

R&D Expected in Cooperation with Vendors

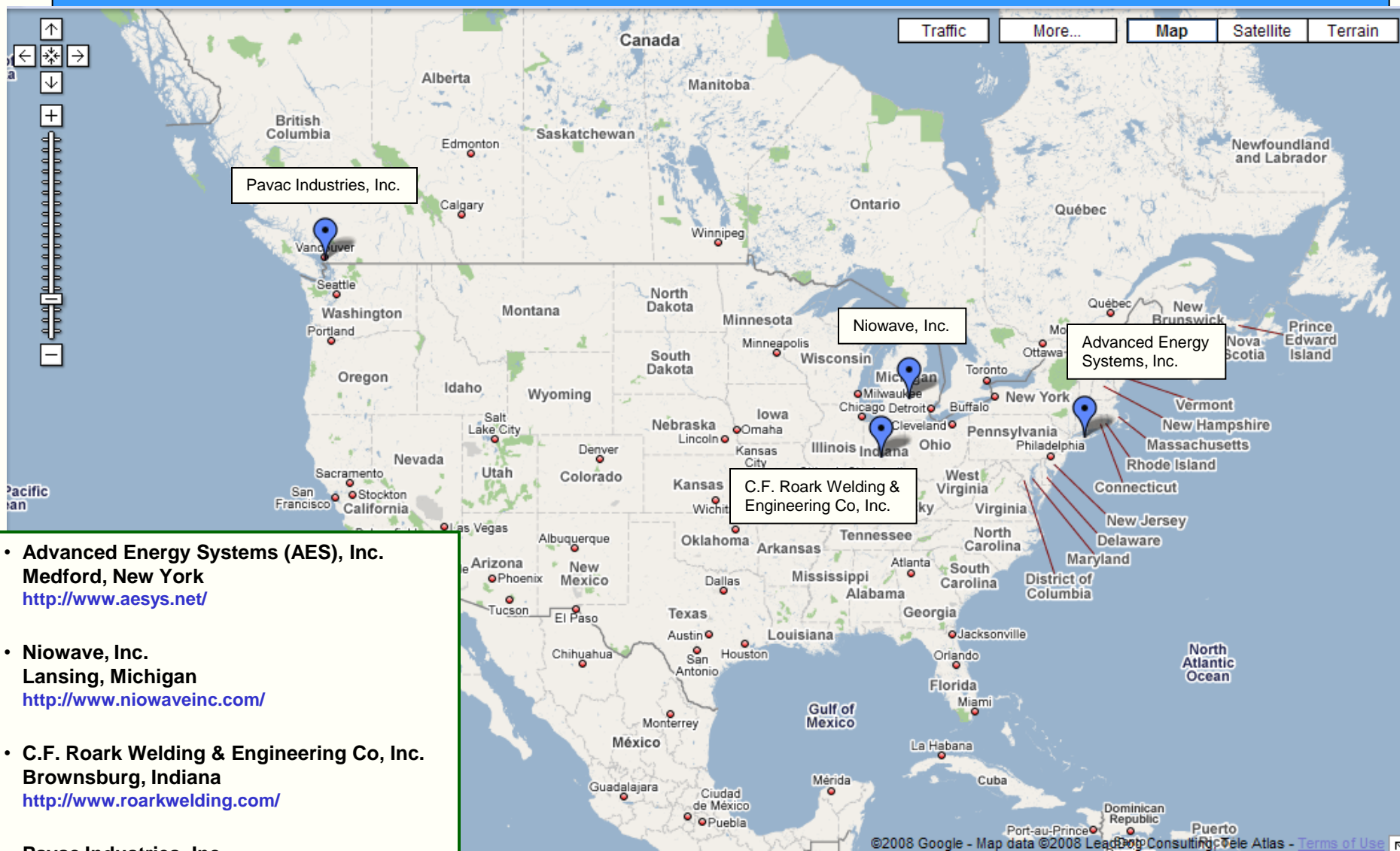
ILC Baseline Assessment Workshop

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Americas Region Cavity Vendors

Americas



- **Advanced Energy Systems (AES), Inc.**
Medford, New York
<http://www.aesys.net/>
- **Niowave, Inc.**
Lansing, Michigan
<http://www.niowaveinc.com/>
- **C.F. Roark Welding & Engineering Co., Inc.**
Brownsburg, Indiana
<http://www.roarkwelding.com/>
- **Pavac Industries, Inc.**
Richmond, British Columbia
<http://www.pavac.com>

Americas Region Cavity Inventory

Tesla-shape nine-cell cavities		
Description	No. Cavities	Status
AES 1-4	4	tested
AES 5-10	6	tested
AES 11-16	6	delivered Aug-Sep 2010
AES 17-36	20	Planned deliveries: 10 in Apr-Jun 2011, 10 in Mar-May 2012
Accel 6-9	4	tested
Accel 10-17	8	tested
Accel 18-29	12	testing in progress
Jlab fine-grain 1-2	2	tested
Niowave-Roark 1-6	6	First two received; balance due late 2010
Niowave-Roark 7-16	10	Planned deliveries: 3 in Jun 2011, 3 in Mar 2012; 4 in Dec 2012
Pavac 1-10	10	Planned deliveries: 3 in Jun 2011, 3 in Mar 2012; 4 in Dec 2012
Total	88	
Already Received	44	
Tesla-shape single-cell cavities		
Description	No. Cavities	Status
AES 1-6	6	tested for vendor qualification; currently used for R&D
Accel 1-6	6	tested for vendor qualification; currently used for R&D
Niowave-Roark 1-6	6	tested for vendor qualification; currently used for R&D
Pavac 1-6	6	received summer 2010
Additional R&D cavities	10	out for bid
Total	34	
Already Received	24	

- **Accel 18-29 (12 cavities)**
 - 3 qualified for cryomodules (≥ 35 MV/m)
 - 4 in process
 - 4 in queue for processing/testing
 - 1 in R&D path (local grinding at KEK)
 - **Niowave/Roark 1-2**
 - In process
 - **Cavities due through end of 2011**
 - 10 from AES
 - 7 from Niowave/Roark
 - 3 from Pavac
 - **Cavities due in 2012**
 - 10 from AES (Mar-May)
 - 7 from Niowave/Roark (3 in Mar; 4 in Dec)
 - 7 from Pavac (3 in Mar; 4 in Dec)
- } 44 cavities

- **Summary**

- **At least 30 additional cavity performance results can be expected based on new cavities already received or due by end of 2011**
 - 18 from AES and RI
 - 12 from Niowave/Roark and Pavac
- **Plus another 16 cavities are due in Mar-May 2012**
 - Assume ~10 can be processed/tested before end of 2012
- **30-40 additional cavity performance results by end of 2012**

- **Engineers assigned to each vendor**
- **Vendor visits as needed**
- **Occasional meetings with scientific staff for reporting of observations, performance results, and discussion of production techniques**
- **Frequent vendor contact at conferences and workshops**
 - **For example, recent hydroforming meeting at Fermilab, with all North American cavity vendors in attendance**

- **Whole-cavity BCP at AES and Niowave**
 - Flow-through interior chemistry with adjustable flow rate and temperature
- **Horizontal EP development at AES**
 - Designed for 1300 MHz ILC cavities and 650 MHz Project X cavities
- **Establishment of Pavac US operations in Batavia near Fermilab**
 - Will included machine shop, pre-weld etching, and electron beam welding: everything needed to fabricate ILC cavities

New vacuum ovens planned for Fermilab and Cornell

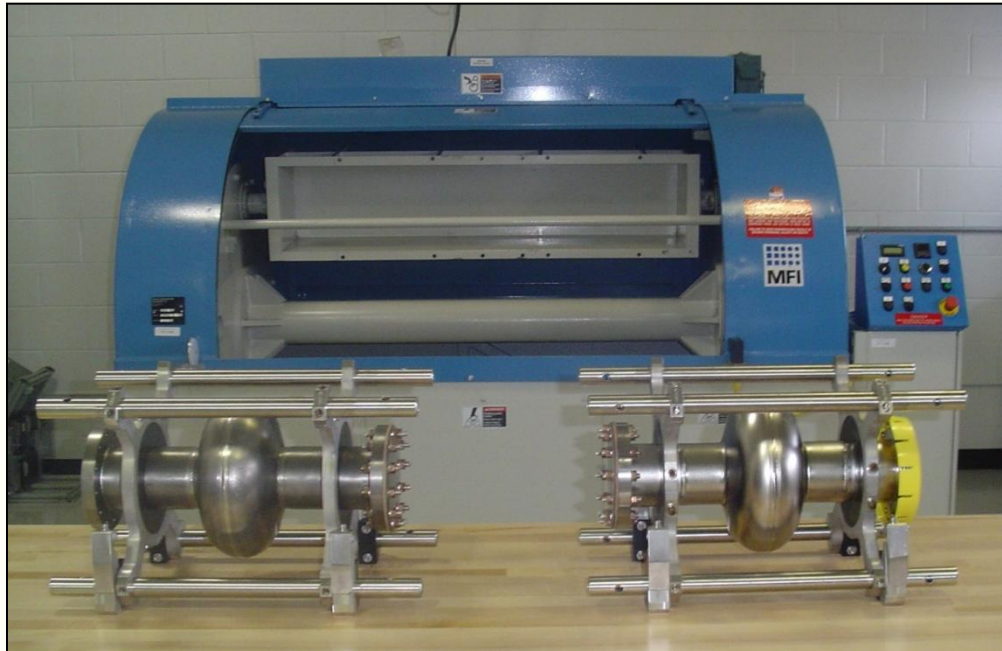


Jefferson Lab oven presently used for hydrogen degassing of all Americas Region cavities



New oven installed at Fermilab

- Plan to commission in Sep 2010
- Cornell has ordered same oven
- 2nd larger oven due at Fermilab late 2010



Fermilab
Tumbling
Machine

- Fermilab and Jefferson Lab have nearly identical machines
 - Same company, different gearing (to be modified)
- Cornell has the same machine on order for delivery later this year
- If tumbling becomes part of the “standard process,” we will be well-positioned for implementation

- **Recrystallized fine-grain Nb tube developed by Black Labs LLC and ATI-Wah Chang**
 - **Uniform microstructure, good for forming; long enough for a complete 9-cell**
- **Two tubes were formed into 2- and 3-cell units at the DESY facility with participation from FNAL (winter 2009-2010)**
- **Plan to assemble, process and test a nine-cell cavity from these components (underway at JLab)**
- **Held a one-day hydroforming summit at Fermilab Sep 1st**
 - **Participation from niobium industry, hydroforming industry, and North American cavity vendors**
 - **Objective was to formulate a plan for the realization of nine-cell cavity hydroforming in North America in 1-2 years**
 - **ILC ART plans to fund this activity in FY11**
 - **Specifications and requests for proposals to be prepared**

- **Plan to process and test another 30-40 cavities by end of 2012**
- **Will work with all North American cavity vendors during the next two years**
 - **AES**
 - **Niowave/Roark**
 - **Pavac**
- **New vendor capabilities include BCP, EP, and manufacturing facilities**
- **New hydrogen degassing ovens being installed at Fermilab and Cornell**
- **New tumbling machines are being established at Fermilab, Cornell, and JLab**
- **ILC ART plans to pursue hydroforming of nine-cell cavities during the next two years**