller or niche markets
 - Commercial success often requires identification of adjacent markets
 - Similar to innovations developed through the NASA SBIR/STTR programs
 - Selected six Phase III success stories to share



Adelphi Technology Inc.

- Initial SBIR award focus
 - Advanced components for beamlines at DOE National Labs
- Innovation
 - Compact neutron generator – eliminates the need for an accelerator, nuclear reactor, or radioactive materials to provide neutrons
 - Three R&D 100 Awards
- Adjacent markets addressed (>\$8M in sales)
 - Materials analysis: mining, homeland security
 - Medical isotopes: cancer treatment
 - Physics research: dark matter detection



The Adelphi small animal cancer model irradiator for development of Neutron Capture Therapy using the Adelphi DD110.8MB.

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/Adelphi_Success-Story_2018.pdf
- Company website: <http://www.adelphitech.com/index.html>

Silicon Audio LLC

- Initial SBIR award focus
 - Advanced seismic sensors for remote detection of nuclear explosions
- Innovation
 - Optical seismic sensor with broad dynamic range and frequency response (femtometer displacement measurement)
 - Georgia Tech licensed technology
- Adjacent markets addressed (ramping to 4000 units/year annual production)
 - Oil and gas surveys
 - Broader scientific research applications
 - getting on the USGS vendor list was a key enabler

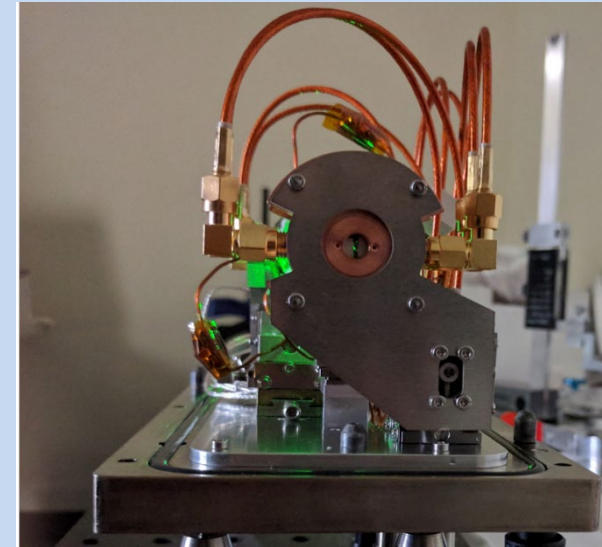


Brad Averson, an engineer with Silicon Audio, sets up seismic sensors on Gulkana Glacier in Alaska to see if a NASA lander would work on icy Europa.

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/Silicon-Audio_NNSA_2018.pdf
- Company website: <http://www.siaudio.com/>

Euclid Techlabs LLC

- Initial SBIR award focus
 - Components for RF accelerators
- Innovation
 - Electron buncher for RF accelerators
- Adjacent markets addressed (emerging opportunity)
 - Time-resolved spectroscopy and diffraction using Transmission Electron Microscopy (TEM)
 - Required development of low speed electron buncher suitable for retrofitting a TEM

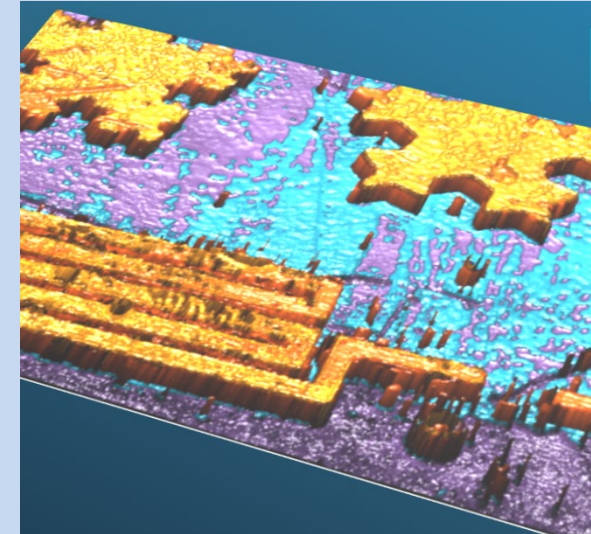


Electron beam modulating apparatus for producing a high-frequency, pulsed electron source for commercial transmission electron microscopes.

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/Euclid_2018.pdf
- Company website: <http://www.euclidtechlabs.com/>

KMLabs Inc.

- Initial SBIR award focus
 - ultrafast pulsed lasers for high energy physics
- Innovation
 - 10 femtosecond pulsed laser
 - Colorado Governor's Award for High Impact Research
- Adjacent markets addressed (>\$14M in sales)
 - Extreme Ultraviolet and Soft X-ray sources
 - Upconversion enabled by ultrafast pulsed lasers
 - High resolution imaging
 - Using coherent diffraction imaging (CDI), enables high resolution imaging at ambient conditions
 - Intel Capital investment because of potential for high throughput inspection



Nanometer-size titanium features patterned on a silicon substrate and imaged with KMLabs' tabletop CDI microscope

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/KMLabs_2018.pdf
- Company website: <https://www.kmlabs.com/>

Daylight Solutions Inc.

- Initial SBIR award focus
 - Standoff detection of atmospheric chemicals for nuclear forensics
- Innovation
 - Tunable infrared (IR) quantum cascade laser
- Adjacent markets addressed (>\$90M in sales)
 - Chemical detection applications
 - Mid-IR imaging microscope

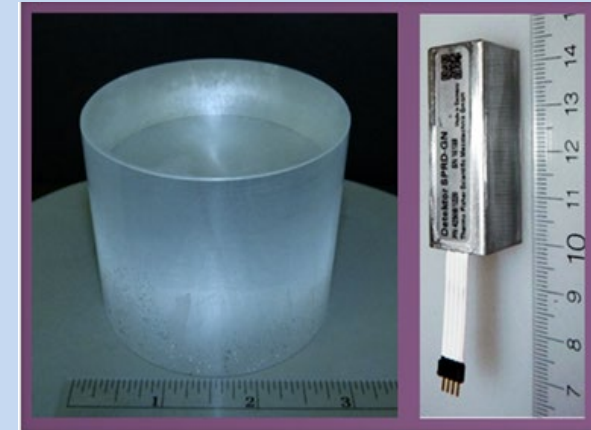


Daylight Solutions has developed a suite of mid-infrared (mid-IR) tunable and fixed wavelength lasers to support cutting-edge molecular detection and imaging applications.

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/Daylight-Solutions_NNSA_2016.pdf
- Company website: <http://www.daylightsolutions.com/>

Radiation Monitoring Inc.

- Initial SBIR award focus
 - Detection of gamma rays and neutrons for nuclear physics experiments
- Innovation
 - Cs₂LiYCl₆ (CLYC) scintillator capable of simultaneous detection of both gamma rays and neutrons
- Adjacent markets addressed (currently scaling from \$1M/year)
 - Homeland security: CLYC enables portable identification of a wide range of radioactive materials



RMD's 3 inch diameter CLYC crystal and packaged detector

- Success story: https://science.energy.gov/~media/sbir/pdf/Success%20Stories/RMD_success-story_2017.pdf
- Company website: <https://www.dynasil.com/company/rmd/>

Summary

- DOE mission-driven R&D may enable technical breakthroughs that can be exploited in adjacent markets
 - Adjacent markets are often larger
 - Innovations in one discipline can be a critical enabler to advance research in other disciplines
 - Adjacent markets may supply sales revenues to sustain and grow the company
- Identifying these markets requires hard work and (sometimes) good fortune
- Small businesses apply for SBIR/STTR should think carefully about which agency-driven R&D they pursue
 - In the best case scenario, SBIR/STTR projects provide a platform technology that can grow and sustain a business

