Introduction

Bridging the Gap Conference was held on Wednesday, 6 January 2010, at the Hilton Hotel in Albuquerque, New Mexico. It began with lunch at noon, talks and panel discussions were held from 1PM to 5pm, with exhibit and networking time until 6pm.

The Honorable Richard J. Berry, Mayor of Albuquerque, declared "Directed Energy Technology Day in Albuquerque, New Mexico" by executive order.

This conference explored the economic impact of directed energy technology development in New Mexico, commercialization of Directed Energy, and support for increasing the industry base for Directed Energy through keynote speakers and distinguished panelists. There were exhibits, question and answer periods, and one-on-one conversations.

Three panels consisted of industry, government, and academic leaders addressing economic impact of directed energy to the State, economic development through business and educational support, and commercialization potential. Questions presented to the panelist prior to arrival included, but were not limited to:

- What are the barriers to bridging the gap between technology developments and fielding systems or producing products?
- What can be done to smooth the roadblocks?

This report contains an executive summary and acknowledges event sponsors and participating organizations, summarizes speaker presentations, recaps key messages from panelist, and records questions from audience. Bios of speakers and panelist and more information on the GAP issues and solutions are included in full Conference Proceedings.

In this paper, DE, means Directed Energy and its related technologies, such as: optics, photonics, sensors, detectors, control systems, software, modeling and simulation, etc.

Executive Summary

Mr John Garcia, Albuquerque's Director of Economic Development opened the 2010 Bridging the Gap Conference by presenting a proclamation signed by Mayor Richard J. Berry proclaiming 6 January 2010 as Directed Energy (DE) Technology Day in Albuquerque, New Mexico (NM).

Ms Cynthia Kaiser, Chief Engineer Air Force Research Laboratory Directed Energy Directorate, presented a briefing on Directed Energy in NM. Directed Energy technology, which includes high power microwaves and high energy lasers to produce a beam of energy and associated optical subcomponents for conditioning the beam, is an economic platform for NM today. With collaboration by the DE community to include government, industry, academia, and professional societies, DE can increase the Quality of Life in NM in all areas (jobs, education, health care, etc.).

New Mexico is the leader in the United States for DE technology development, Air Force Research Laboratory Directed Energy Directorate, Sandia National Labs, Los Alamos National Labs, the High Energy Laser Joint Technology Office, White Sands Missile Range, and the High Energy Laser System Test Facility. With an increase in the industrial base; NM can be the leader in the United States for directed

energy technology development and product development. Directed Energy is capable of transforming the battle space like stealth technology did decades ago.

Ms Susan Thornton, Director of Air Force Research Laboratory Directed Energy Directorate presented a briefing on the Labs perspective on the Gap. The Directed Energy Directorates core technical competencies are high energy lasers, high power microwaves, beam control, and modeling, simulation, and effects. The Gap for the Air Force Research Laboratory Directed Energy Directorate is to transition DE technologies to the warfighter. The laboratory's role is to mature technology to Technology Readiness Level 6 (TRL 6); the level at which a system or a subsystem is tested in a relevant environment. In order to transition innovative technology development, technology needs to mature to the prototype level which is greater than TRL 6. There is no agency funded to produce and test DE prototypes outside of a product center or System Program Office (SPO). The Air Armament Center (AAC) was appointed as the DE weapons SPO but is not funded to do the job.

The DE community needs to come together to educate decision makers and warfighters on the importance of this technology for the nation. For NM this should include increasing the industry base and educating more scientists and engineers. Directed Energy will become a national priority and New Mexico can take the lead.

There were three panels with distinguished moderators and members from the government, industry, academia, and professional societies. These panels were:
Panel 1 – Impact of DE and related technologies on NM jobs and economy
Panel 2 – Federal, state, and local support and incentives for industry base to develop directed energy and related technologies
Panel 3 – Technology commercialization potential of DE and related technologies and the impact on NM jobs and economy

Congressman Ben Rey Lujan spoke during panel 2. The congressman stated that we need to commercialize these technologies in NM.

Congressman Martin Heinrich spoke during panel 3. The congressman challenged the group to increase NM competitiveness in DE.

Dr Jim McNally, Applied Technology Associates and chairman of the New Mexico Optics Association, concluded the conference by stressing the importance of the DE community to come together nationally for the purpose of integrating DE weapons into the operational inventory.

Host Organization:
nmOptics, Ed Spivak, President, and Jeanie Malone, Executive Director
New Mexico Optics, at 505 280-5280 or ed@nmoptics.org.

Major Sponsors:
- Applied Technology Associates
- Boeing
- Lockheed Martin,
- Northrop Grumman

- Raytheon

The following Gap's were discussed with proposed solutions:

Business, political, and community leaders are generally not aware of the technical and economic contributions of the DE community

- Develop strategic plan for DE
- Develop marketing strategy and communication plan
- Reach out to other State delegations and champions for DE
- Identify stakeholders

Policy, rules, regulations, and funding need to support innovative technology (such as, DE) and prototype development, and subsequent transition to operational products

- Form a joint Gov-Industry study group to recommend policy, rules, and regulation modifications
- Support funding for DE research to maintain US technical superiority
- Fund an organization to do prototype development

Increase economic impact of Directed Energy and related technologies through efficient collaborations

- Offer tax breaks and additional incentives for the development/expansion of industry clusters
- Increase the integration and collaboration of research and directed energy and related technology efforts across the services and industry- create organization to lead integrated product development

Build the workforce

- Develop well educated workforce, through stipends, scholarships, internships, and educational grants for higher education students
- Develop a NM education coalition that leverages and promotes collaborations between existing programs for K-12 students
- Promote STEM education to build work force fundamentals

Exhibitors

- Air Force Research Laboratory Directed Energy Directorate (AFRL/RD)
- Air Force Research Laboratory (AFL) La Luz Academy
- Airborne Laser Program Office (ABL)
- Applied Technology Associates (ATA)
- The Boeing Company
- Burgos Group, LLC
- Defense Technical Information Center (DTIC)
- Directed Energy Professional Society (DEPS)
- High Energy Laser Systems Test Facility (HELSTF)
- High Energy Joint Technology Office (HELJTO)
- InSync Optics, Inc.
- Lockheed Martin
- Menicucci Agency
- nmOptics Association
- New Mexico State University (NMSU)

- Northrop Grumman
- Professional Aerospace Contractors Association (PACA)
- Raytheon
- Sandia National Laboratories (SNL)

Conference Agenda

Opening Remarks:
Mr. John A. Garcia, Director of Economic Development, City of Albuquerque
Proclamation

Luncheon Speaker:
Ms. Cynthia Kaiser, Chief Engineer, Air Force Research Laboratory Directed Energy Directorate
Directed Energy in New Mexico

Invited Speaker:
Ms. Susan Thornton, Senior Executive Service, Director, Air Force Research Laboratory Directed Energy Directorate
The Technology Gap: A Laboratory's Perspective

Panel 1 – Impact of Directed Energy and Related Technologies on New Mexico jobs and economy
Moderator – Lee Gutheinz, Retired Program Director and Site Executive of Boeing-SVS, Inc

- Air Force Research Laboratory Directed Energy Directorate (AFRL/RD) – Ms. Susan Thornton, Senior Executive Service and Director
- Applied Technology Associates (ATA) – Dr. Jim McNally, Director of Operations
- Boeing Missile Defense Systems – Mr. John Sandvig, Director of Advanced Development for the Airborne Laser (ABL) Program
- Lockheed Martin Space Systems Company – Mr. Jim Rothenflue, Director for Advanced Directed Energy Systems
- Northrop Grumman Aerospace Systems (NGAS) – Dr. David Mordaunt, Director of Technology for Directed Energy Systems
- Raytheon Missile Systems – Charlie Bice, Manager, Raytheon Albuquerque office

Panel 2 – Federal, State and Local support and incentives for industry base to develop directed energy and related technologies
Moderator – Dr. Garrey Carruthers, New Mexico State University (NMSU), Dean of the College of Business and Vice President for Economic Development

- Air Force Research Laboratory Directed Energy Directorate (AFRL/RD) – Ms. Cynthia Kaiser, Chief Engineer
- Albuquerque Economic Development, Inc. – Mr. Bob Walton, Vice President of Business Development
- Los Alamos National Laboratory – Dr. Robert Dye, Lead for the commercialization and licensing teams for Superluminal Systems and Free Electron Laser technologies, Technology Transfer Division
- New Mexico Economic Development – Mr. Fred Mondragón, Cabinet Secretary
- Science Advisor to New Mexico Governor Bill Richardson – Dr. Thomas Bowles, on assignment from Los Alamos National Laboratory

- New Mexico Association of Commerce and Industry (ACI) -- Dr. Beverlee McClure, President and Chief Executive Officer
- Sandia National Laboratories – Mr. Hal Morgan, Senior Manager, Industry Partnerships and Strategy

Guest Speaker – Congressman Ben Rey Lujan, United States House of Representatives, New Mexico's 3rd Congressional District, member of the Committee on Homeland Security and the Committee on Science and Technology

Panel 3 – Technology Commercialization potential of Directed Energy and Related Technologies and the Impact on New Mexico jobs and economy

Moderator – Mr. Sherman McCorkle, President and Chief Executive Officer of Technology Ventures Corporation (TVC)

- Air Force Research Laboratory Directed Energy Directorate (AFRL/RD) – Dr. David (Tony) Hostutler, Lead of the Center of Excellence for High Energy Lasers and Principle Investigator for the Electric Hybrid Laser Program
- The Boeing Company -- Mr. Edward Pogue, Director, Advanced Technology Development Directed Energy Systems
- Burgos Group, LLC – Mr. Mario Burgos, President and Chief Executive Officer
- New Mexico State University (NMSU) -- Dr. Kenneth R. White, Interim Dean for the College of Engineering
- University of New Mexico (UNM) -- Dr. Luke Lester, Professor in the Department of Electrical and Computer Engineering, Microelectronics Endowed Chair Professor, and General Chair of the Optical Science and Engineering Graduate Program

Guest Speaker – Congressman Martin Heinrich, United States House of Representatives, New Mexico's 1st Congressional District, Class President of the 111th Congress' Freshman Class and Regional Whip for New Mexico, Arizona and Texas

Concluding Remarks:

Dr. Jim McNally, Director of Operations, Applied Technology Associates (ATA)

Questions from Audience (no particular order):

1. Why is it difficult for a serial entrepreneur and inventor from Sandia National Lab to license his/his own technology?
2. Does the NM Congressional Delegation promote DE technologies for Homeland Defense? Especially on NM's southern border.
3. Is there any thought to conduct a "STEM-only" conference in NM to share ideas, promote STEM Education, etc?
4. What is the education of the 140,000 unemployed?
5. What "vehicles" are there available that NM can promote DE to industries outside of NM?
    a. Conference?
    b. Large Market Ads?
6. How do you make university presidents at UNM and NMSU appreciate the critical importance of engineering programs to the state's economic development success? (Impress)
7. What about that Gross Receipts Tax issue?
8. Oh my God! NM has Sandia National Lab, Los Alamos National Lab, AFRL, Intel and various other technical companies in the state. Why are NM universities considered or perceived as "Tier 4" educational institutes? What is being addressed to correct this situation since it affects hiring and retaining top personnel?
9. Is there a "catalog" of facilities available at AFRL, Sandia, Los Alamos, Bases, etc? And who the contact is for each of those? If not, can we obtain a commitment from those organizations to do this?
10. Is there a "catalog" of "incentives" for technology/innovations/R&D from the city, county, state that businesses and policy makers can refer to? Along with contacts for each. If not, can we obtain a commitment from those organizations to do this?
11. Will AFRL's STEM-Effort, which involves the La Luz Academy and the DE Scholars program and is the largest funded effort in NM (>$5M/yr) be sustainable in this economic environment?
12. Do any of the universities anticipate providing DE specific degrees?
13. (Statement) Small businesses and academia need to collaborate with large business to incorporate production/commercialization requirements into the design early in the development process.
14. What is industry doing to address the significant shortfall of young scientist and engineers coming in to the workforce? How do we handle the shortfall?
15. What should the government do to encourage small business to team with large businesses to mature SBIR technologies past TRL-6?
16. What are the job prospects in DE for recent graduates? Is U.S. citizenship required in all cases?
17. Why doesn't industry band together to promote at least one DE system to be acquired for the warfighter so the politicians and the nation can see the benefits of DE?
18. Are there any steps that the NM State Legislature can take to enable DE technology/products to either be expanded/moved/occur in NM?