REPORT OF THE
SECRETARY OF COMMERCE AND TRADE

Evaluation of the Effectiveness of the Contractual Relationship Between the Virginia Philpott Manufacturing Extension Partnership (VPMEP) and Virginia Tech

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 32

COMMONWEALTH OF VIRGINIA
RICHMOND
2006

COMMONWEALTH *of* VIRGINIA

Office of the Governor

Michael J. Schewel
Secretary of Commerce and Trade

January 13, 2006

The Honorable John H. Chichester
Chairman
Senate Finance Committee
Senate of Virginia
Post Office Box 904
Fredericksburg, Virginia 22404

The Honorable Vincent F. Callahan, Jr.
Chairman
House Appropriations Committee
House of Delegates
Post Office Box 1173
McLean, Virginia 22101

Dear Messrs. Chairmen:

Attached is the report required by Item 95.D of the 2005 Appropriations Act requiring the evaluation of the effectiveness of the contractual relationship between the Virginia Philpott Manufacturing Extension Partnership (VPMEP) and Virginia Tech in terms of the total number of projects undertaken, revenues earned, projects shared or referred between the two entities, services provided, and productivity levels achieved by the clients.

Sincerely,

Michael J. Schewel

MJS:kme

Report from Michael J. Schewel, Secretary of Commerce and Trade on VPMEP per Appropriations Act Item 95.D

Summary Recommendations

The Virginia Philpott Manufacturing Extension Partnership (VPMEP) should be integrated into Virginia Tech in order to more effectively serve the Virginia manufacturing industry. This relationship should be based generally on the model of the Virginia Cooperative Extension as described in Virginia Tech's attached proposal. In addition, VPMEP should maintain a strong relationship with Old Dominion University and its VATPDC program. VPMEP should work with Virginia Tech to finalize the details of the relationship by June 30, 2006.

Discussion

Why a formal relationship and key components of an ideal relationship

The overall goal of considering a formal relationship between VPMEP and a Virginia university is to enhance the demonstrated capability of VPMEP and the institution with which it affiliates to serve industries throughout the Commonwealth. Global competition is intensifying. The need for industries in Virginia to advance their knowledge and improve their processes is great.

Since its creation by the General Assembly in 1993, VPMEP has a track record of success. Impact data collected by VPMEP from clients in fiscal year 2005 include $129 million in retained and increased sales, $58 million in cost savings, $13 million in investments, 381 jobs, and a satisfaction rating of 4.79 on a scale of 5.0.

While there is a strong track record of success, the future environment will include ever-increasing demands on VPMEP – as well as new and challenging demands – from manufacturing and industrial clients in Virginia for services and expertise. Furthermore, VPMEP increasingly faces state budgetary pressures.

Therefore, an ideal relationship between VPMEP and a Virginia university would include the following key components:

- Mutually beneficial to both VPMEP and the partner institution
- Improved connection of VPMEP customers to the resources and expertise of a leading engineering and research university – that is, building upon and improving the "Extension" model of applied knowledge and technology transfer
- More reliable source of funding for VPMEP through the influence of the partner institution

In summary, a formal relationship with a Virginia university would bring much needed capacity and expertise, as well as fiscal stability.

Process

The Secretary of Commerce and Trade (SOCT) worked with the VPMEP board and staff on the following process:

- VPMEP board formed a board study committee
- In conjunction with SOCT, board study committee developed request for proposal (RFP)
- RFP was sent to all Virginia institutions of higher education
- Five (5) formal written responses were received from Virginia Tech, ODU, George Mason, University of Virginia, and James Madison University
- The VPMEP board study committee reviewed and analyzed the proposals and presented findings and recommendations to SOCT
- Concurrent to this, VPMEP and Virginia Tech provided to SOCT an evaluation report on the current Virginia Tech-VPMEP affiliation.

Analysis and recommendations

Upon review of the VPMEP reports, the Secretary believes that Virginia Tech's and ODU's proposals are the strongest and represent the best path forward for several reasons.

Overall, the proposals from Virginia Tech and ODU "match-up" the best with both the objectives and approach of this process, as well as with VPMEP's mission. The proposals address and respond most effectively to the key components outlined above for an ideal relationship between VPMEP and a Virginia university.

Specifically, highlights of the proposals from Virginia Tech and ODU include the following:

- More robust focus on manufacturing, and especially applied engineering, technology, and research
- Engineering schools and research infrastructure with the strongest reputation
- Proven track records in and commitment to outreach and "extension" model
- Existing relationships and joint programs with VPMEP that have demonstrated success.

With regard to Virginia Tech, in particular, it should be noted that its proposal provided the best understanding and appreciation for the current state of Virginia manufacturing, as well as the best-formulated vision for the future of Virginia manufacturing and the university's role in that vision. Virginia Tech has the highest-ranked engineering school in the Commonwealth. Furthermore, as Virginia's senior land-grant university, Virginia Tech proposed to create an engineering outreach function in the College of Engineering that is parallel to Virginia Cooperative Extension, largely in the College of Agriculture and Life Sciences.

(The appendices provide more details on each of the university proposals.)

Structure of Relationship

The remaining question deals with the best structure and form of the relationship between VPMEP, Virginia Tech, and ODU. The two universities submitted different approaches. ODU proposes that VPMEP remains an autonomous entity with a dotted-line level of reporting to ODU's Vice President of Research. Virginia Tech proposes full integration of VPMEP into its College of Engineering, with direct reporting of VPMEP staff to the Dean.

Both approaches bring strengths and weaknesses. A middle ground that includes both integration with Virginia Tech and continued relationship with ODU is the best approach.

SOCT recommends that VPMEP work with Virginia Tech to develop specific plans for integration with Virginia Tech in a manner that will allow a strong continued relationship between the integrated entity and ODU.

Appendices

I. VPMEP Board Study Committee Report
II. VPMEP/Virginia Tech Evaluation of Relationship

VPMEP
Solutions for a better way
in collaboration with Virginia Tech

360VU

July 28, 2005

Danville

The Honorable Michael J. Schewel
202 N. Ninth Street
Richmond, Virginia 23219

Dear Secretary Schewel:

Lynchburg

The VPMEP Board Study Committee has completed a draft report for your review based upon the enclosed proposals from the five universities. We appreciate the effort expended by George Mason (GMU), James Madison (JMU), Old Dominion (ODU), University of Virginia (UVA), and Virginia Tech (VT). Representatives from all five universities were enthusiastic and cooperative.

Martinsville

We understand our task to be a discussion of the five proposals without making a specific recommendation. We have had multiple discussions and found all of the proposals worthy of consideration. We are grateful that these distinguished institutions all saw value to an affiliation with VPMEP.

Newport News

Our analysis of the proposals indicates to us that GMU, ODU, and VT merit closer consideration. Although an affiliation with JMU or UVA is feasible, we believe the other three universities provide a better fit based upon the proposals. We suggest follow-up occur with these three universities to better comprehend the value of their approaches and to explore possible alternative approaches to some of the points outlined in the proposals.

Norfolk

We found it difficult to effectively and candidly capture our collective questions and thoughts on this subject in the attached draft report. Therefore, The Study Committee suggests a face-to-face meeting in Richmond in the near future at a time convenient for your schedule.

Richmond

Thank you for your time and attention regarding this issue of tremendous importance to the future success of VPMEP.

For the Committee,

Roanoke

Jeff Kohler
Executive Director

vls

Winchester

Enclosures (6)

cc M. Cowan, T. Godfrey, M. Lightsey, and L. Ryder

Wytheville

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DRAFT

VPMEP Proposal Review for the Secretary of Commerce & Trade

Submitted by:
The VPMEP Board Study Committee

Mattie Cowan

Tom Godfrey

Jeff Kohler

Martin Lightsey

Larry Ryder

July 28, 2005

Summary

The VPMEP Board Study Committee provides the following information for the study being prepared by the Secretary of Commerce and Trade regarding the future affiliation of VPMEP. Five university proposals were received from George Mason (GMU), James Madison (JMU), Old Dominion (ODU), University of Virginia (UVA), and Virginia Tech (VT).

Including a "no change" alternative, there are six options - VCCS, VT, ODU, GMU, UVA, and JMU. Operationally, VPMEP has flourished during the last few years with an independent VCCS affiliation. Any change in the affiliation or the organizational structure of VPMEP must realize positive results for VPMEP, the affiliated institution, and ultimately the manufacturers in the Commonwealth.

In 1994 the Philpott Center hired its first employee. In 1996 VPMEP received its first statewide cooperative agreement with the National Institute of Standards and Technology Manufacturing Extension Partnership (NIST MEP). In 1999 fees collected from clients were about a quarter million dollars. The Board challenged the organization to focus on fee generation with more of a private sector business approach to operations. VPMEP staff responded and collected over three million dollars in fees this past fiscal year. Impact data collected by VPMEP from clients in fiscal year 2005 include $129 million in retained and increased sales, $58 million in cost savings, $13 million in investments, 381 jobs, and a satisfaction rating of 4.79 on a scale of 5.0.

If VPMEP should alter its association to become a university-based organization, we believe there are two issues. The first is the best form of association, and the second is the best university partner or partners. The proposals submitted reflect a variety of approaches with many different ideas. VT submitted a proposal with full integration. GMU, JMU, ODU, and UVA submitted proposals pursuing an affiliation.

While full integration has the potential of creating long-term stability and enhanced synergy, this approach involves significantly more risks than affiliation, particularly in the short term. There are questions about how the management and professional staff of VPMEP will relate becoming subordinate to the academic leadership of a large university. The ability to effectively serve manufacturing clients in the form of a business consultant-client relationship may be challenged in a university environment. Integration is also more likely to reduce flexibility and responsiveness, because the universities follow strict institutional policies. Today VPMEP is free to serve clients with minimal overhead and protocol. Frankly, all of the universities have a slow approach to matters of business. Further, such an arrangement would be expected to increase the difficulty of recruiting and retaining good board members.

This integration risk must be weighed against potential opportunities for enhanced technology transfer and synergistic interaction. The opportunity exists for integration to provide additional stability, if VPMEP is able to establish a priority voice and maintain a separate VPMEP line item for funding in the state budget.

In contrast to the VT integration approach, ODU has proposed an affiliation relationship. The Virginia Applied Technology and Professional Development Center (VATPDC) at ODU has provided service to manufacturers for many years and has a good working relationship with VPMEP.

GMU presents a well-developed proposal with a concrete example of a similar working affiliation with the Community Business Partnership (CBP). Furthermore, GMU would provide a more neutral base that might better encourage relationships with other entities.

UVA and JMU provide other strengths as affiliation candidates. Although an affiliation with either UVA or JMU could work effectively, in our opinion, the proposals from the other three universities present a stronger case.

There does not appear to be an inherent advantage or disadvantage to the university MEP model. The MEP Metric Map for 2005 Q1 provides one measure of performance for the about sixty MEP Centers. There are nineteen centers above the highest-level performance curve, including VPMEP. The other eighteen MEP's are composed of eleven independent 501c3's, two 501c3's with a university fiscal agent, three universities, and two state technology organizations. There are about thirteen university MEP's in total. University MEP's apparently do not use faculty in a significant percentage of consulting engagements.

Our Federal Program Officer, David Cranmer, is monitoring this affiliation process. NIST MEP does not take an official position on MEP structure. Although GMU would likely provide the most beneficial situation for NIST MEP due to its proximate location to Gaithersburg and its government linkages, NIST MEP focuses on performance rather than structure. Since our cooperative agreement is based upon annual reviews, NIST MEP would have the option of eventually "re-competing" the VPMEP agreement, if they disagreed with the approach.

A final complicating factor is that this analysis is based on the proposals as presented. The universities would likely be willing to discuss variations, although the VT proposal appears to be the least flexible.

Following are comments on the proposals from each university in alphabetical order:

George Mason

If potential rancor between VT or ODU from not achieving an association with VPMEP for their college of engineering (while such a relationship is being achieved by their primary rival) is a concern, then GMU could play an effective role as a more neutral affiliation party.

The GMU proposal is very well written. Keith Sergersen did an excellent job in verbally presenting a very persuasive and coherent explanation regarding the affiliation approach at GMU. Jody Keenan, Director of the Small Business Development Centers Network (SBDC), verbally presented a logical opportunity for VPMEP to work with the SBDC's located at JMU, Radford, Longwood, and Hampton Roads.

The Mason Enterprises Center (MEC) already has similar affiliations with CBP. Using the CBP affiliation as a model would facilitate the actual implementation. MEC works with over 5000 businesses each year. It provides assistance to people who want to start a new business or grow an existing small business. The current eight intertwined programs working in business development and growth by providing services including training, seminars, and conferences would create collaborative opportunities for VPMEP.

GMU is a very entrepreneurial university. VPMEP clients could benefit from the extensive knowledge in entrepreneurship and economic development. VPMEP staff would be encouraged by the past experience at GMU with innovative retention programs.

The primary limitation at GMU is a lack of manufacturing focus. The engineering and science programs do not have the industrial capabilities of VT. There is some linkage to industry through the SBDC's and the Virginia Economic Bridge (VEB); however, such linkage is not in the same league as VT or ODU.

The VEB also partially mitigates another GMU problem -- geography. The GMU Northern Virginia base is very inconvenient. VEB encourages a bond between the north and the south. GMU probably would support a long-term physical VPMEP presence in Martinsville to help balance its Northern Virginia focus.

James Madison

JMU offers the flexibility of a smaller university with an innovative College of Integrated Science and Technology (CISAT) combined with interdisciplinary options with the Colleges of Business and Education. The geographic location is reasonably central to the state. JMU has had a positive relationship with VPMEP for many years.

A JMU affiliation would probably be perceived as less threatening than the larger institutions. JMU provided few details regarding affiliation structure, suggesting a willingness toward flexibility. JMU mentions a minimum of "red tape" and the ability to respond rapidly.

Dr. John Noftsinger and some of his colleagues verbally presented ideas expressing enthusiasm with a VPMEP affiliation. Dr. Kander and Dr. Zarrugh have had involvement with VPMEP for many years.

Old Dominion

ODU presents a strong proposal with substantial merit. Jerry Robertson, the primary author of the proposal, has worked hard to develop a successful relationship between VATPDC and VPMEP. It is impressive that the suggested linkage would be to the Vice President for Research, and that President Runte has been personally involved with the proposal.

VATPDC has worked closely in conjunction with VPMEP to create a valuable service team for Northrop Grumman Newport News Shipbuilding. Many local suppliers to Northrop have

benefited from this joint effort. A Job Shop Lean Course was also developed by VATPDC that is now being used with many clients.

ODU is completing a building next year dedicated to research in advanced manufacturing. Two entities of special interest there will be the Lean Institute and the Ship Repair Maintenance and Operations Institute. The focus on manufacturing in the Batten College of Engineering and Technology along with the involvement with Tidewater industry is positive. However, the ODU brand recognition is not nearly as strong statewide as that of VT.

The Old Dominion University Research Foundation (ODURF) appears to be a functional mechanism for VPMEP fiscal agency. Three organizations are listed that are currently provided fiscal administrative services by ODURF. The Mid-Atlantic Regional Spaceport (MARS) is also mentioned as a concrete example of the suggested model.

Relationships with VCCS are potentially enhanced given the existing TELETECHNET Distance Learning program. Most universities are probably less threatened by ODU than VT. An affiliation with ODU might make a continued relationship with VT difficult.

University of Virginia

UVA brings the prestige of the number two ranked public university along with a favorable geographic location. Further, the Darden School has a very highly perceived status within the business community, although not necessarily with an industrial focus.

One of the founders of VPMEP was Dr. Bob de Voursney. Bob has been associated with the Weldon Cooper Center for Public Service at UVA for many years. He authored a 1993 concept paper on the Philpott Center and attended a recent VPMEP board meeting.

The proposal is limited on specifics suggesting a willingness for a flexible affiliation. Imagination is offered emphasizing creativity.

Virginia Tech

As the land grant university with the best-known engineering college in Virginia, VT is perhaps the natural leader for an association with VPMEP. Since VT has chosen to present an integration proposal compared to the other four affiliation proposals, much of the VT consideration focuses on the issue of integration.

Relationships are key to any partnership. Effective contacts with VPMEP have been developed by various people at VT. Dr. Henneke, Dr. Settle, and Dr. Taylor have invested many hours in working closely with VPMEP and have clearly demonstrated VT's interest in VPMEP.

VPMEP would continue to benefit from VT brand recognition. The VT alumni presence in industrial Virginia is also a huge positive influence.

The model suggested is the Virginia Cooperative Extension (VCE). This model has the potential of best fulfilling the elusive vision of establishing VPMEP as an effective conduit between a research-focused university and the private sector manufacturing community. However, there are important differences: VPMEP is fee-based serving mostly corporate clients, and VCE was created as part of VT rather than integrated from a separate entity like VPMEP.

Responsiveness to clients will likely be a challenge with integration. Contract approvals, intellectual property resolution, and third party service procurement would be potential difficulties.

Integration presents real problems for staff retention. The current staff at VPMEP is comprised of individuals who come from industry, and they may not be comfortable working in a university setting. In the case where universities most value individuals with numerous degrees and research accomplishments, the VPMEP staff may be misplaced. The possible decreased costs mentioned from expected changes in the VPMEP incentive system must be balanced against increased costs from anticipated higher staff turnover. VPMEP's strict reliance on merit-based pay increases is another cornerstone of its culture that may be threatened by integration into a state university.

Other cost issues are mentioned. A cost increase would be anticipated for services when compared to the current cost from Patrick Henry Community College (PHCC). The proposal makes the unlikely assumption of donated office space in Martinsville. Additional charges to cover indirect costs are also mentioned. The VT proposal expects excess funds generated in a fiscal year to primarily move to VT, a violation of existing NIST MEP terms.

Governance as proposed by VT is problematic. A Stakeholder Committee composed of a majority of VT staff would be a significant change from the current board with a private sector, manufacturing focus. Since VPMEP functions much like a private-sector, for-profit consulting business (with subsidized fees for small manufacturers), it is unlikely that a governing body from academia is the best choice. The value of the existing board solely in an advisory board capacity is questionable.

Geography in Blacksburg, while reasonably convenient to Martinsville, isn't centrally located within the state for long-term benefit.

Conceptually, an association with VT is appealing. Providing easier access for Virginia's manufacturers to the intellectual assets of the university through the network of VPMEP field-based project managers is laudable. Linking VPMEP with the broader economic development efforts of VT could be beneficial. Enhanced collaboration with the Center for High Performance Manufacturing is desirable.

The trade-off between the gain in better access to VT versus the loss in focus and flexibility is difficult to evaluate.

Virginia's Philpott Manufacturing Extension Partnership
Affiliation Proposal
June 30, 2005

Submitted by the Mason Enterprise Center of George Mason University

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The Mason Enterprise Center of George Mason University respectfully submits this proposal to Virginia's Philpott Manufacturing Extension Partnership (VPMEP) expressing strong interest in creating a highly successful and client rewarding partnership affiliation with our two statewide business assistance programs. After meeting with Mr. Jeff Kohler on June 22nd to discuss this exciting opportunity, the leadership of both the Mason Enterprise Center and George Mason University feel strongly that this affiliation will greatly benefit both organizations and more importantly, provide increased benefit to those businesses and industries most in need of assistance to expand and improve operational and business processes.

As requested in the VPMEP PROPOSAL GUIDELINES, dated June 2, 2005, this proposal will respond directly to each request for information. Additional information will be provided as relevant. Please refer all inquiries and responses to:

Keith B. Segerson
Managing Director, The Mason Enterprise Center
George Mason University
4031 University Drive, Suite 200
Fairfax, Virginia 22030
(703) 277-7724
segerson@gmu.edu

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Executive Summary:

The Mason Enterprise Center (MEC) at George Mason University is uniquely positioned to establish a mutually beneficial partnership and teaming affiliation with Virginia's Philpott Manufacturing Extension Partnership (VPMEP). As presented in this proposal, the MEC and the university have extensive experience and current operations statewide providing assistance and support services to all classifications of business. Specific to this proposal, the MEC has in operation, as host - a statewide network of 29 Small Business Development Centers (SBDC); as host - one of the top regional and soon-to-be statewide Defense Logistics Agency-sponsored Procurement and Technical Assistance Center (PTAC) programs in the country; and combined with the largest network of domestic and international small business incubators/accelerators in the Commonwealth of Virginia; the state's only women's business center; a leading Mentor-Protégé Program supporting 8a-disadvantaged, women and minority-owned businesses; and a network of

GSA-sponsored telework centers, VPMEP's affiliation with the Mason Enterprise Center would create one of the most dynamic and influential business assistance networks in the United States. The Mason Enterprise Center and the School of Public Policy also have extensive experience in international business and economic development (specifically in China, India, Europe, Latin America, and Southeast Asia) through joint partnerships and service contracts. Knowledge of competitive manufacturing strategies would be instrumental to VPMEP as Virginia positions itself to compete in a growing international marketplace. Finally, the enhanced visibility of VPMEP as an affiliate of the Mason Enterprise Center would greatly impact long-term success of the program – thus, increasing the overall benefit to industry. Access to George Mason's extensive research and intellectual properties would be helpful as well. Making use of Virginia's Economic Bridge as technology transfer mechanism will create even more opportunities for VPMEP to provide state-of-the art services in support of industry growth throughout the Commonwealth of Virginia. Organizationally, the Mason Enterprise Center has an established and successful affiliation in place with the Community Business Partnership that serves as an excellent model for George Mason's affiliation with VPMEP. It's not just a promise that the Mason Enterprise Center can deliver on this proposal - we are currently providing effective and dynamic statewide business assistance in a networked and affiliated environment. We look forward to a dynamic partnership with VPMEP!

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Background Information:

The Mason Enterprise Center: An Overview

Entrepreneurship and economic development through business assistance services is a core part of the character and signature of George Mason University from its inception. There are two centers, based in the School of Public Policy, that underpin this effort. One of these is the Mason Enterprise Center (MEC) and the other is the Center for Entrepreneurship and Public Policy (CEPP). The MEC has more than 120 employees and an annual budget of about $7 million. It provides assistance to people who want to start a new business or grow an existing small business. Some of its programs include the Small Business Development Center Network (SBDC Network) that includes 29 SBDC Centers located throughout the Commonwealth of Virginia. Each of these centers provides assistance with respect to business plan development, market research and planning, management training, business networking, management planning, legal issues, financial and capital formation assistance and intellectual property. The MEC also provides assistance to the same clients on how to apply for and procure contracts from the U.S. federal government as well as from state governments through two programs: Procurement and Technical Assistance and Mentor Protégé. A Women's Entrepreneurship Center and an Ethnic Entrepreneurship Program (counseling and training are offered in 4 languages) are operated to bring focused assistance to the needs of specific population groups. The MEC also houses a 35-company technology incubator and an international incubation program, and operates the Tier II Step Up Program for

relatively strong viable companies to prepare them for rapid pursuit of growth company status. To this end the MEC has co-located the Minerva Seed Fund at its central location in Fairfax adjacent the GMU campus and is in the fund raising stage of establishing a $20 million SBIC venture fund that will greatly expand its ability to facilitate capital formation options for its client companies.

The mission of the Center for Entrepreneurship and Public Policy (CEPP) is primarily research. To this end several dissertations concerning the role of entrepreneurship in the public and non-profit sectors have been completed. This work has served as the basis of a more strategic objective to develop the field of public sector entrepreneurship that includes not only work in the established field of policy entrepreneurship but more broadly approaches for guiding and steering programs that will help government employees and agencies adopt and survive via a more entrepreneurial approach to their tasks. The CEPP has sponsored two research conferences each year for the past 6 years. One of these, the Tinbergen Conference, is jointly sponsored with the Tinbergen Institute in Amsterdam, Netherlands, which focuses on entrepreneurship policy and regional development. The other is the Uddevalla Conference, in Sweden, that focuses on the role of entrepreneurship and policy in the development of lagging regions. This conference is held in Western Sweden, which is recognized as a lagging region by the European Union. Special editions of journals and books have been produced for the past 6 years from the papers that have been written and presented at these conferences.

Both the MEC and the CEPP serve as knowledge centers represented not only by the publications noted above but also in providing advisory services. For example, university faculty members, on behalf of these centers, have evaluated a number of the technology incubators in the Torch Program (the primary technology incubation program in China) and continue to provide advisory assistance to these programs. Also, assistance is being provided to a number of the graduate management education programs in India (e.g., MDI, IIM-L, XLRI, BIMT, IIT-B, IISc –Bangalore) in the design and development of entrepreneurship (wealth creation), tracks in their Master's degree programs as well as in creating an outreach program like the MEC. Joint research, exchange and education programs are well developed with some of these management programs especially MDI, IIM-L and XLRI as a consequence of some 3 years of interaction.

The School of Public Policy at George Mason University: An Overview

The School of Public Policy at GMU, formed in 1990, is viewed as one of the most entrepreneurial programs of its type with nearly 65 percent of its funding coming from sources external to the university or the Commonwealth of Virginia. It has what is believed to be the world's largest Ph.D. program in public policy with more than 135 doctoral students enrolled. There have been nearly 100 Ph.D's awarded in the School's short history since the early 1990s (see list of dissertations attached in Appendix 1). Instead of just one flag ship multi-purpose masters degree in public policy, the usual model for U.S. public policy schools, SPP also offers additional specialized masters degrees in international commerce policy; transportation policy operations and logistics;

peace keeping policy; organizational learning and knowledge management; and enterprise engineering and policy (jointly offered with the School of Information & Technology Engineering). Unlike most public policy schools in the U.S. that focus heavily on social policy, the GMU School of Public Policy concentrates on a diverse set of specialized topics including policy formation, the role of culture and values in policy making, regional economic development policy, science and technology policy, entrepreneurship in the public sector, policy making and globalization, governance (including e-governance), institutional dynamics and policy, intergovernmental relations and transportation policy and international trade policy including e-commerce.

The School has more that 40 full time tenure track faculty including 5 endowed chairs, 3 university professors, 15 Ph.D. level research faculty, and 40 faculty from other schools and departments that participate in the SPP program. The total faculty available to the program, when adjunct professors are added, is well over 100. In addition to its doctoral students, SPP has nearly 1000 master's degree students. The School has no undergraduate education programs. As such, it is a graduate education and research dominated academic unit. The total staff base for the school is nearly 300 including faculty, research, support and administrative staff and those students who are supported as research assistants. Most of the tenure track faculty is at the full professor level because of the strong research and Ph.D. level training mission of the School. With few exceptions the faculty members are internationally recognized for their expertise and research and have a global intellectual orientation to back up their more operational advisory work at this level.

The School was initiated with only a Ph.D. program; the master's degrees came later. The strong emphasis on Ph.D. level training in its early years laid the foundation for a strong research tradition that today is represented and defined by various research centers including: Center for Public Policy Analysis, Center for Regional Analysis, Center for Science and Technology, Center for Transportation Policy, Operations and Logistics, Mason Enterprise Center, Center for Entrepreneurship and Public Policy, Center for State Economic Development, International Medical Policy office, and Center for Global Policy (see Research Centers at the SPP web site – http://policy.gmu.edu). In addition to these centers the School also has an executive education program that is in its second year of operation (described in more detail in the next part of the statement).

George Mason University: An Overview

Recognized internationally for its innovation, diversity and entrepreneurial spirit, George Mason University (GMU) offers a broad array of academic programs, enterprising scholars and teachers, and a student body representing 135 countries and all 50 states in the U.S. Located in Virginia only minutes from Washington, D.C., GMU provides unparalleled opportunities in research, internships and work experiences through strong alliances with business, community and government. Recognized by numerous media and authority as probably the most entrepreneurial university in the U.S., GMU responds

to demands for interdisciplinary research and programming not simply by adding new programs but by rethinking traditional approaches to the academy itself.

Formed in 1972, GMU has nearly 30,000 students making it the largest university in the Commonwealth of Virginia. Nearly half of these are at the graduate level (Masters and Ph.D.). GMU offers more than 100 degree programs including many of an interdisciplinary nature that enable students to design personalized courses of study with faculty guidance. At the same time, it has achieved excellence in a variety of traditional and non-traditional ways. For example, GMU has two Nobel Laureates in Economics on its faculty, James Buchanan for his formalization of Public Choice Theory and Vernon Smith for his breakthrough work in Experimental Economics. The GMU School of Law is the only U.S. school of law that has ever moved from a 3rd tier ranking to a 1st tier ranking and did so in a matter of less than 10 years. Finally, the School of Public Policy has been ranked every year for the last 6 years by the National Science Foundation (USA) as one of the top 5 schools nationally in federally sponsored research – for most of this period it has been ranked 2nd just behind the Harvard Kennedy School of Government. In addition to the School of Public Policy, other innovative interdisciplinary programs at GMU include the School of Computational Science, School of Information Technology Engineering, New Century College, Center for Conflict Management, university wide program in Entrepreneurship, and its more recently formed programs in Bio-Defense, Global Studies and Critical Infrastructure.

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Proposal Response (*Q*-Question & *A*-Answer):

Q - "VPMEP exists to serve clients. Please explain how our current and future clients would profit from our association with your university."

A – George Mason University and the Mason Enterprise Center have a strong culture of service and assistance to businesses within the Commonwealth of Virginia (as described above) resulting in significant economic development and growth benefits. This culture of service and assistance permeates throughout all facets of the Mason Enterprise Center – especially within those programs focusing on the establishment and delivery of high quality services to the business community served. VPMEP would benefit by being an important partner in the delivery of those services, partner in the hosting of timely and informative seminars, and the partner in the leadership for directing economic benefits to targeted industries based in the Commonwealth of Virginia.

Q – "Clarify existing manufacturing, industrial, engineering, business, and consulting expertise."

A – George Mason University is the lead center for the Virginia SBDC Network and manages the grant from the US Small Business Administration. The Virginia SBDC

Network, established in 1989, is the most extensive business assistance program in Virginia. There are 29 centers across Virginia organized into 5 regions. The local centers are hosted by 5 universities, 6 community colleges, 4 chambers of commerce and 2 independent economic development organizations. Service areas are defined for each office and range in size from one city or county in densely populated areas to several counties and cities in rural areas. There are 70 employees in the network with most offices having 2-3 people.

SBDCs provide management assistance to existing small businesses (many of which are manufacturing oriented and software development-based) and to aspiring entrepreneurs who want to start their own companies. 53% of SBDC clients are pre-venture and 46% are in business.

Counseling and training are the primary offerings of each SBDC. SBDC counselors meet one-on-one with business owners in a confidential setting and they provide quality service, practical advice and objective guidance. Areas of counseling include loan packaging assistance, business plan refinement, financial statement analysis, strategic plan development, market assessment, and general start-up issues. Typically, client counseling sessions range from 1-3 hours, with 25% of SBDC clients receiving more than 5 hours of one-on-one counseling assistance during the year. All counseling is provided at no charge to the client.

SBDCs also offer a variety of seminars for small business owners across a broad range of topics including business plan development, business start-up, marketing, accounting and record keeping, taxes, and financing alternatives. Training topics are selected to address a specific issue with practical tips and applications for immediate use by the business owner. Seminars are typically offered in the evening, occasionally on Saturdays and they are affordably priced. While most seminars or workshops are 2-3 hours, the SBDCs also deliver the NxLevel course, a 15-week business plan development program. Seminars are developed and delivered by SBDC professionals and subject matter experts. In addition to professional paid staff, the SBDCs also rely on volunteers from the private sector who counsel clients and develop and deliver training seminars.

Since 1989, the Virginia SBDC Network has counseled or trained 141,000 Virginia business owners and aspiring entrepreneurs helping them generate over $1 billion in new sales, $964 million in new capital investments, and more than 25,000 new jobs, resulting in an increase of over $53 million in state taxes and $72 million in federal taxes. These data are based on client surveys.

The SBDC network is an established program with a statewide infrastructure. The professional staffs delivers hands-on practical advice and objective guidance and refers clients to private and public resources as needed. Most of the centers are located at universities or community colleges and all are integral to the economic development activities in their regions. The SBDCs are a resource for both expanding and growing companies and new businesses or aspiring entrepreneurs.

Q – "Discuss opportunities to enhance technology transfers while minimizing intellectual property issues."

A – George Mason University has a policy of minimizing the lien that the University makes on patents and other IP of its faculty and students who start companies. This enables new start up company's unencumbered access to venture capital. To enhance technology transfer and dissemination of best business practices to disadvantaged areas of Virginia, George Mason's focus on teaching, research, and community/public service would be of great benefit to VPMEP. One example of an existing program that Mason helped establish is the Virginia Economic Bridge (see description below).

Background. Virginia Economic Bridge, Inc. is a 501 (c)(3) non-profit organization focused on creating an environment for economic development in today's technologically advanced society. There is a long-term relationship between George Mason University and southwest Virginia through the VEB. Since 1989, Mason has provided both funding and institutional support for the VEB. Among the many success stories that chronicle the success of the Virginia Economic Bridge are:

Linked Workforce
By joining the vibrant economy of Northern Virginia with the competitive workforce of Southwestern Virginia, Virginia Economic Bridge, Inc. creates unlimited opportunities for business advancement and transforms the Commonwealth into a formidable competitor in today's uncertain market. Through Linked Workforce, Virginia Economic Bridge, Inc. spans cultural gaps and links business opportunities across the state's regions by uniting the economic advantages of Northern Virginia with the rich, untapped resources in Southern Virginia: plentiful, inexpensive land, distinguished colleges and universities and efficient, accessible transportation systems. Linked Workforce brings geographically distant workers and employers together through a sub-contracting arrangement. Work is outsourced to established companies in Southwestern Virginia, allowing offsite technology experts and onsite professionals to work seamlessly without the burden and expense of travel.

Virginia's Business Pipeline
Virginia Economic Bridge, Inc. gives Virginia businesses a global advantage.
The Virginia's Business Pipeline is an online database composed only of businesses located in the Commonwealth of Virginia. It functions as a marketing tool for Virginia goods and services, as well as a supply management resource for organizations around the world. Through the use of innovative vehicles, the Pipeline cultivates relationships with each Virginia business, demonstrating their importance to the economic vitality of Virginia. The Pipeline delivers organized, current data to end-users without the need for costly or time intensive research, enabling businesses of the Commonwealth to establish sustainable competitive advantages over their out-of-state competitors.

Western Virginia and South Western Virginia Public Education Consortia
Virginia Economic Bridge, Inc. recognizes that the shaping of our workforce begins in grades K-12. The two Public Education Consortia work toward the ultimate goal of

raising academic achievement, promoting student personal development, and instilling the value of community in all students. Students participating will be adaptable, globally educated, skilled in their chosen careers, technologically competent and prepared to compete in the Information Age.

Community Audit

Through closer examination of a community, the Community Audit provides information to act as a strategic planning manual, marketing and training package, thus creating a toolbox for each community. As a strategic research tool, the audit provides outcomes including, but not limited to:

- A forecast of economic and workforce climate
- Determination of the economic growth sectors of area
- Recognition of business needs
- Recognition of training needs
- Identification of the gap between the needs of job seekers, business and area training providers

Q – "What synergies does an affiliation with your institution bring? "

A – George Mason University hosts the Virginia SBDC Network and manages the U.S. SBA grant of approximately $2 million. The SBDC Network is organized into 5 regions (see attached map) and GMU maintains subcontracts with each regional lead center. Local centers are based at 5 universities, 6 community colleges, 4 chambers of commerce and 2 independent not-for profit economic development organizations. In addition, local municipalities and economic development authorities also financially support the local SBDCs.

SBDCs are integral to the economic development initiatives in their service areas—they connect small businesses with higher education, government, economic development and the private sector. These leveraged relationships bring expertise to the business owners in a convenient, affordable and practical manner. Synergies between these supporting players deliver a united and coordinated approach to business assistance making the process easier for companies to navigate. VPMEP would benefit from the access to industries that the SBDCs currently has relationships with and those that evolve.

Affiliation will enable VPMEP to create a presence in Northern Virginia and build critical north-south linkages that are increasingly important for Virginia to maintain competitiveness in the national and global marketplace. In addition to the SBDC program relationships, George Mason University has established research, academic and collaborative relationships with many other Virginia institutions including Virginia Tech, ODU, James Madison, UVA, and VCU. VPMEP will be encouraged to continue established relationships with universities and to consider and pursue new relationships with GMU and others that GMU may facilitate.

Q – "VPMEP's success has been predicated upon client responsiveness. Please explain how you would contribute to our current speed of service."

A – The Mason Enterprise Center drives entrepreneurship and development, and client services. Having over a decade of highly successful service to small, medium, and large businesses throughout the Washington D.C. metropolitan region and across Virginia, the MEC has the experience and track record to help VPMEP continue its success to-date. Assisting over 5,000 businesses each year and offering training, seminars, and conferences to thousands more, the MEC will leverage all resources to benefit VPMEP – this includes client-marketing, client-tracking, project management, and organizational efficiency. Given that the MEC consists of 8 intertwined programs – all working in harmony to benefit business development and growth, an affiliation with VPMEP just opens that many more doors for collaborative opportunities.

Q – "Another important area involves relationships. Discuss your willingness to enhance existing VPMEP relationships with other universities, community colleges, the National Institute of Standards and Technology, and other stakeholders. Talk about your willingness to become VPMEP's fiscal agent and to provide political support for legislative and budget issues."

A – As one of the most connected universities in the Commonwealth, George Mason will ensure that its partnership with VPMEP is a component of all the shared opportunities with other institutions in Virginia. The relationship with Northern Virginia Community College, the second largest in the nation, is unique and could provide access that VPMEP would not otherwise enjoy. As with all other affiliated or associated organizations, we would expect that VPMEP would agree to have Mason act as its fiscal agent for both Commonwealth appropriated general funds and for those fees collected by the Partnership. The management structure for that arrangement would be finalized in the MOA/MOU negotiated by the parties. As a partner, VPMEP would have access to, support from, and endorsement by the powerful members of the Northern Virginia legislative coalition. They represent chairs of appropriations subcommittees, Chair of the Appropriations committee, House Finance Committee, and other relevant legislative leadership positions. George Mason University supports and promotes its partnerships and actively works toward their success with the General Assembly on specific, and general, legislative issues.

Q – "Please detail your ideas on the structure or framework of an affiliation with your institution, including governance issues and reporting relationships. Currently, the Gubernatorial-appointed VPMEP Board of Trustees is a governing board with fiduciary responsibility. Please explain the anticipated role of the Board."

A – George Mason University affiliation with VPMEP, as it is with all other Commonwealth activities, would be detailed in an affiliation agreement and/or MOU negotiated by both parties. That said, it is anticipated that the governance of VPMEP would remain unchanged in that the Board of Trustees would continue in its current role, including the approval of the negotiated agreement. The negotiated agreement would also allow input from the University on the evaluation of the performance of the Executive Director in so far as the success of the working relationship would be

significantly influenced by his/her performance. An indirect reporting relationship is anticipated to the Dean of the School of Public Policy (through the Mason Enterprise Center – the Director is also the Dean for Research and External Relations in the School) with which VPMEP activities are most appropriately paired.

Q – "Another key enabler is the utilization of the talent of our staff. Currently we are employees of Patrick Henry Community College with a VPMEP incentive plan and performance management system. Please clarify your approach to this and identify any additional opportunities for VPMEP staff at your university."

A – Already directly employed by the Commonwealth of Virginia, VPMEP staff will transfer to become employees of George Mason University with all existing state-provided benefits maintained. George Mason was an early adopter of incentive and performance-based human resource programs – with success in the recruitment and retention of highly qualified technology staff during one of the most difficult times to compete for this type of staffing – the "dot-com" era in Northern Virginia. Salaries, signing bonuses, and competition for the best and brightest employees made human resource management very difficult. George Mason designed, proposed, and implemented a pilot program for Higher Education within the Commonwealth of Virginia to enable incentive and performance-based hiring and retention. This program proved to be successful and would be a model program for VPMEP.

Q – "The genuine interest of your university in this affiliation with VPMEP will be critical. Please provide your thinking on this and cover the anticipated benefits to your institution, including economic development, outreach, and other areas."

A – This affiliation will certainly bolster George Mason's and the Mason Enterprise Center's outreach efforts and will facilitate broader and deeper networking built on the existing SBDC and PTAP infrastructure. Additionally, it would greatly enhance important research and advisory activities both within the Commonwealth of Virginia, Nationally, and Internationally.

Q – "Please mention any benefits to the marketing of the VPMEP brand. Discuss any effects on the visibility and stability of VPMEP. Enumerate any cost avoidance, financial gain, or other support."

A – George Mason University is the largest university in Virginia – based on in-service enrollment. Through the university's growing and increasingly involved student body and alumni, as well as corporate and legislative partnerships, it is expected that VPMEP's brand will be well represented throughout the Commonwealth of Virginia, regionally, nationally, and internationally. George Mason is one of the most active universities in Virginia in the area of economic development outreach and a direct and interactive relationship between VPMEP and the university's Mason Enterprise Center would be a powerful and effective partnership. Both VPMEP and the university would benefit greatly. Affiliation with George Mason and the Mason Enterprise Center would also

enhance visibility to the Virginia legislature as the university has a highly successful history of effectively interfacing with the legislature resulting in significant economic development outcomes. Combined efforts will only strengthen success for both entities.

Q – "In summary, please provide detail on any other strengths specific to your university that would assist VPMEP in its' mission to help Virginia industries compete."

A – George Mason University maintains some unique relationships in order to link institutional expertise and resources with community needs. In 1995, the Community Business Partnership (CBP) was established as a 501(c)(3) tax-exempt organization to create and foster opportunities for small businesses in Fairfax County. The CBP was created in response to an identified need for small business technical assistance and financing services, particularly to low-moderate income and disadvantaged individuals, including minorities, women and the disabled. Several key organizations within Fairfax County, including the Mason Enterprise Center at George Mason University, collaborated to form the CBP. George Mason University has always functioned, as a fiscal agent for CBP and a similar relationship would be established and maintained with VPMEP. CBP has an independent board of directors, but CBP staff is employed by GMU and receive the benefits and advantages of Commonwealth of Virginia employees. CBP handles most proposal submissions and contract management under their own organization, but if required or necessary they rely on the university for guidance and support. It is proposed that VPMEP be managed similarly by George Mason University's-Mason Enterprise Center.

VIRGINIA PHILPOTT MANUFACTURING EXTENSION PARTNERSHIP AFFILIATE PROPOSAL

INTRODUCTION

James Madison University is very much interested in establishing an affiliate relationship with the Virginia Philpott Manufacturing Extension Partnership. Such an alliance would be beneficial to both entities permitting each to expand and enhance its relationship with both the educational and business communities.

James Madison University is a comprehensive, co-educational institution of higher learning in the Shenandoah Valley of Virginia. Founded in 1908 as a state school for women, JMU has grown to a current student body of 15,809 on a campus of 613.72 acres. The university is comprised of the College of Arts and Letters, Business, Education, Integrated Science and Technology, Science and Mathematics, and Graduate and Professional Programs. JMU offers 66 undergraduate degree programs, as well as 29 master's, 2 educational specialist, and four doctoral majors.

JMU is dedicated to the belief that an enduring and meaningful educational experience must be future-oriented, grounded in knowledge of one's cultural heritage learned from study in the liberal arts and sciences. The university has been recognized in numerous national publications, including *U.S. News and World Report, Kiplinger's Personal Finance, Money, Changing Times, The Guide to 101 Best Values in America's Colleges and Universities, The Black Students' Guide to College, U.S.A. Today, The New York Times and Barron's, Peterson's* and *Yale Daily News* college guides as one of the nation's best choices among undergraduate public universities.

Most notable about the JMU experience is the incredibly high level of student involvement in the classroom, the lab and activities around and off campus. The amount of student research in the sciences here has been cited as peerless. Our Service Learning Program is nationally known for giving students the opportunity to apply classroom learning to real world situations. Internships are an integral part of our curriculum. All of this adds up to an education that offers students an opportunity to apply what they learn and to see what works. Recently sponsored programs has increased to $21 million providing funds for a vivid array or research and public service programs that would be

nicely complemented by the Philpott presence. This faculty and student involvement in the local and state economy is a primary asset in the university's proposal to seek an affiliation with the Virginia Philpott Manufacturing Extension Partnership.

The university's Colleges of Business, Education, and Integrated Science and Technology offer programs and affiliations directly related to the mission of VPMEP. Unlike most universities of this size where colleges function as independent units and collaboration is laborious and does not occur quickly, the climate at James Madison University is one where integrated programs and project activity such as the integration of business and technology can develop quickly, complement each other and offer a unique partnership among students, faculty, business, and government. VPMEP would be a welcome partner to this dynamic, responsive environment. This extensive partnership would not only provide student and faculty resources and the affiliations of the university community to VPMEP, but also offers an opportunity for the university to enhance its existing curriculum with VPMEP offerings and expertise furthering the real world experience of our students. VPMEP staff could teach courses such as the VPMEP "LEAN 101" course and similar workforce-related offerings.

Many courses at JMU are interdisciplinary in structure or at a minimum address the interdisciplinary nature of the world of practice. While this interaction is prevalent throughout the university; the programs, faculty, and outreach activities of the College of Integrated Science and Technology (CISAT) are the most directly related to the mission of VPMEP. CISAT encompasses professional programs whose common denominator is the use of science and technology to enhance the quality of life. CISAT was founded on the recognition of the need for individuals who understand the importance of disciplinary specialization, as well as cross-disciplinary connections, and also the integration of knowledge for practical application. These individuals must have the flexibility to be able to operate in an environment of uncertainty and complexity, the drive to seize such opportunities as may arise, and the vision and creativity to create new opportunities as needed. CISAT faculty members are dedicated to producing graduates with a scientific knowledge base and a matching set of interpersonal, organizational and technical skills. The faculty not only educate students, but also serve as a source of inspiration and as role models.[i] Goals of CISAT include:

- promoting and supporting a collaborative, interdisciplinary perspective.
- emphasizing innovation.
- promoting the wise use of appropriate technology and the application of scientific principles to everyday life.
- encouraging partnerships with industry, government, public and private agencies, and professional organizations.

The College of Integrated Science and Technology places a high value on partnerships with the community, believes it has a responsibility to participate in efforts to enhance the well-being of our community, and appreciates the impact of experiential activities on student learning.

Related outreach programs of the college offer transferable skills to industry.

- The **Center for Environment, Health & Safety (CEH&S)** was created to acknowledge and facilitate the many industrial, environmental and occupational safety and health management endeavors with which JMU faculty, staff, and students have been involved. CEH&S is not an administrative unit; rather, it serves as a conduit to the faculty involved and/or interested in EH&S functions and projects. It is hoped that this presence will allow us to better serve the industrial community while providing practical experience for students and faculty.
- The **Center for High Performance Manufacturing** helps manufacturing firms become high-performance manufacturers via research and development of enabling tools and technologies and the successful transfer and implementation of these items. The center provides assistance to manufacturing firms striving to maintain competitiveness in the continually evolving global manufacturing and distribution environment. The CHPM labs at JMU focus on rapid prototyping and tooling, materials development, and injection molding.
- The **Center for Materials Science** offers a minor and concentration in materials science that enhances students' preparation for employment and advanced study in the rapidly growing materials industry. In these programs, students develop broad interdisciplinary skills and in-depth knowledge in materials science that integrates undergraduate education with basic and applied research.
- **Virginia's Manufacturing Innovation Center** helps enhance the competitiveness of Virginia's smaller manufacturers through a high-quality, well-trained workforce, accessible technology and modern business practices. Center participants include many faculty and students from Integrated Science and Technology, Computer Science, and Computer Information Systems/Operations Management in the College of Business. The center partners with many Virginia economic development agencies, companies, and community colleges. Current projects target e-business and information systems tools in manufacturing, biomanufacturing, microelectronics, fabrication and production management.

Integrated Science and Technology (ISAT), a department within the College of Integrated Science and Technology, educates students for positions that are often filled by graduates of the traditional sciences, engineering, and business programs. The ISAT graduate, however, is professionally prepared in a broader sense. ISAT students are educated to be technological problem solvers, communicators, and life-long learners. They are unique in having breadth of knowledge and skills across a variety of scientific and technological disciplines; formal training in collaborative and leadership methods, problem-solving techniques from many disciplines, and use of the computer as a problem-solving tool; and the ability to integrate scientific and technological factors with political, social, economic, and ethical considerations in problem solving. Breadth is provided through study in Strategic Sectors that reflect national critical technologies and include Biotechnology, Energy, Engineering and Manufacturing, Environment, Information and Knowledge Management, Health Systems, and Telecommunications. Depth is provided through studies in an area of concentration and through a capstone thesis project.

In the laboratory, the classroom, and in preparation of a senior thesis project, students extensively engage in teamwork. Laboratory experiences guided by faculty who are greatly committed to applied science permeate the curriculum. The faculty thus combines scientific theory with hands-on experience in such exciting areas as electron microscopy, computer-integrated manufacturing, multimedia production, lasers and optics, and environmental field studies. The ISAT faculty believes *experiential education* - practicums and internships related to course work – informs dramatically and should be a part of the total education picture.

Consulting. JMU faculty comprises a myriad of consulting expertise in manufacturing, technology, business and education and is actively involved with business and industry in their particular field. Faculty expertise includes but is not limited to:

- Dr. Ronald Kander, Department Head – Integrated Science and Technology
  Education: Ph.D., Chemical Engineering, University of Delaware
  Business/Industry/Government Experience: Engineering faculty member in the Materials Science & Engineering Department at Virginia Tech for 11 years, Engineer in the Advanced Composites Division of the Fibers Department and Polymer Physics Group in the Central Research Department at E. I. DuPont for 5½ years.

Specializations/Research Interests: Rapid prototyping and rapid tooling technologies, Polymer processing & manufacturability, Polymeric materials characterization.

- Dr. O. Geoffrey Egekwu, Professor – Integrated Science and Technology
  Education: Ph.D., Industrial Engineering, University of Nebraska
  Specializations: Manufacturing Systems Design & Analysis, Systems Simulation, and Industrial Management
  Business/Industry/Government Experience: Eleven years as Manufacturing/Project Engineer, General Motors, Brunswick Corporation; Director of Manufacturing, ACP; and Senior Research Engineer, Alcoa

- Mr. James Ridings, Instructor – Integrated Science and Technology
  Education: Executive Development Program-University of Tennessee, M.S.M.E., University of Pittsburgh, B.S.M.E., University of Tennessee
  Specializations: Mechanical and Electrical Design Engineering, Manufacturing, Management, Concurrent Engineering, Automation,
  Business/Industry/Government Experience: Thirty-one years in Engineering/Manufacturing/General Management with Westinghouse Electric Corporation in Commercial Air Conditioning and DOD/Commercial Aircraft Power Systems. Retired Corporate Director of Operations for Westinghouse. Holds basic patents on aircraft power relay and utility circuit breaker.

- Dr. John B. Noftsinger, Associate Vice President of Academic Affairs, Executive Director - Institute for Infrastructure and Information Assurance
  Education: Ed. D., University of Virginia
  Business/Industry/Government Experience: Extensive experience in managing partnerships among government, business, and education; served as Deputy Secretary of Education for Virginia. Currently serves as co-chair of the Virginia Research and Technology Advisory Commission.

- Dr. Mohamed Zarrugh, Professor - Integrated Science and Technology, Director – Virginia's Manufacturing Innovation Center
  Education: Ph.D., Mechanical Engineering, University of California, Berkeley
  Specializations: Manufacturing Systems Automation and Integration, Product Development and Product Engineering, Robotics systems integration and applications, Dynamic Systems and Control,
  Business/Industry/Government Experience: Nine years of R&D Management and Automated Design and Manufacturing Integration with Schlumberger

- Henry A. Reeves, Director – Shenandoah Valley Small Business Development Center
- **Education**: BS, MBA University of California at Berkeley
- **Business/Industry/Government Experience**: Director of the Shenandoah Valley Small Business Development Center and Executive Director of the Central Region; founded and operated an accounting software company

Affiliations. JMU has developed and values its strong synergy among businesses, government and individuals. These affiliations are a core component of the university curriculum and enable students and faculty to be an integral part of a realistic learning experience while sharing their expertise with local, state, and national entities. It is the philosophy of the university that partnerships are a viable aspect of the academic experience and partners are encouraged to become an integral component sharing their experience and expertise with students. The Institute for Infrastructure and Information Assurance (IIIA) at James Madison University (JMU) integrates and supports the university's efforts in the increasingly vital area of homeland security. Within IIIA, is the Critical Infrastructure Protection Program which is a collaboration between JMU and George Mason University and is funded by a grant from the National Institute of Standards and Technology (NIST) which the university values as a strong partner.

Through the work of the Institute for Infrastructure and Information Assurance, JMU is developing a testbed for Supervisory Control and Data Acquisition (SCADA) systems and Radio Frequency Identification (RFID) technology for application in manufacturing and supply chain processes. Under the direction of Dr. O. Geoffrey Egekwu and Mr. James Ridings, this project is using passive RFID tags to track parts on an automated assembly line which manufactures gear boxes and is controlled by a SCADA system. The goal of this project is to improve the security of SCADA systems by using biometric and cyber authentication techniques and transmit information collected by RFID tags through secure channels. The Manufacturing Lab, located in the ISAT/CS building, provides a learning environment for JMU students to use these technologies and engage in applied research focused on building secure manufacturing systems. The workshops and training programs of VPMEP can use this facility and offer new educational programs based on the RFID and SCADA research being conducted by the Institute for Infrastructure and Information Assurance.

Partnerships with George Mason University, Virginia Tech, and several community colleges as well as our relationships with agencies such as NIST, NIH, and DOD are enhanced by support from our state and federal legislators who share our objectives in creating a strong workforce and continuing to strengthen the industrial economy of the United States.

ISAT students obtained career-related employment and internships during recent summers with many nationally prominent organizations such as Dominion Semiconductor, DuPont, Electronic Data Systems, Ford Motor Company, Lockheed Martin, Merck & Co., Inc., NASA, R.R. Donnelley & Sons, Tenneco Automotive, and Wella Manufacturing (ISO 9000 project). The university considers these affiliations to be a vital component of our program and maintains close relationships with all of our affiliate partners.

JMU's College of Business (COB) offers ten undergraduate majors and two graduate programs to an enrollment of approximately 3,500 students, about 22 percent of JMU's student body. The curriculum integrates various aspects of business courses, such as accounting, marketing, and computer information systems, to prepare students for the workplace environment. A junior year 12-credit, integrated course allows the student to practice the theory of the innovation process by developing an idea or invention into a business and marketing plan. This synthesis prepares students to understand the interrelationships among business systems. Taking this approach one step further, COB offers an ISAT undergraduate the option of staying a fifth year to obtain an MBA in a cross-discipline curriculum called the "4+1". Classes and projects are directed by highly qualified College of Business faculty such as Drs. Paul Copley, Richard Mathieu; and Paul Bierly; all of whom bring not only academic stature but also extensive non-curricular expertise.

JMU hosts a number of regional organizations such as the Shenandoah Valley Partnership, the economic development/marketing organization for the Valley region (Planning District 6); the Shenandoah Valley Technology Council, the regional voice of technology for the greater Shenandoah Valley; the Workforce Improvement Network, a program of the College of Education in partnership with the Commonwealth of Virginia; the Small Business Development Center of the College of Business, the regional assistance group for small business in the Valley, providing services to both existing and startup businesses; and the Center for Entrepreneurship. The Center for Entrepreneurship (CFE) within the COB is the focus and originating point of a broad variety of business-related activities with special emphasis on venture creation and entrepreneurship. Since 1995, JMU's Technology Innovation and Entrepreneurship concentration has been

ranked as one of the "Top 10 Up-and-Coming Entrepreneurship Programs" by *Success Magazine*. In 2004 *Entrepreneur Magazine* ranked the JMU Entrepreneurship Program within the top 10 programs in the country with an entrepreneurial emphasis.[ii]

JMU has recently established an Office of Technology Transfer. Through developing this office, the university has researched the current state of university technology transfer, and chooses to create an infrastructure that enables innovation and builds on networks and collaborations already in place. JMU is an applied research institution, which provides professors opportunities to focus on building collaborative relationships with small and medium-sized businesses as well as large government agencies to solve real-world problems. JMU, through its hiring practices, seeks ISAT and COB faculty with Ph.D.'s **and** extensive industry experience to actively engage students in collaborative, interdisciplinary educational and research efforts and provide students with a real world understanding of the problems and organizational structures of corporations. As a means of enhancing the university's technology transfer, JMU is partnering closely with the Harrisonburg Innovation Center (HIC), which is the first technology building in the city of Harrisonburg's newly created Harrisonburg Downtown Technology Zone (HDTZ), and is part of the downtown revitalization initiative. This innovative partnership recognizes its strengths, differences, and opportunities for technology commercialization.

The university is actively involved in the economic development of the greater Shenandoah Valley region and maintains a close affiliation to business, government, and education. Our partners would welcome VPMEP's involvement, enhancing both programs.

Organizational Structure. Should our proposal be accepted, the VPMEP would be structured at the university much as other outreach programs. Public Service Outreach Programs are under the purview of the Associate Vice President for Academic Affairs and function as independent entities. The integration into the campus is facilitated by the appropriate component of Research and Public Service.

Other benefits to VPMEP. JMU is perceived to be a dynamic, fast-paced university that is large enough to do the job, yet small enough to be flexible, efficient, and service-oriented. Procedures are developed to insure a fast turn-around and varied enough to

permit ease of operation with a minimum of "red tape." JMU can respond rapidly to special requirements of affiliate organizations. JMU will provide support to VPMEP while remaining compliant with the University and Commonwealth of Virginia regulations, policies and procedures.

Because of its proximity to major metropolitan centers, JMU is strategically located from Washington, D.C., Richmond, and Roanoke. Its central location in the state offers a savings in both travel costs and time and is convenient to much of the customer base.

James Madison University is pleased to submit this proposal for affiliation with the Virginia Philpott Manufacturing Extension Partnership and will be pleased to have any questions addressed to:

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Associate Vice President for Research and Public Service
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Harrisonburg, VA 22807
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Email: noftsijb@jmu.edu

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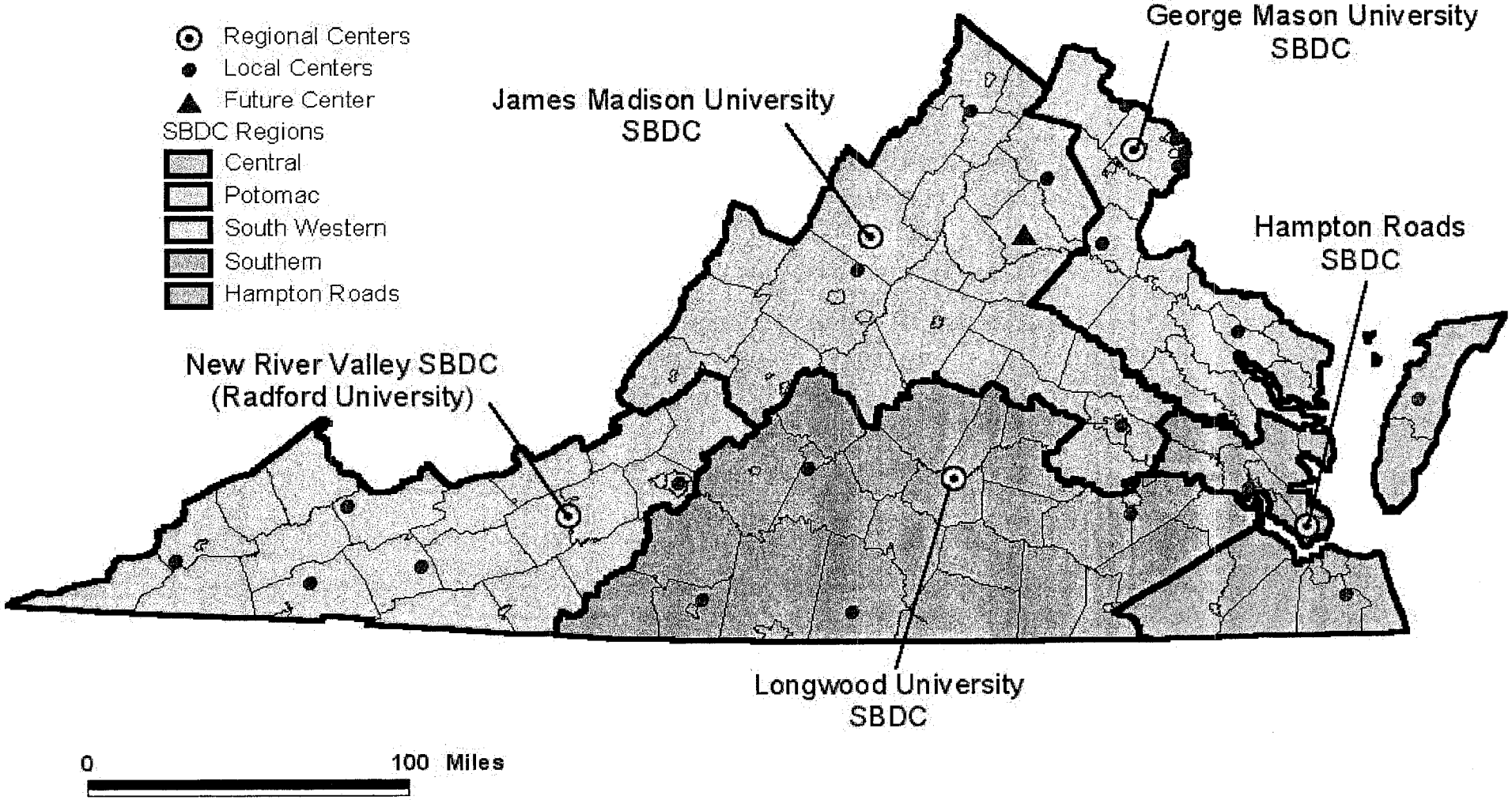
[i] JMU CISAT Website http://www.jmu.edu/cisat/about.html
[ii] JMU College of Business. Retrieved May 6, 2005 from http://www.jmu.edu/cfe/about.shtml.

VIRGINIA SBDC NETWORK
by REGIONAL CENTERS



VPMEP AFFILIATION WITH OLD DOMINION UNIVERSITY

A PROPOSAL

Submitted To

Virginia's A.L. Philpott Manufacturing Extension Partnership
Attn: Mr. Jeff Kohler, Executive Director
645 Patriot Avenue
P. O. Box 5311
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Submitted By

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June 30, 2005

VPMEP AFFILIATION WITH OLD DOMINION UNIVERSITY

Background

The mission statement of Old Dominion University (ODU) reads "...Hampton Roads has been the state's gateway to the rest of the world and the world's gateway to Virginia in commerce and industry... [t]hus, the University has a special mission for the Commonwealth in commerce." True to its mission, ODU has been the leader in the state for well over 20 years in its commitment to Virginia's manufacturing sector. In 1986, the Engineering Clinic was founded within the Frank Batten College of Engineering and Technology specifically to assist "ailing manufacturers" in their attempts to compete and prosper. The clinic later became the Technology Applications Center (TAC) where over 500 industry projects have been completed. As a result of the current relationship with Virginia Philpott Manufacturing Extension Partnership (VPMEP), the manufacturing consulting efforts have merged with the industry training efforts to form what we now call the Virginia Applied Technology and Professional Development Center (VATPDC). To date, the current collaboration has provided outstanding results across Hampton Roads. This highly successful partnership, coupled with the two entities' exemplary reputations for responding to industry needs, would be further augmented by this proposal that seeks to establish a formal affiliation between VPMEP and ODU, thus bringing together resources and expertise of ODU's academia and research centers.

ODU is one of the largest providers of distance learning degree programs (Bachelors, Masters and Ph.D.) in the country. Through its TELETECHNET Distance Learning program, ODU serves over 4,000 students at 50 sites in Virginia, DC, Arizona, Illinois, Washington and Georgia. Thanks to a unique partnership with the Virginia Community College System, no Virginian is more than 50 miles from ODU via distance learning. The recently added motor sports engineering program, for example, is closely related to the raceway, and students will be dividing their time between the Norfolk campus and the speedway in Southside Virginia.

Services and Initiatives for Manufacturing and Industrial Clients

The training to Northrop Grumman Newport News Shipbuilding that is co-delivered by VPMEP and VATPDC resulted in over $10M in cost savings last year and $12.5M reported this year. The co-delivered services to NGNN's Supply Chain Initiative have also resulted in tremendous cost savings for local vendors. This program was the impetus for a new Enterprise Lean Certification that is being endorsed and partially funded by Norfolk's Economic Development Authority. Thus far, four companies based in Hampton Roads have requested this program to be implemented.

The future is even brighter. The University's commitment to manufacturing is concrete. The formation of the University Research Park has begun. The first building (Building 1) of this project will be dedicated to research in advanced manufacturing. Building 1, which will be completed in September 2006, will house both VATPDC and at least two other academic institutes aimed at assisting manufacturers. One will be the Lean Institute and the other will be the Ship Repair Maintenance and Operations Institute. These academic institutes provide an entry to special developmental funding in these specialized areas for our ongoing, collaborative efforts (see the College's organizational chart).

Building 1 will also be the home to several Virginia companies. It is known that such a collocation fosters productive collaborations. Resulting relationships will allow for much more interaction than the traditional "incubator" arrangement. This "technopark" approach to academia/business affiliations has enormous potential for ODU/VPMEP resources to be utilized even more effectively.

The VATPDC also has a Norfolk Disadvantaged Business Program that serves to assist women or minority-owned manufacturers. This program has already provided Manufacturing Extension Partnership (MEP) services to several companies in the test area of Norfolk, and plans are in place for a program that serves all of Hampton Roads. There has been an interest expressed by Norfolk's Economic Development Authority in supporting this type of program. Small disadvantaged businesses are in desperate need of MEP type services.

An additional area in which we have worked closely with VPMEP is special course development. Working with VPMEP, VATPDC developed a high variability and low volume approach to delivering lean training to shipyard workers. This course, known as *Job Shop Lean*, has been very successful. Co-developed products, such as this course, help project VPMEP into the national forefront of the MEP.

The Frank Batten College of Engineering is in the process of developing a manufacturing curriculum that is applied in nature. There have been special courses already developed in the area of plastics manufacturing as well as a preparatory training course for the Plastics Operations examination. This course was delivered for Stihl Chain Saw Inc. plastics employees who were scheduled to take the exam. As a direct outcome of the course, the pass rate was 95%.

Focus on Manufacturing

As a direct result of a focus on manufacturing at ODU, specifically at the Batten College of Engineering and Technology, one of the College's Research Clusters is on *Design and Manufacturing*. A research cluster brings together and mobilizes all of the expertise, infrastructure and resources available in a particular topic area.

The Engineering Management and Systems Engineering Department has expertise in manufacturing process improvement and system of systems approach to supply chain management. The Engineering Technology (ET) Department administers the only full-service engineering technology programs in the Commonwealth. Several ET faculty specialize in manufacturing and related fields of study beneficial to the manufacturing community. The Mechanical Engineering Department is home to the only master's degree Program in the Commonwealth that concentrates on Design and Manufacturing.

The College has dedicated two endowed professorships to the area of Manufacturing: the Mitsubishi Kasei Professor is Dr. Han Bao of Mechanical Engineering and the Ray Ferrari Professor is Dr. Alok Verma of Engineering Technology. The spendable income of these endowments is devoted to the research activities in design and manufacturing.

Manufacturing Laboratories

The university has several labs specifically geared towards manufacturing studies and support. There is a rapid manufacturing capability and several numerically controlled machine tools are utilized. There are also numerous testing labs that have already been used to test new products. Millennium Building Materials, for example, has used these test labs to validate their product claims, and as a result, they have begun manufacturing their products in Virginia.

Special ODU Resources

Old Dominion University also offers several unique services to manufacturing. The **Virginia Modeling Analysis and Simulation Center** (VMASC) is a premier modeling center in the world.

VMASC has the capability to develop and apply prototype enterprise business models that capture (at the macro-level) the salient features of a business enterprise and which can be used by decision makers to better understand their problems and contexts. Computer simulations based upon enterprise models are useful for planning, management and training. VMASC provides the capability to model typical manufacturing challenges, such as, warehousing problems, new production techniques, or assembly processes. Almost any "what if" scenario can be modeled before a large investment is made.

The **Applied Research Center** (ARC) provides unique materials research. There is a tremendous opportunity for the expanded use of lasers in manufacturing. ARC also provides materials research and advances in nanotechnology. The objective is to promote innovative, high-tech solutions for private industries and stimulate the economy in the local Hampton Roads area and Commonwealth of Virginia.

ODU's mission at ARC is directed towards linking high-tech industries with leading-edge research, development, technology transfer and educational outreach programs. Our unique expertise in laser, optoelectronics, microelectronics, materials science and engineering is available to industries for the best strategic solutions to challenging technology problems.

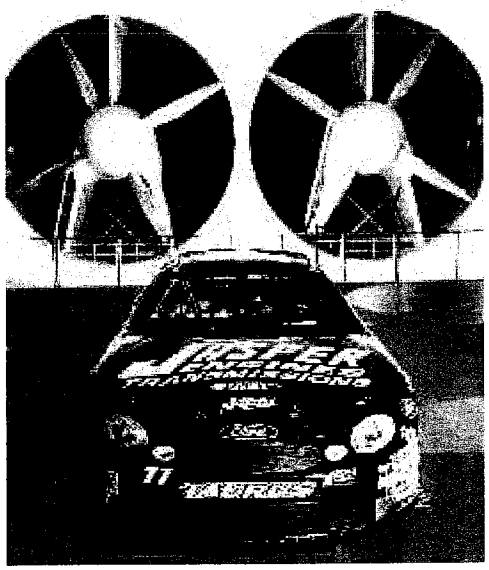
ODU's faculty and researchers from sciences and engineering share this $18 million, seven-story, 122,000 square foot ARC complex with high-tech business start-ups, a venture capital firm, Jefferson Lab, the College of William & Mary, Christopher Newport University and Norfolk State University. Today's high-tech solutions need an interdisciplinary approach, and the faculty at ODU ARC has that diverse expertise in electrical and mechanical engineering, manufacturing technology, physics, chemistry and material science. This ODU center attracts visiting faculty and research scholars from leading institutions around the world.

ARC's ability in the area of laser machining holds great potential in the manufacturing industry. American Hoffman in Lynchburg, for example, has recently considered lasers to remove material in its balancing machinery line.

Old Dominion University also has a very capable scientific model shop. This facility has made it possible to expand the traditional MEP services to include automation. The use of this facility has already made it possible to work with companies located in rural areas such as Brunswick Box Co.

The **Langley Full Scale Wind Tunnel** is a resource not normally associated with manufacturing, but this facility was used to test new flat roofing techniques for Acrylife Inc. in Wytheville.

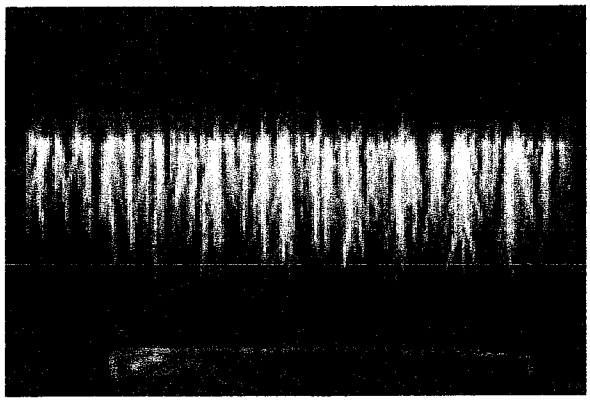
The traditional use of this facility is to test vehicles from aircraft to trucks. A full-scale automotive force balance, known locally as a "trapeze" balance, became operational early in 1998. The trapeze balance provides accurate measurements of total vehicle drag, plus down-force at each wheel. The vehicle is supported on four small tire contact plates, separated from the surrounding non-metric ground board. The ground board configuration provides a boundary layer bleed roughly 15 feet ahead of the vehicle. An active boundary layer control system is also available when required, installed just ahead of the test vehicle. For larger vehicles, the tire contact plates are connected to the external 6-component balance, as described more fully below. By this means, vehicles up to 20,000-pound deadweight can be tested, such as Class-8 tractors.



This facility also has tested other products for the manufacturing community. Rubbermaid,® for example, tested storage units' response to hurricane speed winds in this tunnel.

The **Center for Bioelectrics** offers a tremendous resource for potential manufacturing. The use of pulsed power is currently being used primarily in biomedical areas, but has great potential in the area of electrical switch design. In this age of potential biological threats, the resources at this center could support the development of bio-cleanup equipment and the manufacturing of such equipment.

Bioelectrics refers to the use of pulsed power, or the application of powerful electrical pulses, for extremely short periods of time, to manipulate biological cells, tissues and/or organisms. Researchers at the Center for Bioelectrics are testing the use of these high-intensity electrical surges to remove diseased or unwanted cells or groups of cells such as tumors. Use of this technology in medicine and biology is the first of its kind in the world. The biomedical applications, based on ultra-fast, pulse-cell interactions, have extraordinary potential to treat persons with cancer, cardiovascular disease and other conditions. A promising branch of bioelectrics within environmental sciences involves the use of electric pulses that may be used to generate non-thermal ionized gases (cold plasmas) as a means for bacterial, viral and chemical decontamination. This technology provides a new, environmentally benign, non-chemical means to decontaminate gases, liquids and solids such as food.



Pulsed electric fields are used to decontaminate liquids, particularly liquid food. Other applications include bacterial decontamination of water using combinations of pulsed power and cold plasma technology, and using pulsed electric fields for bio-fouling prevention. Cold plasmas have also proven to be efficient in bacterial decontamination of gases. High-pressure plasmas, which can be generated in atmospheric pressure air, are effective in both bacterial and chemical decontamination. Various carcinogens, used in industrial processes, have been eliminated when contaminated gases were exhausted through such cold plasmas.

Leveraged Funding

ODU offers a valuable asset through its partnership with VPMEP - a strong history of leveraged funding. The former Technology Application Center had a proven track record of being able to attract matching funds from several funding entities across the state. The result has been that small manufacturers have been able to embark on improvement

projects (that they would not have been able to otherwise initiate without TAC's support) when they could only afford a small portion of the project cost. Several local legislators have encouraged VATPDC's initiative by promising a renewed incentive fund pool in the next legislative session. Since these programs and cost relief already exist within VPMEP, its partnership with ODU will prove very lucrative and progressive for manufacturers across Virginia.

Reporting Relationship/VPMEP Board of Trustees

It is proposed that the Virginia Philpott Manufacturing Extension Partnership continue to remain an autonomous entity within the Commonwealth of Virginia. The VPMEP Board of Trustees would continue to serve in its current capacity. The Board make-up is a healthy composite of manufacturing management, balanced with academic leadership from across the state. It would be assumed, however, that the Old Dominion University leadership would have a seat on the Board similar to the other academic leaders.

The board would continue to serve as the reporting line for the VPMEP Executive Director. A dotted-line level of reporting to the Old Dominion University Vice-President for Research is proposed. ODU's VP for Research oversees the administration of the Old Dominion University Research Foundation (ODURF) and coordinates ODU's federal and state governmental relationship efforts as far as research and economic development efforts are concerned. This reporting relationship would serve to strengthen the VPMEP Executive Director's position in budget matters and would secure additional state and federal support in support of VPMEP's core mission. ODU is prepared to represent VPMEP's financial requests as part of the university's annual requests to the Commonwealth.

A similar arrangement is in place for the management of Mid-Atlantic Regional Spaceport (MARS) at Wallops Island on the Eastern Shore. This model has served MARS and the Commonwealth's Virginia Commercial Space Flight Authority very well.

There is a significant opportunity for the qualified VPMEP project managers to seek *Adjunct Faculty* appointment in the Department of Engineering Technology. Such academic relationship with ODU can foster considerable research collaborations that aim to enhance greater services to Virginia manufacturers. These VPMEP staff will have the privileges that are typically extended to ODU adjunct faculty and ODURF self-supporting research personnel.

VPMEP Staff

The university recognizes the critical role the existing staff of VPMEP plays in its successful delivery of services. These individuals are indispensable and their future is to be taken very seriously. The employment status of the VPMEP staff would remain the

same with the exception being that the hosting agency would change to ODU. The employees would remain covered restricted status (formerly series 90000).

Since most VPMEP staff members have undergraduate/graduate degrees, their opportunities for educational advancement at Patrick Henry Community College have been minimal. A relationship with Old Dominion University would offer the VPMEP staff and their dependants the opportunity to attend classes either live or via distance learning.

In the areas of manufacturing, logistics, and related supply chain issues, in particular, Batten College of Engineering and Technology units work in close collaboration with the College of Business and Public Administration. It is envisioned, therefore, that VPMEP staff members and projects will be benefiting from faculty expertise and curriculum resources of both Batten College of Engineering and Technology and College of Business and Public Administration.

Fiscal Agency

The Old Dominion University Research Foundation (ODURF) serves as the fiscal agent for ODU for all externally research and sponsored programs. ODURF, on behalf of ODU, will serve as the fiscal entity for coordinating all VPMEP transactions. The foundation would provide all necessary fiscal and administrative services including, but not limited to, human resource and procurement services. The fee for providing these services would be based on actual cost of ODURF staff time required to provide fiscal and administrative services to VPMEP and estimated non-personnel cost. ODURF is well known for providing similar fiscal and administrative services for Virginia Space Grant Consortium, Virginia Commercial Space Flight Authority, National University Teleconference Network, and among other ODU-affiliated organizations.

In addition to general fiscal and procurement services, the university would serve as a partner for support at the state and federal levels where budget and/or political outreach would be needed. The Vice-President for Research would be the point of contact for both state-related and federal-related efforts and issues.

Client Service

Another benefit for VPMEP using ODURF as its fiscal manager is the Foundation's ability to act promptly. The foundation is subject to procurement rules that allow for purchases to be made in a very short time. The foundation also presents the ability to utilize third party providers without the restrictions placed on most state universities.

The Foundation's services, along with VPMEP's continued autonomy, will allow timely, and efficient responses to clients' global needs.

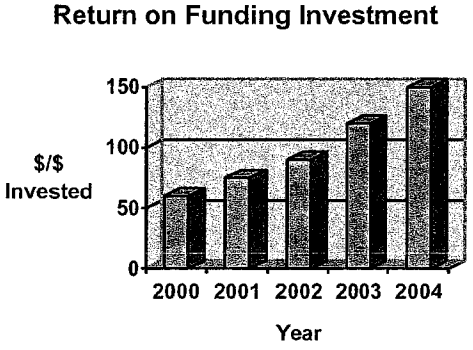
Marketing/Outreach/Additional Relationships

The university will vigorously promote its relationship with VPMEP. It has long been part of ODU's mission to enhance its relationship with the industrial community. Economic impact and job creation are important measures of an institution's value to the community. The VPMEP/VATPDC partnership has consistently generated measurable impacts on industry sales, retained jobs and reduced operating costs. The services offered by VPMEP will be showcased and endorsed in a fashion befitting the highest level of university services.

The expansion of relationships with other institutions is also encouraged at ODU. The university has very close partnerships with Eastern Virginia Medical School, College of William and Mary, Norfolk State University, NASA Langley and Jefferson Lab to name a few. The University is a regularly funded institution by the Department of Defense, National Science Foundation and is designated as a Carnegie Doctoral/Research Extensive University.

Economic Development

ODU has a long, established history of making commitments to the Commonwealth's economic welfare. For years, the Technology Applications Center and Entrepreneurial Center worked with Virginia manufacturers and other businesses to help increase competitiveness and save costs through the elimination of waste and the introduction of new technology. During 2000–2004 Virginia's Center for Innovative Technology measured the return on its investment at ODU. The return grew from $60 per dollar invested in FY 2000 to $150 per dollar invested in FY 2004. Additional impact has been associated with other University and College efforts. The modeling, simulation and visualization activity in Hampton Roads, led by VMASC, was recently cited as contributing $413M in total regional economic output and $248M net to the gross regional product.



This commitment to Virginia business continues. A more formal partnership between VPMEP and ODU would strengthen the abilities of both entities and better serve Virginia's manufacturing industry.

Intellectual Property/Technology Transfer

ODU and ODURF have dedicated resources to ensure that it is an industry–friendly institution for transfer of technology. No other institution in the Commonwealth has a

track record of working with manufacturers in a manner that allows for new ideas and techniques to be marketed and used in a way that leaves industry unencumbered. These policies allow for innovation, and they clear a path for new products and services while keeping the Virginia taxpayer's interests protected.

Summary

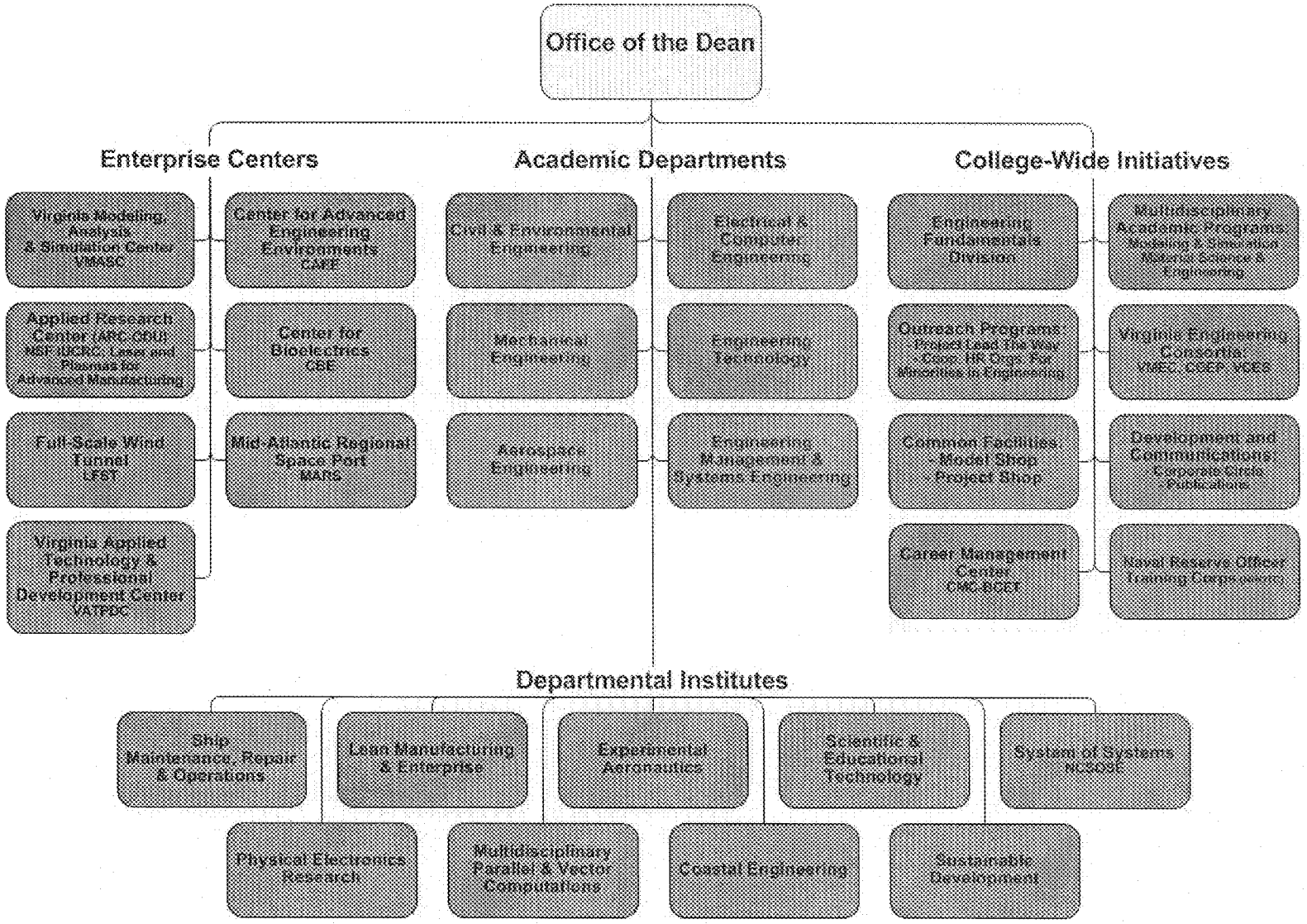
VPMEP shares a vision with ODU. ODU has a special mission to provide assistance to Virginia businesses so that new jobs are created, industry's level of competitiveness is raised, new investments are made, and ultimately revenue increases. In the current climate, these goals are ambitious but they are more important than ever.

It is also the University's mission to help make Virginia's workforce the best trained and capable workforce anywhere. Without this workforce, companies would neither move in nor stay in Virginia. Across the nation, jobs are being lost to overseas operations. A disproportionate number of these jobs are from the manufacturing sector.

These challenges are shared by VPMEP and ODU. The two organizations' joint efforts significantly benefit manufacturers, and our co-delivered training activities have tremendous impacts upon our manufacturing and industrial clients.

ODU offers VPMEP an academic anchor in the state university system, as well as a non-profit fiscal agent that can respond to any need very quickly. ODU offers VPMEP an atmosphere where manufacturing needs are the focus of future commitments. The proposed link with the Office of Research will also allow VPMEP to seek additional state and federal support for sustaining and building on its mission.

It is the vision that VPMEP and ODU will function in partnership even stronger than as individual units.


Office of the Dean
Enterprise Centers
Academic Departments
College-Wide Initiatives
Virginia Modeling, Analysis & Simulation Center VMASC
Center for Advanced Engineering Environments CAEE
Applied Research Center (ARC, CFUI, NSF I/UCRC, Laser and Plasmas for Advanced Manufacturing
Center for Bioelectrics CBE
Full-Scale Wind Tunnel LFST
Mid-Atlantic Regional Space Port MARS
Virginia Applied Technology & Professional Development Center VATPDC
Civil & Environmental Engineering
Electrical & Computer Engineering
Mechanical Engineering
Engineering Technology
Aerospace Engineering
Engineering Management & Systems Engineering
Engineering Fundamentals Division
Multidisciplinary Academic Programs: Modeling & Simulation Material Science & Engineering
Outreach Programs: - Project Lead The Way - Camp HR Dogs For Minorities in Engineering
Virginia Engineering Consortia: VMEC, CCEP, VCES
Common Facilities: - Model Shop - Project Shop
Development and Communications: - Corporate Circle - Publications
Career Management Center CMC-BCET
Naval Reserve Officer Training Corps (NROTC)
Departmental Institutes
Ship Maintenance, Repair & Operations
Lean Manufacturing & Enterprise
Experimental Aeronautics
Scientific & Educational Technology
System of Systems NCSESE
Physical Electronics Research
Multidisciplinary Parallel & Vector Computations
Coastal Engineering
Sustainable Development

Virginia's Philpott Manufacturing Extension Program

Affiliation Proposal from the University of Virginia

June 30, 2005

Background: Virginia's Philpott Manufacturing Extension Partnership (VPMEP) is currently hosted by Patrick Henry Community College. In an effort to forge closer ties to Virginia's institutions of higher education, VPMEP is seeking proposals from the state's colleges and universities to create an affiliation which will benefit both parties.

Benefits to Clients: VPMEP seeks to improve the productivity of small manufacturers throughout Virginia by providing consulting services. The University of Virginia (UVA) is qualified to act as a resource to VPMEP in many regards. UVA has extensive expertise in business administration as demonstrated by the highly-ranked McIntire School of Commerce and the Darden Graduate School of Business Administration. Consulting firms continue to be a major employer of our undergraduate and graduate business students, and our faculty members maintain strong ties to industry.

We understand that VPMEP employs a staff of skilled project managers with extensive engineering and management experience. UVA could supplement this knowledge in a number of ways, including:

- Executive education programs at Darden, which offer open enrollment as well as customized programs in Charlottesville and other locations.
- Faculty in many disciplines interested in consulting activities, including market trends/forecasting, evaluation of technology, and program review.
- Student internships or class projects designed to assist either VPMEP clients or staff.

Additionally, the University of Virginia Patent Foundation has a staff of technology transfer professionals who have already established a number of new initiatives to share their proficiency with others, including:

- Development of a widely-acclaimed technology transfer manual, available on-line, which provides great detail on the process and documentation of technology transfer.
- Service arrangements with the College of William and Mary Technology Transfer Office, the Southern Universities Research Association (SURA, which operates Jefferson National Laboratories), and Hampton University, whereby the UVA Patent Foundation offers staff support and expertise.

- Spinner Technologies, which provides faculty start ups with hands-on mentoring, advice, connections, and lab space.
- Academic Licensing Community of Virginia (ALCOVe), a network of licensing professionals in the state who share experiences, contracts, and marketing and licensing documents.

The UVA Patent Foundation is willing to share its cumulative knowledge in technology transfer with VPMEP and affiliated companies.

Relationships: UVA is currently affiliated with a number of associations to which it will gladly offer introductions and support to VPMEP staff. These include, but are not limited to:

- Virginia BIO
- Virginia Economic Development Partnership
- Thomas Jefferson Partnership for Economic Development
- Central Virginia Small Business Development Center
- Virginia Piedmont Technology Council
- Charlottesville Venture Group
- University-based Economic Development Group
- Association of University Research Parks
- Association for University Technology Managers
- Center for Innovative Technology
- Charlottesville Chamber of Commerce
- Academic Licensing Community of Virginia

Additionally, we enjoy excellent relationships with Piedmont Virginia Community College (PVCC), and are confident that any collaboration desired by VPMEP with PVCC would be welcomed by President Frank Friedman.

Affiliation Framework: We understand that a key guiding principle is to ensure that VPMEP's autonomy is maintained. We further understand that the organization as a capable staff and operations are running smoothly. The nature of our affiliation should serve the interests of both entities. A memorandum of understanding could be executed outlining the services the University would make available to the VPMEP. It is not necessary that the VPMEP become part of the University or come under the governance structure of the University.

Staff: The opportunities for VPMEP staff at the University are bounded only by the imagination of those involved. When appropriate, we anticipate offering options such as being a guest lecturer, teaching a class in the continuing education program, or becoming an adjunct faculty member.

We would make available to the VPMEP staff all library privileges enjoyed by full-time faculty.

Fiscal Agent Support: The University can provide fiscal and administrative support to the VPMEP. Because the University intends to pursue additional authority over its financial and administrative operations through negotiation of a management agreement under the terms of the Restructured Higher Education Financial and Administrative Operations Act the same authority granted to the University would be expected to extend to the VPMEP if we became its fiscal agent.

This fiscal support would take several forms, including but not limited to, access to the University's accounting system, use of the procurement system with retention of VPMEP's current state exemptions, and utilization of UVA's human resource and payroll systems. For example, VPMEP staff would be paid through UVA's payroll system.

The University will incur some additional costs to provide these administrative services. We would like the opportunity to discuss an appropriate level of reimbursement similar to VPMEP's current arrangement with Patrick Henry Community College.

Further discussions will be required in two other areas: (1) how VPMEP's incentive and performance management plans can be accommodated or enhanced at UVA, and (2) how budgeting and funding for all revenues and expenditures will be handled.

Interest in Affiliation: UVA's mission is three-fold: research, scholarship, and service to the Commonwealth. A partnership with VPMEP would clearly be in line with our service mission, and would further develop our outreach activities. In addition, the Governor expects that institutions such as ours will promote economic development in underserved regions of the Commonwealth. A partnership between the University of Virginia and the VPMEP will support this goal.

Benefits to VPMEP brand: All of Virginia's universities have unique strengths, which in turn serves to reinforce the highly regarded quality of higher education in the state. The University of Virginia is ranked the #2 public university in the country (tied with University of Michigan), according to the 2005 *U.S. News and World Report.* Since *U.S. News* began ranking public schools in 1984, U.Va. has never been lower than No. 2. *U.S. News* also ranks UVA as #22 in its Top National Universities category, which includes public and private institutions.

In the same survey, some top ranked departments in the School of Engineering and Applied Science include: Biomedical Engineering (15th), Materials Science (26th), Computer Science (27th), and Computer Engineering (28th).

As association with the University of Virginia will broaden the visibility of the VPMEP and stabilize its infrastructure. Taking advantage of the economies of scale inherent in a large research university such as administrative systems and services, technology infrastructure, library services, faculty and staff expertise, and technology transfer methods, among others, should result in cost avoidance for the VPMEP while also providing opportunities for growth and expanded services to industries.

Summary: The University of Virginia has a strong interest in creating an affiliation with VPMEP. We believe we can add value for businesses and citizens of Virginia through a formal relationship with VPMEP. Although all the details have not been examined at this time, we are confident that we can work through the issues and create a collaboration that is beneficial to both parties.

Proposal
Integrating
Virginia's Philpott Manufacturing Extension Partnership into Virginia Tech

Introduction

The manufacturing sector in the Commonwealth of Virginia has been and continues to be a major contributor to the health and long-term viability of Virginia's economy. This sector creates products for the world, provides a significant tax base, enables high paying jobs for a large number of citizens, and provides an economic foundation that is recognized as a strength of the Commonwealth of Virginia.

However, over the past several years the Commonwealth of Virginia, like other states, has experienced significant job loss and plant closings in the broad manufacturing sector. Many companies in the textile, furniture, and commodity manufacturing sectors found that foreign labor and lower general manufacturing costs offered compelling arguments for relocation of manufacturing facilities to offshore operations. The continued success of the core of the manufacturing sector remaining in Virginia -- the small to medium-sized manufacturers -- will depend on state-of-the–art tools and technologies to remain cost effective and agile in the current economy. Unfortunately, these same companies are often unable to make adequate reinvestments in capital equipment, workforce development, or any type of product or process R&D. As a result, there is a continuing need to help these companies remain competitive.

The proposal: Given industry needs in this environment and the potential for Virginia Tech's academic strengths to make a contribution, the university wishes to improve its service to and engagement with the manufacturing sector in the Commonwealth of Virginia. One of the strategies is to integrate Virginia's A. L. Philpott Manufacturing Extension Partnership (mission, tasks, and personnel) into its College of Engineering. This initiative will strengthen both VPMEP's and Virginia Tech's programmatic and financial base along with efforts to foster economic growth by enhancing the competitiveness of Virginia's small and medium-sized businesses and the manufacturing economy in Virginia.

Virginia Tech's interest in enhancing manufacturing in Virginia

Virginia Tech's College of Engineering, ranked among the top 15 colleges of engineering nationally, has long been recognized as the major source of engineering talent and expertise in Virginia. More recently, the university has strengthened its commitment to economic development, especially manufacturing, across the state.

The Commonwealth Technology Research Fund invested in the Center for High Performance Manufacturing at Virginia Tech to help manufacturers research, develop, and implement new processes, methods, and technologies to stay competitive. Building on a new relationship between leadership from Virginia Tech's outreach organization and the state secretary of Commerce & Trade, the director of CHPM developed a proposal for the secretary that resulted in a partnership between Virginia Tech and the secretary's office to significantly enhance manufacturing in Virginia during the past two years. This partnership initiated several positive steps to enhance manufacturing in Virginia:

- Building on multiple informal relationships, Virginia Tech and VPMEP developed a formal relationship in January 2004 in which senior leadership from Virginia Tech (College of Engineering, Center for High Performance Manufacturing, and Economic Development) and VPMEP meet monthly to nurture this relationship, and VPMEP promotional materials now state 'in collaboration with Virginia Tech'
- The Governor's Working Summit on Advancing Manufacturing met in October 2004, with support from the Virginia Manufacturers Association (VMA) and VPMEP
- A request for funding was included in the Governor's recent budget for the Virginia Small Manufacturing Assistance Program that involves VPMEP and Virginia Tech's Center for High Performance Manufacturing and Business Technology Center
- Planning is underway for Summit II on Advancing Manufacturing in October 2005 with assistance from VMA and VPMEP
- The Manufacturing Advisory Council was created with assistance from VMA and VPMEP
- Virginia's Governor Warner proclaimed Manufacturing Appreciation Week in October 2005
- Virginia Tech participated in a four state consortium in the southeastern United States to harness the assets of the colleges of engineering at four land-grant universities for the benefit of the manufacturing sectors in this region

Therefore, as Virginia's senior land-grant university, Virginia Tech would like to create an engineering outreach function in the College of Engineering that is parallel to Virginia Cooperative Extension, largely in the College of Agriculture & Life Sciences, by fully integrating VPMEP into the College of Engineering through:

- increasing and focusing attention on economic development by enhancing existing manufacturing businesses,
- augmenting VPMEP's current approach with an emphasis on business development (e.g., secure opportunities for manufacturers to commercialize Virginia Tech's research),
- linking VPMEP with the broader economic development efforts of Virginia Tech and the commonwealth, and
- providing easier access for Virginia's manufacturers to the intellectual assets of the university through the network of VPMEP field-based project managers.

Service to clients

VPMEP clients would have full access to the rich and diverse technology, research, and intellectual assets of the university. These faculty-based assets can be readily accessed through the Virginia Tech Expertise Database (www.research.vt.edu/vted).

As the largest research university in the commonwealth, Virginia Tech's comprehensive programs cover nearly the complete range of activities critical to the present and future state of Virginia's economy. Faculty and graduate students are available for consultation in areas ranging from accounting to wood science. Over 100 centers plus disciplinary and multidisciplinary groups actively work together to provide education, apply knowledge, and develop new knowledge. University organizations such as the Center for High Performance Manufacturing, the Energy Management Institute, the Robotics Laboratory, the Vibration and Acoustics Laboratory, the Ergonomics and Biomechanics Laboratory, the Center for Occupational Safety and Health, the Advanced Materials Characterization Facility, the Rapid Prototyping Laboratory, the Polymer Processing Laboratory, the Business/Technology Center, the Virginia Cooperative Extension, Continuing and Professional Education, Outreach and International Affairs, and the Technical Assistance Program (see Appendix A for a more detailed description of these sample units) serve the state, the nation and the world. Foremost among these resources will be the nearly 300 tenure track faculty and $63M (direct and indirect) in sponsored research in the College of Engineering.

The affiliation between VPMEP and Virginia Tech will result in numerous benefits to manufacturing clients throughout the commonwealth served by VPMEP, to VPMEP, and to Virginia Tech. Benefits to clients include

1. the availability of student design teams to work on projects of interest to clients at minimal cost,
2. continuing education workshops with CEUs,
3. faculty and students to serve as third party providers,
4. professional development for VPMEP personnel,
5. collaboration with the Center for High Performance Manufacturing,
6. possible commercialization experiences through Virginia Tech Intellectual Properties, Inc., and
7. long term stability.

These benefits are described in more detail in the following paragraphs:

1. All accredited undergraduate engineering degree programs require a year-long capstone engineering design project during the senior year. A design project is more educationally rich when it is suggested and supported by a company, and, more importantly perhaps for the VPMEP client, when its outcome is needed and used by the client. Virginia Tech can work with VPMEP to identify manufacturers with problems that could be addressed through these student projects. The outcomes of such an interaction are manifold. Through student reports, manufacturers are provided with reduced-cost engineering solutions that are often innovative and useful. In addition, students are exposed to the manufacturing industry and its real world problems that provide them with motivation and encouragement. In some cases, they may seek employment in this critical component of the U.S. economy.

2. Continuing Education Units (CEUs) are becoming increasingly important to document an individual's educational inventory and to verify his/her technical currency and competence in specific areas. Programs sponsored by Virginia Tech and presented by Virginia Tech personnel can quickly and easily receive approval for granting CEUs to individuals attending and completing workshops or similar programs. When VPMEP personnel become Virginia Tech employees, those with the appropriate credentials will be approved to conduct programs granting CEUs. In fact, through our prior working relationship with VPMEP, Virginia Tech already certifies about 13-14 courses (e.g., lean manufacturing, Six Sigma, supply chain management) by VPMEP instructors and offer CEUs for those courses. Furthermore, as an internal Virginia Tech unit, VPMEP will use the complete services of Continuing and Professional Education, a major unit that assists in planning and managing training and educational programs from conception through organizing, marketing, registration, and administration. In 2004, Continuing and Professional Education presented more than 450 conferences, seminars, and workshops to meet the post-college learning needs of working adults. These programs attracted more than 30,000 participants from throughout the commonwealth, the nation, and the world. A major new, modern facility, the Inn at Virginia Tech and Skelton Conference Center, opens on July 10, 2005 to house attendees and conferences on the Virginia Tech campus.

3. VPMEP currently augments its in-house education and technical assistance service delivery capabilities to clients through a network of third party providers, generally including representatives from community colleges and consultants. Faculty and graduate students from the College of Engineering, the Pamplin College of Business, and the entire university represent another source of technical talent for an almost unlimited variety of topics. This university-wide resource base is especially important, given the interdisciplinary basis of many business problems.

4. With their work experience and professional preparation, VPMEP personnel are highly competent and technically proficient. To maintain this reputation, they need to remain current in their existing fields of strength and explore new areas of expertise. Virginia Tech faculty, primarily from the College of Engineering and the Pamplin College of Business, can provide on-going professional development for VPMEP project managers to maintain and increase their professional and technical proficiencies.

5. The Center for High Performance Manufacturing (CHPM) works in a wide variety of areas, ranging from supply chain design and flexible automation to rapid prototyping and low-cost composite manufacturing. CHPM, in a closer relationship with VPMEP, could provide research for VPMEP clients that exceeds the technical or resource capacity of VPMEP personnel, advanced professional development for VPMEP personnel, and workshops for VPMEP clients to supplement programs available from VPMEP personnel. In addition, VPMEP and CHPM could jointly develop areas of mutual interest, including efforts to strengthen existing and create new manufacturing efforts in Virginia. One example of this working relationship is the proposal submitted by Virginia Tech to NSF that included significant effort by VPMEP's Vice President.

6. Virginia Tech has a well-established technology transfer program. One of the university's major goals is the transfer of new knowledge developed by our researchers into the community of users. Virginia Tech Intellectual Properties, Inc. (VTIP), a separate non-profit technology licensing corporation that is charged with managing, marketing, and protecting Virginia Tech-created intellectual property, provides tremendous flexibility to commercialize resulting applications and inventions. VTIP will work with VPMEP to implement the transfer of new technology to manufacturers, utilizing the reputation, experience, and knowledge of VPMEP personnel, to identify these appropriate areas and put the technology to use.

7. Affiliation with Virginia Tech and its associated brand recognition will likely improve stability for long-term survival and growth of VPMEP, and strengthen favorable reactions from NIST and other stakeholders.

While colleges and universities have a reputation for slow response time, our land-grant history and recent behavior suggest that our faculty are frequently waiting for companies to respond. The university does operate its core business on a semester-based academic rhythm, and a research focus frequently suggests a longer cycle. However, our faculty understand the value of engaging with the external community and understand its needs. And, technical assistance projects frequently balance price with timeliness. For example, senior design projects are built around academic semesters, but they generally cost less than $10K. Faculty consulting can be much more timely, but the costs are significantly higher.

Relationships

Virginia Tech is very partnership-oriented, as evidenced by our involvement to date with VPMEP and with the multiple manufacturing-related activities mentioned previously, frequently with the Secretary of Commerce & Trade and with associated companies, non-profit organizations, and agencies. Similarly, our support for and involvement with the Governor's "Virginia Works" initiative also demonstrated our core belief in the need to align our interests with those of other entities to address a larger need and/or increase the resource base.

One of the important relationships is with the Commonwealth of Virginia. When integrated into Virginia Tech, VPMEP will benefit from political support and our legislative agenda as with other institutional priorities.

The Technology Applications Center (TAC) at Old Dominion University and the Manufacturing Technology Center (MTC) in Wytheville are integral components of the VPMEP organization. Virginia Tech is committed to continue existing partnership arrangements with both organizations.

Organization and Governance

VPMEP will be fully integrated into Virginia Tech. As such, it will be a center within the College of Engineering, VPMEP employees will become Virginia Tech employees, and fiscal, personnel, purchasing, and other administrative functions will be handled through existing Virginia Tech mechanisms. The current Board of Directors will become a Board of Advisors with their role shifting from governance to providing counsel. Membership from the same kinds of organizations will be encouraged. Details about these proposed guidelines follow:

Structure and Governance

VPMEP will function as a center within the College of Engineering, reporting to Dean of the College of Engineering (or his designee). The Executive Director will be a member of the Dean's Administrative Council. The current Board of Directors with governance and managerial oversight responsibilities will become a Board of Advisors with the role of providing counsel and insight into strategic programmatic ways to strengthen VPMEP. The Board of Advisors will retain the current mix of external members for historical and relational purposes and for their business and VPMEP experience. Potential new members will be appointed by the Stakeholders Committee with input from the Board of Advisors, the Stakeholders Committee, the Secretary of Commerce & Trade, and the Virginia Manufacturers Association.

A Stakeholders Committee and representatives from the Board of Advisors will support the enterprise. The committee, given the expectation for centers by the Virginia Tech Board of Visitors, will have oversight of all financial, programmatic, and administrative affairs of the VPMEP. This oversight assures the development and implementation of sound business practices in the operation of the VPMEP. This committee will include the Dean of the College of Engineering, the Vice Provost for Outreach and International Affairs, the Vice President for Research, the Director of Economic Development, the Executive Director of VPMEP, and the Chair of the Board of Advisors.

To harvest the anticipated benefits from the integration with the College of Engineering, the Executive Director will spend a significant amount of time in Blacksburg, building relationships with the faculty, and participating in the monthly meetings of the Dean's Administrative Team. In addition, the Executive Director will create events that inform the VPMEP project managers and Virginia Tech faculty of each other's strengths, interests, needs, and capabilities. The other two senior managers within VPMEP, the Operations Manager and the Business Manager, will also spend increasing amounts of time in Blacksburg to further assist with the integration by learning more about the corresponding organizations and individuals on campus.

VPMEP project managers, like the field agents with Virginia Cooperative Extension, will have dotted line connections with academic departments in the College of Engineering to enhance relationships with the faculty that will lead to greater faculty involvement in VPMEP's projects. The project managers will report to the existing VPMEP management, but will be included in various departmental activities to enhance these professional relationships. The College of Engineering has ten departments and is open to involving VPMEP project managers in all departments.

The final organizational structure, governance of VPMEP, and VPMEP's integration into Virginia Tech will require approval of the Virginia Tech Board of Visitors.

Finance & Administration

As an entity fully integrated into Virginia Tech, the university will provide our full range of financial and administrative services in support of all VPMEP business activities. In the first year of integration with Virginia Tech, we will provide these services at the current fiscal year's cost of $44,000, much like the current arrangement with Patrick Henry Community College. During the first year of integration, we will develop a detailed cost study to determine the amount to be charged in future years. Like other similar business and academic units in the University, VPMEP will be expected to cover both its direct and indirect costs of operations, with any excess funds generated in a fiscal year distributed to VPMEP and sponsoring units in a manner consistent with similar university departments and centers.

Virginia Tech is very excited about a more comprehensive relationship with VPMEP. We envision the integration will generate more income for several reasons.

1. The number of companies served will increase because of the attractiveness of the Virginia Tech brand.
2. The size of contracts could increase, primarily by providing a deeper level of technical assistance and problem-focused research.
3. VPMEP will expand the number of products available to current and new clients by exploring opportunities to commercialize Virginia Tech research and other technology transfer.

However, even in the best political climate, funds from external agencies are not guaranteed. And given the sometimes precarious financial support from the federal and state income streams, in addition to the usual ebb and flow of market-based revenue, the university will not subsidize this integration effort. Specifically, the university has for a few years and will continue to donate considerable time of senior leadership to nurture the mutual benefits from greater integration. But this support will not extend to replacing reduced or lost income from the three major streams. In short, the integration must be, at least, revenue neutral on a cash basis (i.e., not counting the significant in-kind contributions) to Virginia Tech.

Support systems that will enable VPMEP to respond quickly to market conditions

Virginia Tech believes in the importance of timely, quality response to clients. Since this proposal requests the full integration of VPMEP into Virginia Tech, the primary difference from the current system relates to contracts and financial transactions. The other processes within VPMEP (e.g., working with clients, making proposals, returning calls, and meeting milestones) are still well within the responsibilities of the VPMEP employees and would not appear to be affected by the new relationship. Likewise, with faculty, student, and staff resources more readily accessible, it would appear that more options, including both breadth and depth strength of project manager-type resources, are available to clients under this new structure. This suggests an increase in client satisfaction from the new relationship.

Intellectual Property

At this time, it is premature to categorically define how we would treat intellectual property (IP). However, the university is demonstrating a growing interest in putting deals together, in assisting small companies, and in making our intellectual property discussions much less onerous and more flexible and reasonable. Therefore, for the first several projects, the IP discussion will be on a case-by-case basis. Out of this practice, a policy will evolve that reflects the rights of the company and the university, considers the likely economic value of the intellectual property to the university, and recognizes the critical role of intellectual property, especially for small companies.

Virginia Tech has been working with VPMEP on the Virginia Small Manufacturing Assistance Program. In our discussions of intellectual property, we have evolved the following resolution during the one-year life of the VSMAP program. This resolution will be reviewed after the first year, especially if the VSMAP program receives continued support from the General Assembly.

1. Approach the client with the Technical Assistance Program, assuming the project size does not exceed $50K, including overhead. If the client accepts the terms, including 'no IP' in the project (and if there is IP, Virginia Tech owns it), we are done. If the client rejects the terms, we proceed to step 2.
2. If the client rejects the terms of the Technical Assistance Program, the client has two options through the Office of Sponsored Programs:
    a. Accept the standard terms of the Office of Sponsored Programs (i.e., Virginia Tech owns the IP; the sponsor has the option to negotiate a license at some time through VTIP), including the standard overhead rate (i.e., full overhead ... not the government-capped rate).
    b. The client receives a royalty-free exclusive license in their specific field of use, but the price of the project to the client is negotiated to more accurately reflect the full cost of the project and to include the value for the exclusive license, i.e., the client compensates the university for a royalty-free exclusive license. Note: with this option, the client will pay a premium for a royalty-free license.

In summary, at this time, Virginia Tech can only reiterate its intention to develop systems and procedures that are administratively streamlined and enable the kind of client service to which we would aspire and of which we would be proud. In short, we share the same client service expectations as VPMEP.

Facilities

The headquarters of VPMEP will continue to be located on the campus of Patrick Henry Community College in Martinsville. This proposal assumes that this space will be donated by PHCC or some other Martinsville-based entity. Over time, Virginia Tech will explore the economic and programmatic feasibility of co-locating VPMEP's field offices with existing facilities of Virginia Tech's organizations across the commonwealth. This will generally enhance access to the local communities through individuals already having deep roots and personal relationships locally.

Employees

Virginia Tech will accept all VPMEP employees as Virginia Tech employees. As such, they will be covered by the appropriate state and university policies and will be eligible for the full range of benefits afforded Virginia Tech employees, including the ability to apply for other positions within the university.

Many of the VPMEP managerial and professional employees will be defined as restricted special research faculty and will be covered under the university's Special research Faculty Handbook. The project engineers in the field will probably carry the project associate or senior project director classifications, both being titles within the research faculty series. The support staff will be blended into the university's job classification system for salaried non-faculty employees. We envision accepting all VPMEP employees at their current salary. But, it is difficult in this short time to clearly identify and resolve the incentive compensation and benefits issues. At this time, if Virginia Tech is selected to negotiate terms with a full integration of VPMEP, we propose to engage a consultant to work with us on developing a complete salary and benefits package that is based on total compensation, reflects the values, culture, and history of Virginia Tech, and acknowledges a need to retain current, experienced VPMEP employees.

One challenge, however, is the current level of the incentive compensation, the application to all employees, and the inability to specifically measure the performance of each employee. At present, members of the Virginia Tech faculty who are engaged in teaching, research, outreach, or administration are not eligible to participate in an incentive (bonus) compensation plan nor are classified employees. While we are open to exploring this option, and in fact are currently discussing this with another Virginia Tech organization which operates like a business, we are not

comfortable with the current level of incentive and the applicability to all employees, unless we can develop more specific measurement tools. Our resulting incentive plan will certainly include stretch objectives involving increased project work with Virginia Tech and growth in the volume of revenues as well as the resulting net income per project.

Virginia Tech's interest in this affiliation

As a land grant university, Virginia Tech's fundamental mission has always included a substantial outreach component. Stakeholders across the commonwealth routinely recognize Virginia Tech for its outreach efforts. Indeed, the Cooperative Extension Service has been an integral part of Tech virtually since its inception with a goal of taking the university's research and development results into the agricultural community. Including VPMEP as the industrial extension model of the land grant university will allow us to extend the university's outreach commitment into the manufacturing and industrial sectors across the commonwealth as well. We anticipate many positive outcomes for Virginia Tech with this integration.

1. VPMEP has developed and maintained good relationships with the manufacturing sector throughout Virginia. Their NIST ratings note VPMEP as one of the most effective MEP organizations in the country and serve as testimony to their commitment to quality, timely service. This service model has helped build strong ties to the industrial community that would be of great benefit to Virginia Tech. The College of Engineering would be able to use these relationships to disseminate information about the many service offerings from the college. Moreover, the VPMEP project managers in the field would be an effective channel to articulate Virginia Tech's increased reliance on industry for outright research support and technical assistance. By more effectively communicating Virginia Tech's outreach mission to the industrial community, we could improve the base of support for the College of Engineering and for Virginia Tech.

2. The increase in the number of relationships with the manufacturing sector across Virginia will result in more projects for our faculty, staff, and students through additional technical assistance and sponsored research; more field locations for research by faculty and students; a deeper understanding of applying theory to the marketplace; and intern, cooperative education, and full-time job prospects for our students.

3. VPMEP's exposure to the full spectrum of industries across the commonwealth would help the College of Engineering to identify companies who might be interested in commercializing Virginia Tech's research products, highlight priorities through the Institute for Critical Technology and Applied Science, and expand our technology transfer program. This could be a substantial financial benefit to all concerned when a company is able to take research results from the College of Engineering and convert them into a commercially successful enterprise. The VPMEP's knowledge of industries would be a great resource for the College of Engineering and Virginia Tech by identifying potential test sites for university research products.

4. VPMEP's knowledge of Virginia's industries will provide opportunities for mandatory senior design projects for College of Engineering seniors. Participation of industries around the commonwealth will improve the quality and diversity of these required senior projects. It is difficult for some departments to locate companies willing to participate. VPMEP would be a great aid in locating companies to support the senior design program.

5. VPMEP would be a significant resource in fostering regional cooperation among universities with similar missions in the mid-Atlantic region. Each state has an MEP, and VPMEP would be a significant channel to foster regional alliances and cooperation. Since many industries have operating facilities in more than one state in the region, the MEP affiliation would offer a significant advantage in facilitating interstate activities and reducing costs for such projects.

Now that Virginia Tech is in the Atlantic Coast Conference, this new network will nurture the academic side of the conference affiliation with other university-based MEPs at the University of Maryland, North Carolina State University, and Georgia Tech.

6. VPMEP could provide a conduit for faculty to become directly involved in industry projects. When issues arise in a VPMEP project that require a deeper level of knowledge or some form of investigation, the project managers could look to Virginia Tech faculty and staff to provide this expertise. This would create opportunities for focused research projects, technical assistance, and consulting opportunities for the faculty, staff, and students.

7. Through the nature of their work, VPMEP project managers will serve as outreach ambassadors for the university by exploring the business issues that inhibit a client from reaching its performance goals. These efforts will enhance the university's image and raise political capital across the commonwealth.

8. VPMEP's locations around Virginia will help the College of Engineering have a more significant relationship with the industrial community. While this factor is intangible, it could be the most significant. The College of Engineering would literally have a presence throughout the commonwealth, and its service mission would be fulfilled in a manner that is impossible today. The College of Engineering could literally be only a few hours away from any industry in the state, enhancing the outreach mission substantially through VPMEP. The overall relationship between the university and the industrial community would improve over time, leading to larger and more significant opportunities for both VPMEP and the College of Engineering.

In summary, aligning VPMEP with Virginia Tech will provide a very significant channel through which we could deploy our resources more effectively and increase our service to companies across the commonwealth. VPMEP would, in so doing; gain unique insights into the workings of a major research university that would enable it staff to be increasingly effective in supporting the mission of Virginia Tech.

Benefits to VPMEP for marketing the Virginia Tech brand

It is difficult for Virginia Tech to measure the impact on VPMEP of using the Virginia Tech brand (i.e., the phrase "in collaboration with Virginia Tech") on their letterhead and website and in discussions with clients. However, discussions with the Executive Director suggest that this phrase and relationship have helped with VPMEP's marketing. If this is true, one can only speculate that taking this relationship one step further to full integration into Virginia Tech could only add further value to VPMEP from the branding.

Effects on visibility and stability of VPMEP

In general, being integrated into Virginia Tech will increase the visibility for VPMEP. This enhanced visibility should translate into greater stability and increased market penetration through improved brand recognition and additional resources to meet client needs. Furthermore, integration with Virginia's major land-grant university seems consistent with the status of more successful MEP programs across the country. Consequently, NIST-MEP would probably view this as a positive step.

Identify cost avoidance, financial gain, or other support

Virginia Tech anticipates the integration may result in a cost increase (not cost avoidance) to VPMEP for the administrative services and rent currently provided by Patrick Henry Community College. However, we believe this increase in cost will be offset by increased revenue from the

integration and possible decreased cost associated with an incentive compensation system. The primary financial gain would be realized through additional business from the Virginia Tech brand recognition and access to additional resources to improve service to clients.

Conclusion

Virginia Tech is very excited about the possibility of evolving our current relationship into full integration. We believe that Virginia Tech, VPMEP, and the manufacturing sector in Virginia will all benefit.

Appendix A

Other resources within the university that could contribute to VPMEP's program include:

1. VPMEP will have access to the full faculty at Virginia Tech. A common mechanism to search their talents is the Virginia Tech Expertise Database (www.research.vt.edu/vted/search.html)

2. Institute for Critical Technology and Applied Science (ICTAS) - (www.eng.vt.edu/ictas/index.html) will be a large-scale, multidisciplinary research enterprise, consisting of three entities the size of Virginia Tech Transportation Institute/Center for Power Electronic Systems (annual funding of $10 million), several smaller institutes (annual funding around $3 to 5 million), and a few very small groups. Some will be completely new to Virginia Tech while others will be existing entities expanded to several times their current size. A significant component of ICTAS involves developing research ideas into commercially viable products, hopefully through VPMEP clients.

3. Center for High Performance Manufacturing (CHPM) (www.eng.vt.edu/chpm/) - launched in July 2001 with $4.35M in funding from the Commonwealth of Virginia (Commonwealth Technology Research Fund). It helps manufacturing firms research, develop, and implement new processes, methods, and technologies in order to stay competitive in today's dynamic manufacturing environment. CHPM specializes in the following areas: flexible automation and lean manufacturing, manufacturing logistics and supply chain design, production and information systems, rapid prototyping and rapid tooling, and low cost composite manufacturing. Virginia Tech leads the Center, with participation from James Madison University, The College of William and Mary, and Virginia State University.

4. Vibration and Acoustics Laboratory (VAL) - consists of four faculty members, three post doctoral research associates and twenty post graduate students and support staff with an annual turnover of approximately $1.5M in research funding. Research areas include: control of sound transmission into payload fairings, acoustic testing of advanced acoustic materials, passive and active control methods for the reduction of vibration in fluid filled piping systems, development of a virtual speaker, development of an efficient binaural simulation for the analysis of structural acoustic data, and control of engine noise.

5. Center for Injury Biomechanics - dummy and cadaver experiments, computational modeling, testing equipment, material preparation space, specimen storage facilities, and low rate, high rate, and small scale large scale material testing machines. High-speed digital video recording, high-speed pneumatic impactor and drop tower.

6. Musculo-Skeletal Biomechanics Laboratory - VICON™ 3-D motion analysis system with 32 channel A/D capability, MotionMonitor™ 6 degree-of-freedom electromagnetic motion analysis system, 2 AMTI™ force plates, 2 Bertec™ force plates, 8-channel radio-telemetered EMG system, 3 4-channel wired EMG systems, video camera, and project-specific accessory hardware (e.g. load cells, harnesses, motor controllers, etc.).

7. Ergonomics and Biomechanics Laboratory - Human postures and motions (VICON-240Hz 3-D system, Biometrics-electrogoniometers); Human Strength (Biodex™ System 3 Pro, Interface load cells); Electromyography (32-channel fixed and 8-channel Noraxon-telemetered); Blood oxygenation (RunMan-NIRS); Energy Expenditure (Oxylog); Heart rate (CardioCard, Nasiff Associates); Kinetics (AMTI and Kistler/Bertec force plates, AMTI 6-axis load cells).

8. Combustion Research Laboratory - 3000 square feet allows eight open combustion experiments to be installed and houses several CW and pulsed lasers covering wavelengths from the ultra-violet to the infra-red. Many types of detectors, point, linear and two-dimensional are available, unintensified and intensified. Gas analysis equipment includes non-dispersive absorption meters (NDIR), Fourier Transform Infrared Analyzer, numerous PCs, data acquisition, image grabbing and manipulating boards are used. The lab contains several burner facilities for studies in the area of pollutant formation and materials synthesis, flow nozzles, and a small wind tunnel.

9. Center for Construction Safety and Health - focused on helping the National Institute of Occupational Safety and Health (NIOSH) achieve a 30% large-scale work-related accident, injury, and fatality reduction in the construction industry in the United States by 2010, through benchmarked best practices associated with exploratory, prevention/intervention and translation research, and strategic partnerships with a diverse array of construction industry stakeholders.

10. Center for Microelectronics, Optoelectronics, and Nanotechnology (MicrON): $100 K Keithely Model 86 Semiconductor Characterization System, Silvaco semiconductor model software, an electromagnetic interference modeling package, Aixtron MOCVD system, Semiconductor Fabrication and Packaging Lab, and an approximately 5,200 GSF Class 100 to 10,000 cleanroom. (http://www.microelectronics.vt.edu/home.htm)

11. Center for Power Electronic Systems (CPES) - an NSF Engineering Research Center, with a total annual budget of more than $10 million. The Center develops integrated power electronics modules (IPEMs). Program elements include advanced power semiconductor devices, power ICs, integrated packaging, control and sensor integration, IPEM synthesis, integrated design methods, distributed power systems and motor drives.

12. Microwave Processing Laboratory (www.me.vt.edu/research/labs/mpl.html) focuses on research for developing industrial applications of microwave heating.

13. Energy Management Institute (www.me.vt.edu/research/centers/emi.html) (EMI) - provides cost savings to energy users in business, industry, and government through training, technical assistance, development of new technologies, and the advancement of basic science. The Institute benefits Virginia by integrating outreach and research expertise and access to a global energy systems information and referral network. The Institute's multidisciplinary team is working on fuel cell systems for transportation and stationary power applications in the following research areas: thermodynamics, thermal optimization, and thermoeconomics, heat and mass transfer, and 2nd law analysis, building, industrial and transportation energy systems, and systems integration, internal combustion engine applications, fuel cell processes and systems, and fuel cell oriented CFD / experimental work.

14. Environmental Biotechnology Laboratory - Faculty in environmental engineering at Virginia Tech are using biotechnology for investigating engineered and natural systems, and detecting and preventing potential problems before they arise. Departmental capabilities in this area include: basic nucleic acid and protein extraction and manipulation, polymerase chain reaction (PCR), fluorescent in-situ hybridization (FISH), and 16S rDNA community profiling and DNA microarray. Use of modern microbiological and molecular methods allow for improved detectability and precision. Biosensors, which can be integrated with process control models facilitate efficient operation of engineered biological treatment systems.

15. Center for Human Computer Interaction (CHCI) – comprised of 20 faculty members from Computer Science and Industrial Systems, working in the general areas of: communication behavior analysis, social & community computing, information visualization, multimodal user interfaces, collaborative systems, vision-based systems, notification systems, ubiquitous computing, knowledge management, multiplatform user interfaces, and 3D interaction & virtual environments.

16. Advanced Materials Characterization Facility (AMCF) - A university resource that will be housed in 12,000 sq. ft. of the new ICTAS building at Virginia Tech. The AMCF will enhance Virginia Tech's ability to support major interdisciplinary centers with state-of-the-art analytical and processing capabilities, cross-trained technical teams, and strategic equipment development or acquisition, including state-of-the-art instrumentation to process, characterize and test materials and materials systems at all scales (macro, micro, nanometer and atomic). Most instruments will be capable of local (Virginia Tech) or remote (state wide) "real time" communication with the user for sample analysis and data manipulation.

17. Nondestructive Evaluation Development Laboratory (NEDL) - measures properties of materials and objects without reducing their serviceability, or nondestructive testing (NDT). Nondestructive inspection (NDI), nondestructive examination (NDE), nondestructive evaluation (NDE), nondestructive materials characterization, non-invasive inspection, and nondestructive measurement science are branches of this area. The NDEDL at Virginia Tech specializes in research, development, engineering, and application of nondestructive measurement methods.

18. Robotics Laboratory (armyant.ee.vt.edu/), called The Machine Intelligence Laboratory, hosts research and independent study in mobile robots, machine learning, artificial intelligence, and control systems.

19. Macromolecules and Interfaces Institute (MMI) – an interdisciplinary education, research, and outreach program in polymers, adhesion science, and composites. Our Macromolecular Science and Engineering MS and PhD Programs are ranked # 5 in the Country. Recent approvals include: a Macromolecular Science and Engineering (MACRO) degree program, a National Science Foundation (NSF) Integrative Graduate Education and Research Traineeship (IGERT) award, and an Army Research Office (ARO) Multidisciplinary University Research Initiative (MURI) award. The Institute is expanding into new areas such as fuel cells, environmentally benign processing, and polymer/biological research.

20. Virginia Tech Computer Aided Design Laboratory - supports interactive design and engineering analysis for teaching and research; equipped with high-end workstations loaded with the latest releases of Unigraphics, I-DEAS, CATIA, Pro/ENGINEER, Teamcenter Engineering, ANSYS, ADAMS, HyperWorks, SPSS, MINITAB, MATLAB, Mathematica; supported by 100Mb/s network, high-capacity servers, and a full-time support staff.

21. Rapid Prototyping Laboratory - for teaching, research, and commercial rapid prototyping fabrication services; FDM 1600 RP system with automated loader/unloader; vacuum oven for material preparation and RTV silicone rubber casting applications. Access to on-campus CNC mills, CNC lathes, SLS and Z-Corp RP systems, CMM, and CT scanner.

22. Polymer Processing Laboratory - a Chemical Engineering department research facility, fully equipped to generate advanced FDM feedstock and to analyze the resulting FDM fabricated parts.

23. Technical Assistance Program (www.tap.vt.edu) is a university-sponsored consulting activity that enables a faculty member to respond quickly to an identified business problem that requires technical expertise. TAPs are intended to strengthen university and individual faculty relationships with external organizations, especially businesses, and result in sponsored research projects.

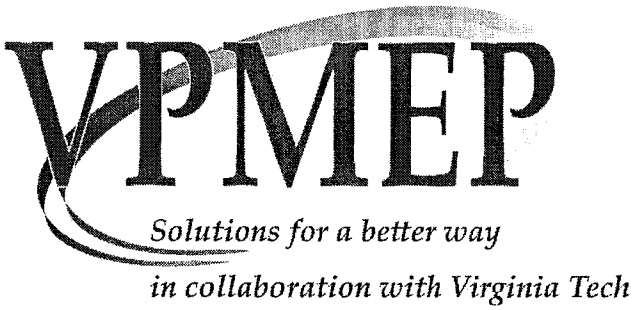
24. Business/Technology Center in the Pamplin College of Business (www.cob.vt.edu/btc/) provides top-quality business assistance with faculty and students to emerging technology-based organizations, individuals, and companies seeking to enhance their competitiveness through technology.

25. Virginia Cooperative Extension (www.ext.vt.edu) helps people improve their lives by providing research-based educational resources through a network of on-campus and local Extension offices and educators. The field agents have significant professional, personal, and political relationships with individuals and organizations in communities across Virginia.

26. Outreach & International Affairs (www.outreach.vt.edu) has offices in Northern Virginia, Richmond, Hampton Roads, Abingdon, Roanoke, and Danville. Staff in these offices market and support the full complement of the university's products and services (credit and noncredit instruction, basic and applied research, and service).

27. Continuing and Professional Education (www.conted.vt.edu) offered about 450 programs last year to 30,000 individuals. CPE could provide CEUs for professional development programs through VPMEP.

Evaluation of the Effectiveness of the Contractual Relationship Between VPMEP and Virginia Tech



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July 7, 2005

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Executive Summary

The 2005 Virginia Budget states, . . . "The Secretary of Commerce and Trade shall evaluate the effectiveness of the contractual relationship between the Virginia Philpott Manufacturing Extension Partnership (VPMEP) and Virginia Tech in terms of the total number of projects undertaken, revenues earned, projects shared or referred between the two entities, services provided, and productivity levels achieved by the clients . . ."

This document provides information to the Secretary of Commerce and Trade to consider during the evaluation. Although VPMEP has been effective during the period of collaboration with Virginia Tech, it is difficult to determine to what extent the collaboration with Virginia Tech contributed to this.

The start of the collaboration agreement between Virginia Tech and VPMEP was January 1, 2004. Results are available from that date through April 30, 2005. During that time period VPMEP earned over $4 million in fees from over 250 projects with about 150 different clients.

Impact to the Commonwealth from these projects is measured by the methodology used by the National Institute of Standards and Technology to evaluate all sixty MEP units located throughout the country. Total increased sales and retention of sales were over $170 million. Total inventory reductions were over $8 million. Cost savings exceeded $60 million. Increased investments were over $16 million. Jobs created or retained exceeded 500. Finally, the satisfaction rating was 4.8 out of 5.0.

Two projects of particular note directly involved Virginia Tech. One was a project with Applied Felts that provided the first contract for the Advanced and Applied Polymer Processing Institute at the Institute for Advanced Learning and Research. Another project involved research under the guidance of Professor Thurman Lockhart to enhance the development of the Flex-O-Chair with Rehabco, a start-up company.

Another area of collaboration is with workshops. VPMEP provided educational workshops with Virginia Tech Continuing Education Units (CEU's) for over 800 people with about 170 companies.

Three other programs were significantly effected by the collaboration. Virginia Tech and VPMEP played important roles in the development of the Governor's Working Summit on Advancing Manufacturing on October 13th and 14th at the Hotel Roanoke and Conference Center. The Virginia Small Manufacturing Assistance Program was created as a joint effort between Virginia Tech and VPMEP to provide targeted assistance to small advanced manufacturing businesses in rural Virginia. The third event was the successful attainment of a U.S. Department of Commerce Economic Development Administration grant received by VPMEP with help from Virginia Tech.

We believe the relationship between Virginia Tech and VPMEP has been modestly successful. As in all new and developing partnerships, initial success is often in small steps. We look forward to furthering the collaboration between Virginia Tech and VPMEP.

Introduction

During December of 2003, Virginia Tech and VPMEP signed a collaboration agreement covering calendar year 2004. The agreement clarified a collaboration approach between the two parties. A similar agreement was signed during the end of 2004 covering the calendar year 2005. Dr. Ed Henneke, Dr. Ted Settle, Dr. Bob Taylor and Jeff Kohler developed the agreement with assistance from many others. See Appendix 1 on page 11 for the current agreement.

Related to the collaboration, the 2005 Virginia Budget contains the following language. The 2005 Virginia Budget states, . . . "The Secretary of Commerce and Trade shall evaluate the effectiveness of the contractual relationship between the Virginia Philpott Manufacturing Extension Partnership (VPMEP) and Virginia Tech in terms of the total number of projects undertaken, revenues earned, projects shared or referred between the two entities, services provided, and productivity levels achieved by the clients . . ." See Appendix 2 on page 16 for the amendment.

The purpose of this report is to provide information to the Secretary of Commerce and Trade. See Appendix 3 on page 17 for a preliminary High Level VT VPMEP Evaluation.

Client Impact

The mission of VPMEP is to help Virginia industries compete. The vision of VPMEP is to be the best resource in the United States to improve the enterprise capabilities of small manufacturers. These are achieved by providing fee-based educational and consulting services to industrial clients throughout the Commonwealth.

The primary approach to metrics at VPMEP is defined by impact categories created by the National Institute of Standards and Technology Manufacturing Extension Partnership (NIST MEP). After every project is completed, we request written documentation from each client defining the results achieved. Following is a summary of the results from the sixteen month period from the January 1, 2004, start of the collaboration agreement between Virginia Tech to the most recently available date of April 30, 2005.

The first category is a combination of increased sales and retention of sales that would otherwise have been lost. The projects that were implemented either enabled sales to be increased or prevented sales from loss. This total for the time period was $170,729,960.

The second category is inventory reduction. Most lean projects provide the opportunity for a dramatic reduction in inventory. The benefit multiplies beyond the capital reduction to also help reduce damage, handling, obsolescence, etc. This total for the time period was $8,718,000.

Cost savings included areas like material, labor, energy, and overhead. This category usually drops right down to the bottom line. The total for the time period was $60,111,494.

The fourth category is increased investments. This includes plant or equipment, information systems or software, and workforce practices or employee skills. The total for the time period was $16,280,771.

The fifth category was jobs. This includes creation of additional jobs and retention of jobs that otherwise would have been lost. The total for the time period was 516.

The final measure is a satisfactory rating. The options are very satisfied at 5 down to very dissatisfied at 1. The average rating for this time period was 4.8 out of 5.0.

In addition to the above metrics, NIST MEP uses an independent survey organization to query MEP clients throughout the country. One of the comparative measures is the MEP Metrics Map. This methodology graphs the performance of every MEP center. The vertical axis is the ratio of the dollar impact amount divided by the number of clients. The horizontal axis is the ratio of the number of impacted clients to the federal investment. The graph displays performance curves for different levels, such as $20 million, $10 million, etc. Better performance is demonstrated by moving northeast toward higher performance curves. VPMEP performed very well on the most recent map. See Appendix 4 on page 19 for the most recent MEP Metrics Map for 2004 fourth quarter.

For this time period the total number of projects undertaken was 264 for a total of 145 clients. The total revenue earned from clients during this time period was $4,394,144.

The largest practice was Lean Enterprise at $1,766,761. Many different areas were covered. This included workshops discussed later. Software selection to pick the best approach was done. Maintenance system implementation occurred. Executive coaching was provided. Lean transformation was undertaken. Lean flow was created. See Appendix 5 on page 20 for a lean success story with Carlisle Motion Control Industries in South Hill.

The second largest practice was Supply Chain Management at $1,481,885. The vast majority of this work was related to our efforts at Northrop Grumman Newport News Sector (NGNNS). VPMEP manages the project for NGNNS and implements the work for the suppliers in Virginia. See Appendix 6 on page 21 for an article explaining the NGNNS work.

The third largest practice was Lean Six Sigma [SM] at $639,869. In addition to the workshops mentioned later there also was sponsor training and needs analyses.

The fourth largest category was Manufacturing Systems at $153,962. That included plant layout, master scheduling, methods improvements, and procedure development.

The fifth largest category was Strategic Management Services at $120,556. This included enterprise assessments, market analyses and strategic advisory. See Appendix 7 on page 24 for a strategy success story with Clarke Communications.

The sixth largest category was Outreach at $82,215. This included various public events to companies.

The seventh largest category was People Systems at $47,500. That included human resource compliance assessment, leadership foundation, organizational effectiveness, awareness of legal issues in the workplace, and developing an effective employee handbook. See Appendix 8 on 25 page for a success story in People Systems.

The smallest category was Quality Systems. This included ISO 9000 implementation, problem solving, defect prevention, matrix analyses design of experiment, SPC workshop, TS 16949 readiness assessment, and CFR21 consulting. See Appendix 9 on page 27 for a Quality Systems success story with Objective Industries in Fisherville.

Workshops

VPMEP provided educational workshops with Virginia Tech Continuing Education Units (CEU'S) for over 800 people with about 170 companies. See Appendix 10 on page 28 for a summary of workshops held. See Appendix 11 on page 30 for a summary of companies that attended the workshops.

One objective of the CEU program has been to build a marketing client base for the Virginia Tech Center for High Performance Manufacturing and the College of Engineering Outreach program. All certificate recipients are provided the opportunity to receive literature and communications from Virginia Tech through this collaborative effort.

These workshops are structured for active learning by working adults and often included participative live simulations. Most of the workshops were developed by the National Institute of Standards and Technology Manufacturing Extension Partnership. See Appendix 12 on page 34 for the Memorandum of Understanding regarding offering CEUs for VPMEP-delivered courses.

Lean

Many different workshops were provided with VPMEP CEU's. The two primary categories are lean and Lean Six Sigma [SM]. In the lean area the traditional introductory workshop is Lean 101. This teaches the principles of lean and how to apply them. During the simulation exercise as a member of the production team for Buzz Electronics, participants apply lean concepts such as standardized work, visual signals, batch size reduction, pull systems, and more. First hand experience demonstrates how lean improves quality, reduces cycle time, improves delivery performance, reduces work-in-process, and enables Buzz to show profit. This particular workshop developed by the National Institute of Standards and Technology has been used successfully thousands of times by MEP's throughout the country.

We also delivered modified versions of the Lean 101. Lean basics were presented as a shortened version. Lean Job Shop modifies the approach to clearly demonstrating how people working in a non-operative customer environment like a small machine shop can apply lean tools effectively in this environment. This workshop was developed at the Virginia Applied Technology and

Professional Development Center (VATPDC). The VATPDC is our partner organization at Old Dominion University.

Another version of introduction lean that was utilized was High Impact Lean. This workshop introduces the concept of Constraints Management with the lean methodology. A video by Dr. Eli Goldratt creates a vehicle for additional discussion.

Some of the lean workshops presented add second level detail to the knowledge transfer. The 5 S Workplace Organization with Live Simulation offered participants first hand experiences in how the 5 S System reduces waste in the mounting plate assembly area of a simulated production facility. The concept of the 5 S System was learned and then applied to transfer a littered, disorganized production area into a lean, organized, and orderly workplace.

Another detail level workshop presented was Setup Reduction Workshop with Interactive Simulation. Participants learned the principles of Setup Reduction and the Single Minute Exchange of Dies (SMED) system. The four-step changeover Improvement Process was applied to achieve Setup Reduction in a life-like simulation exercise. By the end of the day reduced costs, lowered setup times, and increased machine capacity all occurred at the same time.

A more advanced offering was Value Stream Mapping. This technology is at the core of the success of the Toyota Production System. During the workshop participants used the powerful Value Stream Mapping (VSM) tool to create a current state map for Acme Stamping, a real world firm featured in a detailed case study. VSM icons were used to teach the common language of lean as a current state map was created for Acme. Acme's current state was analyzed, non-value added activities found, and a future state map drawn for Acme that eliminated those activities. A plan was also developed to attack those non-value added activities.

A different variant on the lean introduction was Principles of Lean Office and Administration with Live Simulations. Participants gained hands-on experience through simulations in a traditional office environment. As lean principles were applied to the simulated office, they saw how and why the concepts work and recognized the benefits of these techniques in their own company. Class participants took on the roles of customers, engineers, managers and workers like a real company, through the implementations of lean techniques. The office work is transformed from a confused and a slow process to a much more efficient, effective and predictable one. This provided a practical understanding of how lean's continuous improvement techniques can eliminate waste, gain more capacity from existing operations and enhance the company's ability to compete.

The most intensive lean workshop delivered was a Three Day Kaizen Blitz. This process obtains quick results in working from a traditional operation to a more lean enterprise. Value Stream Mapping was used to select an appropriate project. After an initial half-day session in basic Kaizen techniques, an execution plan was developed. Documentation was clarified and process improvement dedicated. After implementation improvement results were presented to management.

The final lean workshop presented was Supply Chain and Simulation. This was created and perfected by Lockwood Greene. The participants learn by doing to optimize a supply chain with the implementation of lean techniques. Supply and logistics issues provided a challenging environment to learn the methodology.

Lean Six Sigma [SM]

VPMEP was thrilled to recently enter into a partnership with the George Group. The George Group wrote the book on Lean Six Sigma [SM] and how to integrate lean and six sigma. This approach combines lean speed with six sigma quality and variation reduction to provide the best available methodology for organizational improvement.

The Lean Six Sigma [SM] Executive Workshop was presented to select management team members. The agenda first establishes the framework for the current state of continuous improvement. The introduction of Lean Six Sigma [SM] is then described. The active learning approach is completed using a fictitious television station. Three rounds of simulation with financial results clearly demonstrated the value of the techniques.

The primary workshop for Lean Six Sigma [SM] was the Lean Six Sigma [SM] Black Belt. This highly rigorous course was presented in four one-week modules. Training materials included four textbooks, four course notebooks, miscellaneous handouts, Virtual Coach and Supply Chain Accelerator simulation software. Virtual Coach software puts all course materials into a handy reference and training tool, so slides, notes and topics can be quickly accessed for reference. Slides can be quickly downloaded to PowerPoint for the black belt to do presentations and to train others. Training is application based with simulations, exercises and Minitab lessons included throughout. Use of Minitab and computer spreadsheets are emphasized to support the lean and statistical calculations. Participants focus less on theory but more on how and when to use the tools effectively. Training is constantly practiced, reinforced and tested to ensure learning. Project completion utilizing the DMAIC approach (Define, Measure, Analyze, Improve, Control) is required of all participants. Coaching of candidates is provided specific to project activity. Teachbacks, passing four exams (including a final exam), and project presentations are required to complete the course certificate.

A less intense workshop was the Lean Six Sigma [SM] Green Belt. This course was presented in two one-week modules. Training materials include three textbooks, two course notebooks, and miscellaneous handouts. Training is application based with many exercises and case studies included throughout. Use of computer spreadsheets are emphasized to support the lean and statistical calculations. Participants focus less on theory but more on how and when to use the tools effectively. Training is constantly practiced, reinforced and tested to ensure learning. Teachbacks, passing two exams, and project presentations are required to complete the course certificate. See Appendix 13 on page 37 for further course descriptions.

Activities

The most interesting shared project is with Applied Felts. See Appendix 14 on page 49 for a descriptive news release. This project provided the first contract for the Advanced and Applied Polymer Processing Institute (AAPPI) at the Institute for Advanced Learning and Research (IALR). The IALR is the Virginia Tech research complex located in Danville.

Applied Felts needed help with an improved bonding process for felt-to-felt and thermoplastic polyurethane outer layer bonding construction. Virginia Tech provided the technological knowledge, and VPMEP managed the project and added engineering support.

Another shared project was with Rehabco in the development of Flex-O-Chair, a fully supported exercise chair designed for use by physical therapists. See Appendix 15 on page 51 for a descriptive news release.

VPMEP managed the project and involved a marketing expert Thomasson Consulting. The Locomotion Laboratory at Virginia Tech conducted the research under the guidance of Professor Thurman Lockhart. Dr. Lockhart is an assistant professor at the Grado Department of Industrial and Systems Engineering at Virginia Tech.

In addition to the projects mentioned above, the collaboration between Virginia Tech and VPMEP contributed to a number of other activities of benefit to industries in our Commonwealth. One of these was the Governor's Working Summit on Advancing Manufacturing held on October 13th and 14th at the Hotel Roanoke and Conference Center. This invitation-only summit brought together a small group of Virginia industry leaders from business, education, and government to focus on a specific action plan for the substantial growth and prosperity of Virginia's manufacturing industry. See Appendix 16 on page 52 for the agenda.

The summit led to the creation of a Manufacturing Advisory Council. The Council is currently working on Virginia's Manufacturing Roadmap. Virginia Tech and VPMEP are working together with many others to bring this to fruition.

Another outcome from the Summit was the Virginia Small Manufacturing Assistance Program (VSMAP) as part of the Governor's Virginia Works effort. VSMAP is to provide targeted assistance and expertise to the start-up of new, and the expansion of existing, small advanced manufacturing businesses in rural and distressed Virginia. The partners in VSMAP will include the Center for the High Performance Manufacturing (CHPM) at Virginia Tech, the Business Technology Center (BTC) at Virginia Tech, and VPMEP. See Appendix 17 on page 54 for program details.

Shared activities have also included various marketing and communications efforts. CHPM and VPMEP actions are noted in both websites and in both newsletters. VPMEP uses the phrase "in collaboration with Virginia Tech" for various communications.

A number of approved proposals have been submitted of a joint nature. A grant was received by VPMEP from the U.S. Department of Commerce Economic Development Administration. The

application mentioned that "we have recently entered into a collaborative agreement with Virginia Tech. This provides access to innovative technological developments that can be transferred to organizations."

VPMEP worked with Virginia Tech's Center for Forest Product Marketing and Management (CFPMM). VPMEP's partner, the Manufacturing Technology Center (MTC) at Wytheville Community College, has also worked with CFPMM. VPMEP and MTC have provided speakers and presented courses at CFPMM events.

VPMEP referred clients to the Center for Load Design, the Department of Electrical and Computer Engineering, and the Department of Engineering Science and Mechanics. CHPM and VPMEP have also provided each other with client contacts.

Virginia Tech and local industry and political leaders in Martinsville and Henry County developed the new Southside Business Technology Center. This will provide student consulting opportunities to local industries. VPMEP continues to assist with this effort located near the VPMEP main office.

VPMEP staff are provided information on Virginia Tech capabilities. Last July a VPMEP Staff Meeting at Virginia Tech included a discussion by Michael Martin on the Virginia Tech perspective on contracts and intellectual property. Also tours were conducted at the Human Factors and Ergonomics Lab, the CAVE (Cave Automatic Virtual Environment), and the Micron Lab.

This July the VPMEP Staff Meeting at Virginia Tech will include a discussion on Senior Design Projects, a review of VSMAP, and a discussion of the Rehabco project. Lab tours will be conducted at Macromolecules and Interfaces Industrial Design, Power Electronic Systems, Intelligent Materials and Structures, and the Advanced Vehicle Dynamics Lab.

Finally, in June VPMEP received a letter from the Governor regarding receipt of an AME award and VPMEP service. See Appendix 18 on page 59 for the letter.

Appendix 1

COLLABORATION AGREEMENT

This Collaboration Agreement dated this twelfth day of November 2004, ("Agreement") by and between Virginia Polytechnic Institute and State University ("Virginia Tech"), a state agency and institution of the Commonwealth of Virginia, and Virginia's A.L. Philpott Manufacturing Extension Partnership, an institution of the Commonwealth of Virginia ("VPMEP").

RECITALS

WHEREAS, Virginia Tech recognizes the contribution VPMEP will make to Virginia Tech's mission and goals, and, therefore, Virginia Tech is willing to collaborate with and provide certain benefits to VPMEP. Mutually, VPMEP recognizes the contribution Virginia Tech will make to VPMEP's mission and goals; and, therefore, VPMEP is willing to collaborate with and provide certain benefits to Virginia Tech. Such collaboration will not, however, be construed to mean that either party is controlled by the other, that either party is responsible for the other's contracts or other acts or omissions, or that either party approves of or ratifies the other's activities; and

WHEREAS, the purpose of this Agreement is to describe the entire relationship between Virginia Tech and VPMEP, including the mutual benefits that the parties may receive and the conditions for their receipt.

TERMS

In condition of the mutual promises contained in this Agreement, Virginia Tech and VPMEP agree as follows:

A. Scope.

1. The parties' goal is to create a framework by which Virginia Tech, primarily through its College of Engineering, and VPMEP jointly can promote technical assistance, research, and outreach with manufacturing interests in the Commonwealth.
2. The parties agree to work collaboratively to improve the competitiveness of manufacturers across the Commonwealth of Virginia.

B. Relationship between Virginia Tech and VPMEP.

1. The parties are independent public entities and neither is a part of the other.
2. The parties agree that this Agreement is the only source of control either party has over the other or its activities except to the extent, if any, that either party chooses to exercise control over activities occurring on its property.

C. Collaboration between the Parties.

1. The Dean of the College of Engineering at Virginia Tech, or his designee, and the Director of the Center for High Performance Manufacturing at Virginia Tech, shall be named as non-voting representatives to the Board of VPMEP.

2. The VPMEP Executive Director agrees to work collaboratively with Virginia Tech faculty. Further, he agrees to meet regularly with the Dean of the College of Engineering, or his designee.

3. A joint meeting will be held annually in Blacksburg, Virginia, between VPMEP field staff and College of Engineering faculty.

D. Dealings with Third Parties.

VPMEP agrees to take reasonable measures to ensure that third parties understand that VPMEP is not part of Virginia Tech. Neither party shall hold itself out as being part of, controlled by, or acting on behalf of the other. However, both parties may inform third parties of the existence of this Agreement.

E. Use of Virginia Tech Name.

Virginia Tech grants VPMEP the right to use the following language to reflect this relationship: "in collaboration with Virginia Tech."

F. Collaborative Programs.

1. Virginia Tech and VPMEP agree to collaborate jointly on projects that will be mutually identified and which the parties agree will be mutually beneficial. In connection with the purposes of this Agreement, the parties agree to engage the services of each other in accordance with the policies and procedures of the parties. Any such project shall be the subject of a separate memorandum that will detail the scope of work, benefits to Virginia Tech and VPMEP, budget, and funding mechanisms for each project. Any such memorandum shall incorporate by reference and be subject to the terms and conditions of this Agreement.

2. By participating in collaborative projects, the parties agree that neither party will be precluded from entering into similar collaborative endeavors with third parties.

G. Employees.

1. Each faculty and staff member who works on projects under this Agreement will be employed by either Virginia Tech or VPMEP, subject to applicable institutional policies.

2. The employment rules and regulations governing the employees shall come from the institution by which the employee is paid his/her salary.

3. The parties agree that unpaid, joint appointments may be offered to employees by other institutions. Such joint appointments will be governed by the rules of the institution granting the unpaid joint appointment.

H. Use of Facilities.

1. Use: Virginia Tech and VPMEP hereby make each other eligible to use their facilities, subject to availability and the policies and procedures of each applicable to such facilities.

2. Cost: At Virginia Tech, VPMEP agrees to pay for the cost of the use of the facilities based upon the facilities usage rate that will be calculated by the Office of Virginia Tech's Controller for each separate facility to be used. At VPMEP, Virginia Tech agrees to pay the standard VPMEP rate for the cost of the use of the facilities used.

I. Rights to Intellectual Property.

The basic policy of the parties is to ensure that the results of research are applied in a manner that best serves the interests of Virginia Tech, VPMEP, and the public.

In furtherance of this purpose and policy, any inventions or copyrighted material conceived, expressed and/or reduced to practice as a result of performance this Agreement (the "Intellectual Property") by the employees of Virginia Tech, shall vest in the University. Any intellectual property conceived, expressed and/or reduced to practice by VPMEP employees during the term of this Agreement shall vest in VPMEP. Any intellectual property made jointly by employees of, or by joint employees of Virginia Tech and VPMEP shall become the joint property of Virginia Tech and VPMEP.

J. Publication Rights.

The parties shall be free to publish papers dealing with the results of projects instituted under this Agreement, except that such publication shall not disclose any of the other party's Proprietary Information (as that term is described in Section K) without the written consent of the owner of the Proprietary Information. Each party further agrees to send the other a copy of any such proposed publication thirty (30) days prior to submission for publication. Each party, on request of the other within such thirty (30) day period, shall delete any Proprietary Information in the proposed publication. The parties agree to delay publication of any information relating to a potential invention until such time as a copyright or patent application is filed or such time as otherwise agreed by the parties. Any papers published shall give appropriate recognition to the support and authorship received from the other party.

K. Proprietary Information.

By "Proprietary Information," means information of a confidential or proprietary nature provided by one party to the other in connection with this Agreement. Except as provided in the next sentence, the non-disclosing party shall use its best efforts not to disclose, in whole or in part, any Proprietary Information to any third party for a period of three (3) years following termination of this Agreement. The non-disclosing party shall have no obligation to prevent the disclosure in whole or in part, of Proprietary Information that is:

1. Not identified as Proprietary Information in writing and appropriately marked at the time it is disclosed by the disclosing party;

2. Already known to the non-disclosing party at the time it is disclosed by the non-disclosing party;

3. Known to a third party without the wrongful act or breach of this Agreement by the non-disclosing party;

4. Rightfully received by the non-disclosing party from a third party on a non-confidential basis;

5. Approved for release by written authorization of the disclosing party; or

6. Required by law or by lawfully issued subpoena to be disclosed.

L. Term and Termination of Agreement.

This Agreement shall become effective as of January 1, 2005 and shall remain in effect for one year, unless terminated earlier by mutual written agreement of the parties. The parties agree to conduct an annual evaluation of the activities undertaken pursuant to this Agreement to determine whether the Agreement should be renewed. This Agreement may be renewed annually subject to written agreement of both parties.

M. Waiver.

Failure of either party to enforce any of the provisions of this Agreement shall not be construed as a waiver of that, or any other, provision or any later breach thereof.

N. Non-Discrimination.

Both parties agree not to discriminate on the basis of race, color, religion, national origin, political affiliation, handicap, gender, sexual orientation or age during the performance of this Agreement.

O. Notices.

Any notice under this Agreement shall be deemed given when delivered in person or received in the mail, postage prepaid, and addressed as follows:

If to Virginia Tech:
Executive Vice President
Virginia Tech
210 Burruss Hall
Blacksburg, Virginia 24061-0148

If to VPMEP:
Executive Director
Virginia's A. L. Philpott Manufacturing Extension Partnership
645 Patriot Ave
PO Box 5311
Martinsville, VA 24115

or to such other person, at such address, as either party may designate for itself and so notify the other party in writing.

P. Entire Agreement; Amendments.

This Agreement constitutes the entire agreement between Virginia Tech and VPMEP concerning the subject matter, and it supersedes all prior written or oral agreements concerning this subject matter. This Agreement may not be amended except by written document executed by both parties. This Agreement is signed on a non-exclusive basis and nothing herein shall preclude the parties from entering into similar affiliation agreements with third parties.

Q. Choice of Law.

The Agreement shall be construed in accordance with the laws of the Commonwealth of Virginia.

R. Paragraph Headings.

The paragraph headings in this Agreement are used only for ease of reference, and do not limit, modify, construe, or interpret any provision of this Agreement.

S. Liability.

Virginia Tech and VPMEP understand and agree that neither institution nor the employees of either will be liable for any of the contracts, torts, or other actions or omissions of the other.

T. Severability.

Each paragraph and provision of this Agreement is severable from the entire Agreement; and if any provision is declared invalid, the remaining provisions shall nevertheless remain in effect.

IN WITNESS WHEREOF, the parties have executed this Agreement Below:

Virginia Polytechnic Institute and State University	Virginia's A.L. Philpott Manufacturing Extension Partnership
By_____	By_____
James A. Hyatt	Jeff Kohler
Title: Executive Vice President	Title: Executive Director
Date: _____	**Date:** _____

Appendix 2

Item 95 #2c

Commerce And Trade

Secretary Of Commerce And Trade — Language

Language:

Page 83, after line 29, insert:

"E. The Secretary of Commerce and Trade shall evaluate the effectiveness of the contractual relationship between the Virginia Philpott Manufacturing Extension Partnership (VPMEP) and Virginia Tech in terms of the total number of projects undertaken, revenues earned, projects shared or referred between the two entities, services provided, and productivity levels achieved by the clients. As part of the evaluation, the Secretary shall also determine whether the Extension would be better served by merging VPMEP with Virginia Tech, Old Dominion University or another appropriate institution or agency, with the principal office of VPMEP remaining in the Martinsville area. The Secretary of Commerce and Trade shall report the results of his analysis to the Chairmen of the House Appropriations and Senate Finance Committees by August 31, 2005."

Explanation:

(This amendment directs the Secretary of Commerce and Trade to study the Philpott Manufacturing Extension's relationship with Virginia Tech and whether it should be merged into one of the Commonwealth's institutions of higher education.)

Appendix 3

High Level VT VPMEP Evaluation

Education to Industry

VPMEP provided educational workshops with Virginia Tech Continuing Education Units (CEU's) for 768 people with 169 companies. Each participant is provided with a certificate of achievement signed by the Center for High Performance Manufacturing (CHPM) and VPMEP. The direct CEU revenue paid to Virginia Tech from VPMEP is in the low five figures. All participants' contact information is provided to Virginia Tech and CHPM for general marketing use.

VPMEP has also worked with Virginia Tech's Center for Forest Product Marketing and Management (CFPMM). VPMEP's partner, the Manufacturing Technology Center (MTC) at Wytheville Community College, has also worked with CFPMM. VPMEP and MTC have provided speakers and presented courses at CFPMM events.

Consulting to Industry

The use of the phrase in "collaboration with Virginia Tech" has been beneficial to VPMEP marketing efforts. CHPM and VPMEP provide marketing assistance to each other. One example is the inclusion of CHPM meetings in the VPMEP newsletter, emails, and website.

VPMEP referred clients to the Center for Load Design, the Department of Electrical and Computer Engineering, and the Department of Engineering Science and Mechanics. CHPM and VPMEP have also provided each other with client contacts.

VPMEP worked with Virginia Tech to help develop the new Business Technology Center (BTC) in Martinsville. This will provide student consulting opportunities with local industries.

Virginia's Small Manufacturing Assistance Program (VSMAP)

Virginia Tech and VPMEP worked together with the Virginia Manufacturers Association and the Secretary of Commerce and Trade to present a working summit on Advancing Virginia's Manufacturing Industry. Many manufacturing leaders across the Commonwealth attended this event that included a presentation by Governor Warner. This summit contributed to the creation of the VSMAP that was one of Governor Warner's economic development initiatives under Virginia Works.

VPMEP is working with CHPM and the Blacksburg BTC to provide targeted assistance to the startup of new and the expansion of existing, small advanced manufacturing businesses in rural Virginia. This program might not have been funded by the General Assembly, if collaboration between VPMEP and Virginia Tech were not in existence. This VSMAP program will provide six figure revenue to Virginia Tech.

Student Involvement
A presentation was made by VPMEP to students in the Supply Chain Management Class at the Pamplin College of Business. The focus was to provide an actual business perspective to supply chain efforts.

Attempts were made for VPMEP involvement with internships and design projects. None was successful. Client distance from Blacksburg is one impediment to these arrangements. Lack of prioritization within VPMEP for student involvement also contributed to this shortfall.

Faculty Involvement
Dr. Thurmon Lockhart developed and completed clinical trials for a client who has invented and patented a biomedical therapeutic device. His endeavor was very successful and positively received, establishing the functionality of the device, and providing a basis for a marketing campaign. This endeavor was an outcome from VPMEP staff touring various research centers at Virginia Tech.

Dr. Ron Moffitt is currently working on the first industry sponsored project at the Institute for Advanced Learning and Research in Danville for Applied Felts in Martinsville. Applied Felts is a rapidly expanding manufacturer of form in place liners that permanently repair industrial and municipal sewers. The project will develop two improved bonding processes for non-woven felts in lap and butt configurations. Improvements will result in processing consistency, production capacity, and improved safety. Pilot equipment required for experiments is being designed by VPMEP and will become the property of Virginia Tech upon project completion.

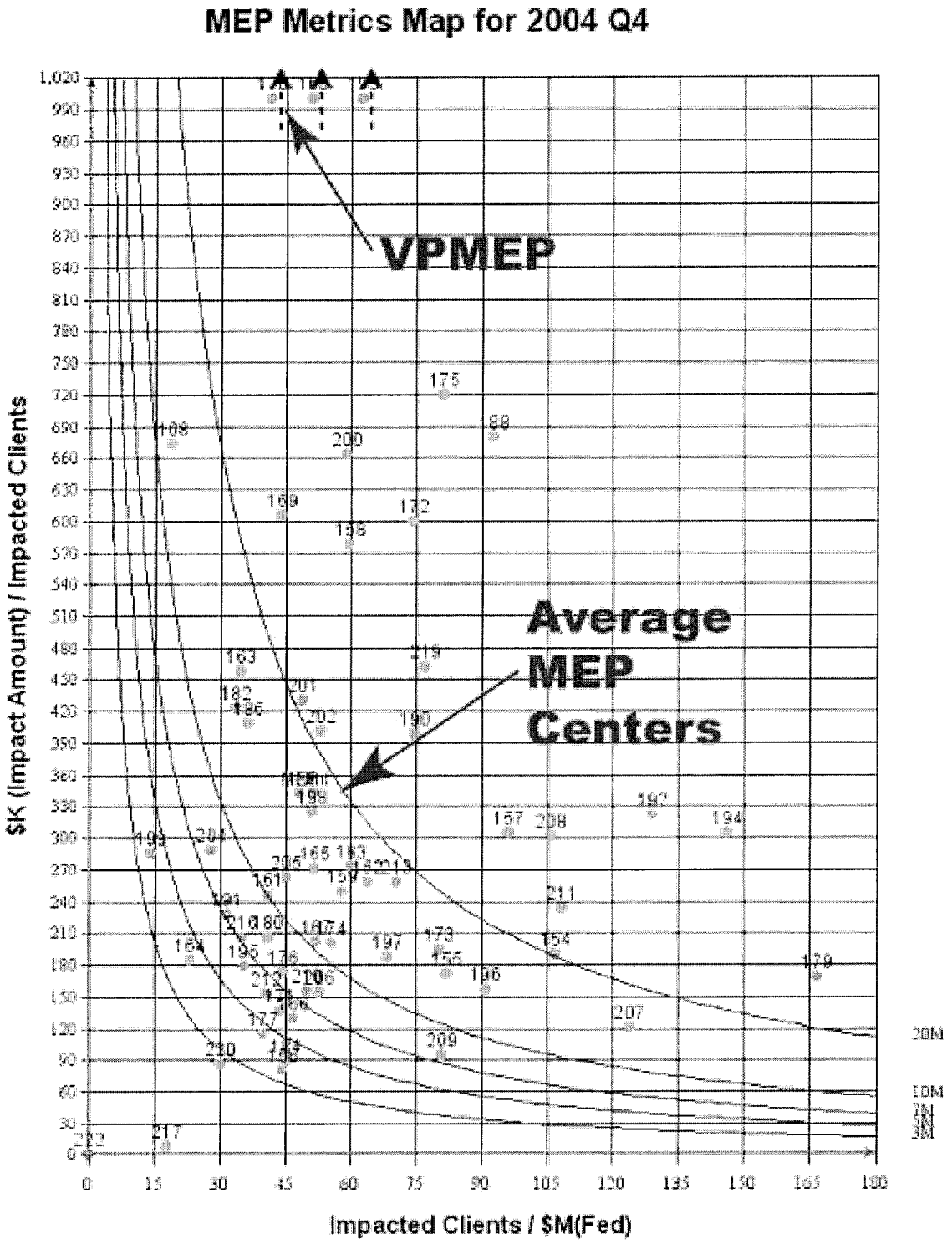
The combined dollar payments to Virginia Tech from these two projects will approach six figures. Two challenges for these types of activities are intellectual property clarification and faculty availability.

Impact
VPMEP receives written economic impact evaluations from all clients at the close of projects. The total economic impact for the first nine months of calendar year 2005 was $179 million. This included increased or retained sales of $116 million, cost savings of $52 million, investments of $9 million, and inventory reduction of $2 million. There were 331 jobs created or retained. At this time, it is too early to identify the impact of the two faculty involvement projects mentioned above.

Summary
We believe that the relationship between Virginia Tech and VPMEP has been modestly successful. As in all new and developing partnerships, initial success is often in small steps. We look forward to furthering the collaboration between Virginia Tech and VPMEP.

Dr. Ed Henneke
Jeff Kohler
Dr. Ted Settle
Dr. Bob Taylor

Appendix 4


MEP Metrics Map for 2004 Q4
VPMEP
Average MEP Centers
$K (Impact Amount) / Impacted Clients
Impacted Clients / $M(Fed)
0
15
30
45
60
75
90
105
120
135
150
165
180

Appendix 5

Carlisle Motion Control Industries, Inc.

VPMEP
Solutions for a better way
in collaboration with Virginia Tech

Incorporating Set-up Reduction Techniques Benefits Carlisle Motion Control

Product: Heavy-duty brake products
Location: South Hill, VA
Employees: 115
Founded: 1938

The Company:

Carlisle Motion Control Industries, Inc. (a subsidiary of a Carlisle Companies, Inc., a diversified global manufacturing company), manufactures brake products for the heavy-duty trucking industry. The company has expanded its product line to include a wide variety of application-specific friction materials, as well as brake shoe remanufacturing and spring brakes. The South Hill operation employs 15 and is a state-of-the-art specialty friction production facility providing a variety of brake components in response to varying levels of demand.

The Situation:

As part of the manufacturing process, brake components require a substantial amount of drilling accomplished by any one of the several multi-head drills in the facility. Different drilling configurations are required for components comprising each product family. Each new configuration requires a changeover of the drill and some changeovers can be extensive. Carlisle Motion believed that there was an opportunity to reduce the changeover time for the major set-ups by using lean manufacturing techniques. To pursue this opportunity, Carlisle Motion contacted Virginia's Philpott Manufacturing Extension Partnership (VPMEP). Previously VPMEP had assisted Carlisle Motion with implementation of QS 9000 at the South Hill facility.

The Response:

VPMEP Project Manager, Mark Oakes, videotaped a changeover in order to identify opportunities for reduction. The time required to perform this specific changeover was just under two hours. Calculations based on the cycle time and the average cost of the product family determined that each hour of production was worth in excess of $1,000 contingent on customer product availability.

Carlisle created a cross-functional team to address the changeover issues. VPMEP provided classroom instruction (which included a simulation) to the team on the techniques of set-up reduction. Following the instruction, the team reviewed the videotape of the drill changeover and began applying the reduction techniques.

During the group analysis of the videotape, the team determined that the present system lacked organization in many areas including task sequencing, tooling availability and visual identification aids. The team created an improved set-up procedure and developed a list of additional action items to facilitate the improvement process.

The Results:

The improved procedure shortened the time on changeover for the major set-ups. Of the eight to ten daily changeovers, four to five are major in scope, which totals 20 to 25 major changeovers per week. With the implementation of set-up reduction techniques, Carlisle Motion has reduced major changeover times by 15 to 20 minutes for each set-up, realizing a saving of 1-1 ½ hours per day. This cost saving of $1,000 to $1,500 a day multiplied by 260 days per year equals $260,000 to $390,000, or an average of $325,000 per year.

Management's Comment:

According to Steve Harris, Production Manager, "The training that was presented by Mark Oakes was very well prepared and presented in a very clear and understandable format. Associating a dollar figure with the time machines when not running gave some of the members of the team a different view of downtime. The training has been embraced by the team members making this effort successful."

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Appendix 6

PRODUCTIVITY
Lean Manufacturing Advisor
Page 12
June 2005
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Lean Supply Chain Effort is Built On Research, Planning & Structure

If you want to work with your suppliers to make your supply chain lean, do your homework.

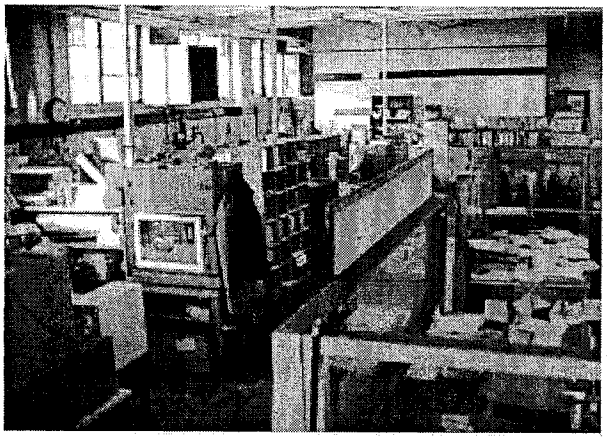
Northrop Grumman did. Executives at the company's shipbuilding facility in Newport News, Va., began a program with suppliers more than two years ago. They carefully targeted which suppliers they wanted in the program, developed detailed plans setting goals and expectations, and contracted with a nationwide network of consultants to make the initiative work.

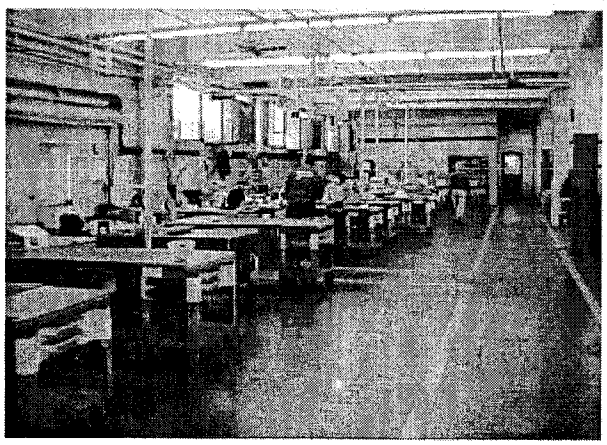
"You really need to make sure that you've done your due diligence in terms of looking at suppliers who are going to make a difference," says John Jordan, director of sourcing at the facility. "You can't just randomly pick them. You need to make a conscious stratification of your supply base."

The effort has already achieved notable benefits. The first group of suppliers involved (there have been four groups so far) achieved improvements in:

- Lead time, with gains averaging 35 percent.
- On-time delivery, 44 percent.
- Inventory turns, 35 percent.
- First-pass acceptance rate, 62 percent.

Further, the effort is helping Northrop Grumman turn at least some supplier relationships into partnerships, leading to long-term supply agreements that Jordan says are resulting in "multi-million dollar savings," though he declined to provide specific figures.





Efforts by Northrop Grumman's Dock to Stock Value Stream Team improved operational flow and led to consolidation of personnel from two buildings into one. One area transformed is shown in its before (top) and after states.

A Need for Speed

The sprawling Newport News facility builds and overhauls aircraft carriers and submarines for the U.S. Navy. Occupying 550 acres along two miles of waterfront, the facility includes numerous buildings, seven dry docks with one floating dry dock, four piers and the largest gantry crane in the western hemisphere. Not quite half of all spending relates to new construction of carriers, with the remainder divided almost evenly between submarine construction and overhauls.

Northrop Grumman is under pressure from the Navy to do all work as quickly as possible, and "we simply don't have a significant amount of lead time in many cases to get material delivered," Jordan notes. "We need components, and we need them in many cases in days or weeks as opposed to months." A ship may come in for overhaul, for example, and workers may discover it needs a new valve, which may be a specialized part with complex engineering. "It's not like you can go to Wal-Mart or Lowe's or Home Depot and just get a valve," he quips.

Targeting Suppliers

The Newport News sector has been on a lean journey since 1996, though by its own admission, the effort was fragmented until about 2002 when an overall enterprise approach was established. That effort provided the basis for supply chain improvements; "We felt we shouldn't be asking suppliers to do something we were not doing ourselves," says

Supply Chain cont. on p.9

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PRODUCTIVITY Lean Manufacturing Advisor

Supply Chain, cont. from p.12

Jordan.

In launching what the company calls lean supply chain management, executives knew it simply was not feasible to involve every one of the sector's 2,600 suppliers. (That number, by the way, is down significantly from what it had been in the year 2000 because of a conscious effort to "right-size" the supply base.)

So the company targeted suppliers providing pipes, valves and fittings, which Jordan says are among the biggest cost-drivers overall — "several thousand mechanics are dependent on those particular commodities," he explains.

Valerie Smith, manager of supplier quality, played a critical role in the selection and implementation processes.

Fifty-one suppliers are actively involved in lean initiatives so far — only a fraction of the total number of suppliers, but those 51 represent almost 40 percent of the company's receipt volume, according to Jordan.

Northrop Grumman's goals for the program are reductions in price premiums, expediting and inventory levels, as well as improved material availability. For suppliers, the expected benefits include reductions in cycle time and inventory levels, increased capacity, and improvements in agility and profitability. Together, the two sides hope to achieve stronger partnerships, improved communication, an

→

A Supplier Sees a Win-Win Partnership

Revcar Fasteners is happy to be giving Northrop Grumman a better price on its products than in the past because the company is getting more business from its customer. And that is a direct result of Revcar's participation in Northrop Grumman's lean supply chain program, which is leading to a stronger partnership between the two companies.

"This really is a partnership," says Jamie Farrell, sales manager with Revcar. "Northrop Grumman is taking the time and money to train us and make us understand their industry better. Typically, we go in and show a customer how we can save them money, but we don't always learn how their business works."

During the past two years, Revcar has been getting an education about Northrop Grumman's Newport News shipyard. The two companies have done business together for years, but the new partnership is leading to a deeper understanding of processes at the shipyard, resulting in Revcar providing better service.

Revcar is a distributor of fasteners to OEMs. A division of the Wurth Group, Revcar has about 100 employees and sales of around $30 million. According to Farrell, sales to Northrop Grumman are "in the millions."

The distributor was part of the second group of suppliers invited by Northrop Grumman to be part of its lean supply chain efforts — and Farrell admits that, initially, her company was skeptical.

"Number one, the concern was 'how much is this going to cost us?'" she recalls. "The second concern was 'how much time is it going to take? How many man-hours is it going to take for our employees to implement these lean procedures?'"

However, the initial presentation by Northrop Grumman was persuasive, and Revcar climbed on board. The first significant change was establishment of a vendor-managed inventory (VMI) program at Newport News, with Revcar in charge of a new supermarket of parts at the facility.

Farrell explains: "They had a warehouse with racks that go up 20 feet in the air. The fasteners were spread out. They would get a requisition, and come into the warehouse for one part. They would drive a forklift, and bring the pallet down, count out 100 pieces, then bag it up. It would then be sent out into the yard somewhere. To pull a part could take half an hour. Now, with VMI, we have 400 part numbers all in a central location. It's a two-bin kanban program. A warehouse employee will walk over to the area and count out what they need. A Revcar Fastener employee comes in three times a week. Everything is bar-coded. They scan the empty bins and replenish them."

More recently, Revcar and Northrop Grumman have been creating value stream maps of facility operations, showing the flow of parts from the warehouse. That effort has made it clear, Farrell says, that "what we need to do is take it to the next level. We need to take some of these 400 parts and put them in the shop, what we call the point of use."

Farrell believes that one of the biggest benefits of the new effort is the partnership between the two companies.

"Now we're sharing information," she says. "We are finding out what parts are critical. We have a better understanding of how the shipyard works and why delivery is crucial, why we need to have a quote into them on time. By working as a partnership, we're finding out they are going to use X amount of this part. We know what their demand for this fastener is going to be throughout the year, or two years or three years. We know we're going to sell this part to them for the next three years. We look at it as a win-win because we can buy it cheaper. And they do save money. If they say 'quote this part, and we're going to work with you as a partnership, and you will supply this partnership for the next three years,' they get a better price."

In addition, Revcar's increased understanding of lean principles is helping the distributor with its other customers. "I can talk intelligently now to a global sourcing manager who is working with these same principles," Farrell states. "That's critical in our business, to bring new ideas to the table. We are definitely a service-oriented company selling what most people consider a commodity."

agile supply chain, improved profitability and strong performance on contracts.

Letter of Commitment

The first challenge in launching the supplier program was getting suppliers to take part. Jordan says he was surprised to learn, when the first group of selected suppliers was approached, that simply inviting them to take part wasn't enough. With subsequent groups (there are a total of four groups so far), top managers from each supplier were invited to take part in a one-day, hands-on introduction to lean concepts and principles — a tactic that led to many more suppliers agreeing to take part.

Northrop Grumman set up the effort in partnership with the Manufacturing Extension Partnership, a nationwide network of non-profit, government funded organizations that help small and mid-sized business to become more efficient, largely through application of lean principles.

The Virginia Philpott MEP, the local organization, became the lead consultant and training organization. However, MEPs in a variety of other states, from Massachusetts to Oregon, are also involved, working with suppliers in those locations.

"You need to make a conscious stratification of your supply base."

John Jordan
Northrop Grumman

Each supplier that signs up for the program signs a letter of understanding making certain commitments. The first is that the supplier undergoes a lean assessment by MEP officials, which is paid for by Northrop Grumman. (The cost is roughly $2,500 per supplier.) This determines the state of the supplier's lean knowledge and capabilities, and includes general recommendations for improvement activities.

(Jordan characterizes most suppliers as being in the beginning stages of a lean journey.)

Subsequently, the supplier and Northrop Grumman split evenly the cost of consulting work to implement those improvements, up to a total cost of $50,000. (The typical cost is around $35,000.) That amount is strictly for the consulting; it does not include any capital spending that may be required of the supplier to achieve additional improvements.

Keeping Score

A chief focus of the efforts is to improve the supplier's agility — which is defined as "a supplier's ability to provide for and reliably react to short notice changes in quantities and quick delivery with minimum inventory levels." Elements contributing to agility are lead time, on-time delivery, inventory turns and quality.

According to Northrop Grumman, agility gains by the first group of suppliers include:

- More than $3.9 million in new sales capacity created.
- Existing sales of $775,000 retained.
- Inventories cut by more than $1.48 million.
- More than $1 million in cost savings (more than two-thirds of that in labor, the rest in overhead).

The focus on agility relates directly to a Northrop Grumman goal, to identify what the company calls best value suppliers.

What this means, in part, is that Northrop Grumman is developing balanced scorecards to evaluate particular groups of suppliers. For example, in looking at the suppliers for a particular product family, the company might evaluate the suppliers on 10 different criteria, price being only one. The others might be lead time, delivery, quality, the supplier's continuous improvement efforts, and so on.

Further, each score is weighted. With a particular product family, for example, Northrop Grumman might decide that lead time is especially important and count it as 20 percent of the total score. Each of the other criteria might be weighted to account for 15, 10 or even 5 percent. The supplier with the highest overall weighted score is most likely to win the contract.

Jordan stresses that Northrop Grumman does not require any supplier to take part in its lean supply chain management program.

However, he comments, "My expectation is that we're going to get the results either way. We are providing them with a potential tool kit. If they want to use the lean tools, that's great. We can help facilitate that. If they don't, if they want to use some other consulting group or some other approach, that's fine, but as part of our supplier management process, we have a scorecard, and we are expecting results one way or another. It's their call." ■

Takeaways

- ❒ **Suppliers provide better service when they better understand their customers' business.**
- ❒ **The customer may need to provide incentives to involve the supplier.**
- ❒ **Close partnerships can lead to longer-term agreements, which benefit both parties.**

Appendix 7

CLARKE Communications, Inc.

VPMEP
Solutions for a better way
in collaboration with Virginia Tech

CLARKE Communications Strategizes Now For Future Growth

Product: Single resource for design, print and mailing
Location: Lynchburg, VA
Employees: 15
Founded: 1955

The Company:

In 2004, CLARKE, Incorporated *(formerly Central Lithographic Printing)* acquired digital photography and mailing equipment, in addition to a creative marketing firm, allowing them to expand services beyond printing. CLARKE, Inc. now offers a wide range of services to its clients with one-stop shopping for design, printing and mailing/fulfillment. They are located in Lynchburg, Virginia employing 15.

The Situation:

Since acquiring the original Central Lithographic Printing almost a decade ago, owner Victor Clarke has continually grown his printing business. With the recent addition of design and mailing/fulfillment services, he wanted to ensure continued success and growth for CLARKE, Inc. Victor was committed to developing a sound, strategic plan to excel operations to the next level. Virginia's Philpott Manufacturing Extension Partnership (VPMEP), a 360vu designated network affiliate of NIST MEP, was invited to facilitate the development of a strategic plan.

The Response:

VPMEP is no stranger to Victor Clarke. Since 1998, VPMEP has maintained an ongoing relationship starting with lean implementation within their printing service. Professional Business Advisor Michael P. Levy (PBA) was assigned to lead the strategic planning project. He is the manager of VPMEP's Strategic Management Services (SMS) practice and delivers the practices' services to clients as a PBA. Michael specializes in helping company owners and leaders clarify and achieve their business goals using a 360-degree approach of enterprise-wide strategic management services including strategic and long-range planning.

After initial consultations with Victor and other involved personnel, Michael recommended a six-step work plan. Those steps included: establishing the company's purpose incorporating vision, mission, values and guiding principles; analyzing and documenting present company strengths, weaknesses, market opportunities and threats (SWOT analysis); developing goals; identifying internal and external obstacles (learned from the assessments) to achieving new goals; establishing criteria for entering new market segments; and finally setting SMART (Specific, Measurable, Accountable, Realistic and Time-based) objectives necessary for successful execution of the plan and the completion of the written plan.

The Results:

The benefits and impact that can be achieved from implementing a strategic plan for CLARKE, Inc. is directly related to the commitment and involvement on the part of management. The impacts are measurable by comparing the initial baseline process outputs at the start of the plan implementation with the process outputs as the plan completion.

Such benefits and impact noted since completion of the strategic plan have been:

- Increased sales revenue by 7%
- Increased profits by 243%
- Increased sales per employee by 13%
- Realized cost savings of $95,000

Management's Comment:

"VPMEP has been a tremendous help over the past several years. The success of the strategic planning project with Michael Levy has put us in the top 25% of printers our size in terms of sales and more importantly, profits."
-Victor Clarke, President

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Appendix 8

City of Danville Department of Utilities

VPMEP
Solutions for a better way
in collaboration with Virginia Tech

City of Danville Partners with VPMEP to Provide Supervisory and Job Enrichment Programs

Product: Electricity, natural gas, street lighting, water and wastewater treatment
Location: Danville, VA
Employees: Utilities Department – 187 total, City of Danville – 1,175
Founded: 1866

The Company:

Founded in 1866, the City of Danville Department of Utilities provides high quality drinking water, wastewater treatment, clean and efficient burning natural gas, electric power and street lighting for the city and surrounding areas. The system serves approximately 86,500 customers and is comprised of the City of Danville as well as the counties of Halifax, Henry, and Pittsylvania.

The Situation:

The department recently completed a comprehensive employee survey under the new leadership of Joe King, Assistant City Manager. This survey was designed to identify those issues or roadblocks inhibiting the department from becoming a *World Class Organization*. The survey results obtained are highlighted in the following list of human resource issues:

- Low productivity and workforce morale
- Perceived favoritism influencing management decision-making
- Inconsistent treatment of employees across divisions, groups or between individuals
- Lack of employee involvement in decision-making
- Inadequate communication involving matters outside immediate work groups

The Response:

Recognizing the need to enhance operations, Assistant City Manager for Utilities Joe King and Human Resource Specialist Jim McInerney initiated a long-term partnership with ***Virginia's Philpott Manufacturing Extension Partnership (VPMEP)***. The partnership objective was to develop and deliver a customized, comprehensive supervisory development and job enrichment program. Existing city departmental policies and procedures were imbedded in the program, which served to complement and reinforce previous *Supervisory Development* skills activities. The supervisory development and job enrichment program unfolded through a series of five knowledge building workshops and programs.

1. Laura Rathburn, VPMEP's Team Leader, launched the project with ***Keystone,*** a leadership program designed to assist management in building a culture that can support and sustain change. The purpose of the program was to align the department's management team relative to its organizational values, vision and long-term strategy. It was hoped that the program would foster confidence in management, promote teamwork and inspire a commitment to involve and empower others for daily operations.

2. Following ***Keystone***, the supervisory staff was divided into cross-functional teams. Each team successfully completed sessions of ***Leadership Foundations℠***, which addressed the challenges and opportunities faced by front-line leadership. Through ***Leadership Foundations℠***, front-line supervisors were provided the skills and abilities necessary to supervise, coach, coordinate, and lead the activities of their subordinates and peers.

   At key points in the program, leadership skills were reinforced and refocused upon such critical areas as ***team building*** and ***effective communications*** in the workplace.

3. The entire management team then participated in ***Team Building***, a half-day workshop designed to improve

(continued next page)

team effectiveness for both workgroups and the leadership team. The experience provided a basic awareness of the dynamics of teams and the power of collaboration.

4. The introduction of ***Effective Communications at Work***, a full-day workshop, provided a comprehensive focus on communications in the workplace, specifically where there are potential conflicts.

5. Finally, a core group of employees were exposed to techniques intended to improve their communication skills relative to the training of their peers. Through this instruction, the group gained insight into the fundamentals of adult learning, the various learning styles, and how to adapt training to each particular style. Also included in the program were the creation and use of effective visual aids, lesson plan development, and the management of training dynamics associated with various forms of communication meetings. The participants were required to deliver several presentations covering topics relevant to their work, instilling them with the confidence and skills needed to facilitate meetings and deliver effective presentations.

The Results:

The supervisory development and job enrichment program proved to be an important factor in breaking down the functional barriers that had impeded the Department of Utilities' effort to achieve its goal of becoming a *World Class Organization*. Through the development of enhanced communication and collaboration skills, productivity throughout the Department increased and morale, as well as overall job satisfaction, improved significantly.

Applying their newly enhanced skills to improve the overall effectiveness of the organization, Danville Utilities is now better prepared to pursue their ultimate goal: *to provide unparalleled customer service and support to its customers*. Employees were indeed empowered, as evidenced by the fact that although the entire management team was involved in a full-day session, there was no loss of productivity. According to Danville City leaders, "...This could not have been achieved six months ago." VPMEP also certified Jim McInerney in the delivery of this program as a means to benefit the entire city staff through the creation of a similar internal program. *Jim's certification is continuing and course development is underway for him to deliver program content in July, 2004, a continuing cost saving to the City of Danville.*

Although annual accumulated savings have yet to be calculated, the overall financial impact of this program upon the Danville Utilities Department was significant.

Management's Comment:

"The programs that VPMEP provided to us were key to our on-going efforts to develop an effective Management Team," said Assistant City Manager for Utilities Joe King. "I was impressed by the high quality, personal service we received from Laura Rathburn and her group. She took the time to get to know our operation and made sure the program focused directly on our needs. ***Leadership Foundations***[SM] served as the core of our training program. It was very well suited for our Management Team, including our critically important frontline supervisors."

Appendix 9

Objective Industries

VPMEP
Solutions for a better way
in collaboration with Virginia Tech

ISO 9001:2000 Quickly Proves A Benefit to An Ultra-High-Precision Machine Shop

Product: Precision machine shop
Location: Fishersville, VA
Employees: 20
Founded: 1967

The Company:

Since 1967, Objective Industries has been a privately held, ultra-precision machine shop located in Fishersville, Virginia employing 20 workers. Objective currently has five state apprenticeship programs including Jig Grinding, ID-OD Grinding, Surface Grinding, EDM Technician, and Machinist. Through these programs, the skilled staff at Objective has earned the level of "Journeymen" in their field.

The Situation:

Objective Industries was experiencing requests by customers to become registered to ISO 9001 as a requirement to remain a vendor. In addition, the sales force was being told by potential new customers that without ISO certification they could not do business with Objective Industries.

The Response:

VPMEP worked with Objective's management team to implement the ISO Quality Management Standard, leading to Objective's being recommended for registration in July 2003. VPMEP's experienced ISO specialists, with Objectives' staff developed the necessary procedures and quality documents to be effective for a small company without additional overhead. This included training the staff to audit, write procedures and maintain a continuous improvement program as required by ISO 9001:2000. In less than a month, this recommendation has led to orders from a new customer in the medical industry, which requires their vendors to be ISO certified.

The Results:

The implementation of ISO 9001:2000 at this small company has led to new business, both with the new customers, as well as existing customers that require their vendors to be ISO certified.

Management's Comment:

"Despite a terrible economy, this implementation had to be done. VPMEP's ability to work with our small company in these hard times has led to new business with a new client in less than a month after being recommended for ISO registration. We see this effort as a new beginning for Objective Industries, and are seeing new business to justify that belief."
-James Oberg, President, Objective Industries

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Appendix 10

CEU Workshop Summary

Date of Event	Seminar
17-Mar-04	Lean 101
13-Apr-04	VSM
17-May-04	Lean 101
25-May-04	Supply Chain Workshop
26-May-04	Supply Chain Workshop
27-May-04	VSM
3-Jun-04	Set-up
4-Jun-04	Kaizen-3 day
14-Jun-04	Lean 101
17-Jun-04	Supply Chain Workshop
17-Jun-04	Lean 101
21-Jun-04	LSS BB Summer 04
29-Jun-04	High-Impact Lean
2-Aug-04	VSM
17-Aug-04	Lean 101
27-Aug-04	High-Impact Lean
2-Sep-04	Kaizen-3 day
17-Sep-04	High-Impact Lean
22-Sep-04	Lean Office
8-Oct-04	High-Impact Lean
11-Oct-04	LSS BB Fall 04
14-Oct-04	Lean Basics
17-Oct-04	Lean 101
26-Oct-04	Lean Job Shop
3-Nov-04	Lean Job Shop
22-Nov-04	Setup Reduction
3-Dec-04	LSS Exec
6-Dec-04	High-Impact Lean
08-Dec-04	LSS Black Belt
13-Dec-04	High-Impact Lean
16-Dec-04	VSM
20-Dec-04	High-Impact Lean
7-Jan-05	High-Impact Lean
7-Jan-05	VSM
10-Jan-05	5S
14-Jan-05	High Impact Lean

21-Jan-05	High-Impact Lean
25-Jan-05	High-Impact Lean
26-Jan-05	LSS Exec
27-Jan-05	LS Chain Workshop
28-Jan-05	High-Impact Lean
2-Feb-05	LS Exec. Overview
8-Feb-05	VSM
14-Feb-05	LSS GB Spring 05
17-Feb-05	5S Workplace
25-Feb-05	Kaizen-5 Day
26-Feb-05	Lean 101
9-Mar-05	Lean Job Shop
10-Mar-05	LSS BB Summer 04
15-Mar-05	High Impact Lean
18-Mar-05	LSS BB Spring-05
22-Mar-05	Lean Job Shop
24-Mar-05	Lean Job Shop
30-Mar-05	High Impact Lean
12-Apr-05	LSS Exec Over
12-Apr-05	High Impact Lean
14-Apr-05	Lean 101
10-May-05	LSS Exec Overview
11-May-05	High-Impact Lean
20-May-05	High-Impact Lean

Appendix 11

CEU Workshop Companies

#	Company	City
1	AFG Glass	Richmond
2	AGY	Aiken, SC
3	AMF Bakery Systems	Richmond
4	AMF Bowling Products	Richmond
5	Advex Corp.	Hampton
6	Aerofin Corporation	Lynchburg
7	Alstom Power Inc.	Richmond
8	Andrew Corporation	Forest
9	Applied Felts, Inc.	Martinsville
10	Architectural Concrete Products	Daleville
11	Areva/Framatome	Lynchburg
12	Atlas Container	Severn, MN
13	Automated Industrial Technology	Forest
14	B & B Printing	Bedford
15	BGF Industries	South Hill
16	Bassett Furniture	Bassett
17	Belvac	Lynchburg
18	Blackstone Manufacturing	Blackstone
19	Boar's Head Provisions Co.	Jarratt
20	Bocava Guild Ltd.	Low Moor
21	Boehringer Ingelheim	Petersburg
22	Brenco Inc.	Petersburg
23	Brown Machine Works	Rustburg
24	Butler Parachute	Roanoke
25	Butler Woodcrafters Inc.	Warrenton
26	BWX Technologies	Lynchburg
27	CCS	Christiansburg
28	CIA Leadership Academy	Philadelphia, PA
29	CPV Mfg.	Aurora, IL
30	Cabot Microelectronics Corp	Richmond
32	Cadmus Specialty Publications	Richmond
33	Cardinal Homes, Inc.	Wylliesburg
34	Caremed, Inc.	South Hill
35	Carlisle Motion Control Industries, Inc.	Fincastle
36	Carris Plastics	San Jose, CA
37	CenterBeam, Inc.	Monroe, LA
38	Century Tel	Richmond
39	Chesterfield County - MH-N	Oak Hill
40	Cisco Systems	Research Triangle Park, NJ
41	Comptroller of the Currency	Washington, DC
42	Corning Inc.	Danville

43	Corrugated Container Corp	Winchester
44	Crown Cork & Seal (USA)	Sandston
45	DRS Power	Milwaukee, WI
46	Dante Valve	Bellflower, CA
47	Data Resource Systems	Richmond
48	Davis Frost, Inc.	Lynchburg
49	Delaware MEP	Newark, DE
50	Delta Star Inc.	Lynchburg
51	d-Scan Inc.	South Boston
52	Dupont	Waynesboro
53	Dynax America Corporation	Roanoke
54	E.D.S.	Danville
55	Eagan McAllister Assoc	Lexington Park, MD
56	East West Dyecom	Roanoke
57	Electrical Equip.	Norfolk
58	Empire Machinery	Norfolk
59	Essel Propak	Danville
60	Execellus BC BS	Rochester, NY
61	Exegetics Inc.	Blacksburg
62	Express Techs, Inc.	Fairhope, AL
63	Ferguson Enterprises	Newport News
64	Filtrona Fibertec	Colonial Heights
65	Formex	Richmond
66	Franz Haas Machinery of America	Richmond
67	Gala Industries	Eagle Rock
68	Garvey Precision Machine	Willingboro, NJ
69	Geith, Inc.	Petersburg
70	General Motors	Fredericksburg
71	Germane Systems	Chantilly
72	Goodwill Industries	Danville
73	Goodyear Industries	Danville
74	Graham-White Mfg.	Salem
75	Grand Springs	Alton
76	Griffin Pipe	Lynchburg
77	Harrington Corporation	Lynchburg
78	Hawkeye Manufacturing	Richmond
79	Healthcare Solutions, LLC	Gurnee, IL
80	HON Company	Chester
81	Honeywell	Hopewell
82	Huntington Bank	Columbus, OH
83	Hyosung America Inc.	Scottsville
84	Independent Consultant	Winchester
85	InService America	Forest
86	Intertape Polymer	Winchester
87	Iron Crafters, Inc.	Louisa
88	ISOTEMP Research Inc.	Charlottesville

89	J.M. Fry	Richmond
90	Jo-Kell Inc.	Chesapeake
91	Kaiser Permanente	Alexandria
92	Kenmore Envelope Co., Inc.	Richmond
93	Lean Sigma Associates	Free Union
94	Liberty Home Medical	Port St. Lucia, FL
95	LifeSpring Development	Chesterfield
96	Lynchburg College	Lynchburg
97	Lynchburg Family Practice Residence	Lynchburg
98	Lynchburg Regional Chamber of Commerce	Lynchburg
99	MIC Industries	Winchester
100	MTS	Austin, TX
101	Manchester Ind.	Richmond
102	Manchester Tank	Petersburg
103	Man Tech Telecommunications	Chantilly
104	MeadWestVaco	Richmond
105	Messier Services America	Sterling
106	MicroAire Surgical Instruments LLC	Charlottesville
107	Mid-Atlantic Printers	Altavista
108	Misys Healthcare Systems	Raleigh, NC
109	Modine Mfg. Co.	Buena Vista
110	NSW, LLC	Roanoke
111	Norfolk Naval Shipyard	Norfolk
112	Northrop Grumman Newport News	Newport News
113	Novozymes	Salem
114	Old Mansion Foods	Petersburg
115	O'Neal Steel	Roanoke
116	Optical Cable	Roanoke
117	Organon Pharmaceuticals	Fredericksburg
118	O'Sullivan	South Boston
119	PGI	Waynesboro
120	People's National Bank	Danville
121	Plastics One	Roanoke
122	Precision Fabricators Inc.	Waynesboro
123	Precision Steel Mfg.	Roanoke
124	Premier Pet Products, LLC	Richmond
125	Problem Solvers for Industries	Midlothian
126	R. R. Connelley	Harrisonburg
127	RADVA	Radford
128	Red Acres Equipment Inc.	Appomattox
129	Reg Intermediate Supship	Portsmouth
130	Revcar Fasteners	Roanoke
131	Rock-Tenn Company	Lynchburg
132	Ronile, Inc.	Rocky Mt.
133	SC-MEP	Columbia, SC
134	SCI Services	Richmond

135	SPSA	Chesapeake
136	Sara Lee, Inc.	Stuart
137	SEALEZE Corp.	Richmond
138	Shelf Conversions LLC	Ashland
139	Smurfit Stone Container Corp.	Richmond
140	Smyth Co	Bedford
141	Southern Graphics	Hopewell
142	Specialty Blades, Inc.	Staunton
143	Suez Energy	Houston, TX
144	Sunbelt Supply	Virginia Beach
145	Super Radiator Coils	Richmond
146	TSRC - Open Plan	Mechanicsville
147	The Miller Group	Richmond
148	Tindall Corp.	Petersburg
149	Tri-Dim Filter	Louisa
150	Tri Tech Labs	Lynchburg
151	Twin County Regional Hospital	Galax
152	U.S. Navy	Washington, DC
153	United Elastics	Stuart
154	Vocational Trades	Burlington, NC
155	Valcon A/S	Naerum, Denmark
156	Virginia Dept. of Labor & Industries	Richmond
157	Virginia Mirror Co., Inc.	Martinsville
158	Virginia Plastics	Roanoke
159	Virginia Premier Health Plan	Richmond
160	Virginia Tech	Blacksburg
161	Volvo Trucks	Dublin
162	Walke Business Solutions	Richmond
163	Watson Metal Products	Petersburg
164	Wesco Distribution	Hampton
165	Wheelabrator Abrasives, Inc.	Bedford
166	Wyeth Pharmaceuticals	Richmond
167	Young & Rubicam	Dearborn, MI

Appendix 12

Memorandum of Understanding

This MOU describes an agreement among Virginia's A.L. Philpott Manufacturing Extension Partnership (VPMEP), Virginia Tech's Continuing and Professional Education unit (VT-CPE) and Virginia Tech's Center for High Performance Manufacturing (VT-CHPM) to award Continuing Education Units (CEU's) for courses delivered by the VPMEP. The partnership will allow VPMEP and Virginia Tech to compete on a national level in offering courses to meet the emerging needs of the manufacturing industry.

The processes described below are guidelines for issuing CEU's from VT-CPE for VPMEP courses, which have been approved by VT-CPHM.

I. Before each course, VPMEP will provide VT-CPE the following information:

- ☐ Detailed course description
- ☐ Agenda
- ☐ Instructor bio's
- ☐ Copy of course evaluation to be administered
- ☐ Electronic signatures for the certificates

VT-CPE will review each course for compliance with the rules and guidelines for awarding CEU's. VT-CHPM will review the content of each course for technical merit.

II. Upon the completion of each course, VPMEP will provide the following to VT-CPE:

- ☐ Excel file that contains the following:
  - o Title of the course
  - o Date of the course
  - o Location of the course
  - o Number of contact hours for the course
  - o Participant's complete name as it should appear on the certificate
  - o Participant's identification number (Social Security number preferred)
  - o Participant's complete mailing address
  - o Participant's E-mail address
  - o Each participant's response (yes/no) for future use of their E-mail address
- ☐ The name and address that the certificates should be shipped to
- ☐ Summary of the course evaluation responses
- ☐ Signature lines for the certificate

III. Within two weeks of receiving a correct course roster, VT-CPE will ship the certificates and invoice to the indicated field office.

III a. The charges for the VPMEP courses listed below, excluding courses offered through the Michael L. George Group, will be based on the following price scale:

- ☐ $25 each - Individual course certificate

- $100 each – Matted certificate with VT seal for program series
- Shipping costs – as incurred

III b. The charges for the VPMEP courses offered through The George Group will be based on the following price scale:

- $200 each – Lean Six Sigma Green Belt Certification– Matted certificate with the VT Seal for 80 contact hours
- $400 each – Lean Six Sigma Black Belt Certification - Matted certificate with VT seal for 160 contact hour course
- $25 each - Lean Six Sigma Executive 1 Day Workshop
- $50 each – Lean Six Sigma Executive 2 Day Workshop
- $75 Each – LSS Champion, Team Accelerator and Sponsor Training
- Shipping costs – as incurred

IV. VPMEP, CHPM, and CPE will collaborate on a continuing basis. The guidelines below will be used as a basis for working together.

VT-CPE graphics department personnel will be the contact for use of the Virginia Tech name and logo.

VT-CPE (Director of Outreach Programs for the College of Engineering) will work with VPMEP (Operations Manager) to suggest event locations at Virginia Tech outreach centers throughout the Commonwealth.

VT-CPE (Director of Outreach Programs for the College of Engineering), CHPM (CHPM Assistant Director), and VPMEP (VPMEP Operations Manager) will continue to work together to develop new and innovative course offerings.

V. The list of approved VPMEP offerings currently includes:

Lean 101, Principles of Lean Manufacturing 101 Workshop, 8 contact hours
Lean 103, High Impact Lean Workshop, 8 contact hours
Lean 101, Principles of Lean for Job Shops Workshop, 8 contact hours
Lean 111, Lean Office Workshop, 8 contact hours
Lean 202, Value Stream Mapping Workshop, 6 contact hours
Lean 203, 5S Workplace Organization with Live Simulation Workshop, 8 hours
Lean 204, Setup Reduction Workshop with Simulation Workshop, 6 contact hours
Lean 205, Cellular/Flow Manufacturing with Simulation Workshop, 6 contact hours
Lean 206, Pull Systems/Kanban with Live Simulation Workshop, 8 contact hours
Lean 207, Total Productive Maintenance with Live Simulation Workshop, 6 contact hrs.
Lean 208, Lean Performance Measurement Workshop, 8 contact hours
Lean 212, Administrative Value Stream Mapping Workshop, 8 contact hours
Lean 302, Value Stream Mapping Facilitation Event, 24 contact hours
Lean 313, Lean Supply Chain Workshop, 8 contact hours
3-Day Kaizen Blitz, 24 contact hours

5-Day Kaizen Blitz, 40 contact hours

The following offerings are collaboratively provided by VPMEP under license from George Group Consulting, a VPMEP partner.

Lean Six Sigma Executive Workshop – 16 contact hours
Lean Six Sigma Champion Training – 24 contact hours
Lean Six Sigma Executive Workshop – 8 contact hours
Lean Six Sigma Black Belt, Mfg. or Service (Transactional) – 128 contact hours
Design for Lean Six Sigma Black Belt – 160 contact hours
Lean Six Sigma Green Belt, Mfg. Or Service (Transactional) – 64 contact hours
Team Accelerator Training – 32 contact hours
Lean Six Sigma Project Sponsor Training – 24 contact hours

The collaborative effort described in this MOU seeks to add courses to this initial list as the need is identified from the manufacturing industry. The process of adding additional courses involves a review process to be undertaken by the VT-CHPM and VT-CPE.

This MOU is entered into within the umbrella agreement (see attached) between Virginia Tech and VPMEP. By signing below, the parties acknowledge that this MOU describes a framework for working together. The processes described here-in will be revised on an as-needed basis.

_____

Edward L. Nelson, Ph.D.
Director of Outreach Programs
College of Engineering - Virginia Tech

_____

Robert E. Taylor, Ph.D.
Research Professor and Interim Director
Center for High Performance Manufacturing – Virginia Tech

_____

Jeff Kohler
Executive Director
Virginia's A.L. Philpott Manufacturing Extension Partnership

Appendix 13

Course Descriptions

Rev 10-19-04

Principles of Lean Manufacturing 101 Workshop – Lean 101 – Contact Hours 8

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

A manufacturer implementing lean produces more with existing resources by eliminating non-value added activities. At this workshop you will learn the principles of Lean Manufacturing and how to apply them. During the simulation exercises – as a member of the production team of Buzz Electronics – you will apply Lean concepts such as standardized work, visual signals, batch-size reduction, pull systems, and more. Experience first hand how Lean improves quality, reduces cycle time, improves delivery performance, reduces Work-in-Process (WIP), and enables Buzz to show a profit.

Principles of Lean for Job Shops - Lean 104 – Contact Hours 8

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

A manufacturer implementing lean produces more with existing resources by eliminating non-value added activities. However, the impact of lean in job shop environments is measured in reducing non value added activities primarily in the design and engineering coordination of production through the enterprise without the benefits of mass production. This workshop teaches and applies the principles of Lean specific to job shop environments. During the simulation exercises participants will apply Lean concepts such as standardized work, visual signals, complexity reduction, pull systems, product family optimization, and more. Experience first hand how Lean improves quality, reduces cycle time, improves delivery performance, reduces Work-in-Process (WIP), and enables a more profitable operation.

High Impact Lean Workshop- Lean 103 – Contact Hours 8

Targeting all personnel from upper-level management and floor supervisors down to the factory floor, this one-day session will provide the foundation upon which the company's Lean transformation will be undertaken. Through a combination of classroom instruction and manufacturing simulation, participants will guide a mythical company through its own Lean transformation. In addition to providing a firm foundation in the fundamental principles of *Lean*

Manufacturing, additional emphasis is placed upon *Constraints Management*, using the techniques developed by Dr. Goldratt.

You will apply Lean concepts such as standardized work, visual signals, batch-size reduction, pull systems, and more throughout the simulation rounds. In addition, the application of constraints theory, including drum-buffer-rope, and the concept of octane, as it relates to maximizing profit across the constraint, is vividly demonstrated.

Fundamentals of Office Lean Workshop – Lean 111 - Contact Hours 8

This workshop provides a basic awareness of lean tools and techniques as well as a common language for all future lean improvements. The workshop provides a consistent body of knowledge to the participants, and also begins the process of developing a group of associates at your firm to have the knowledge to successfully implement lean office techniques consistently throughout your facility. The workshop also serves as an excellent "kickoff" event to an overall "transformation to a lean organization" initiative in your firm.

The workshop is a one-day, hands-on, interactive workshop promoting lean principles in a "train and do" building block format consisting of lecture, discussion, and hands-on simulation. Attendees will participate in a simulated office environment throughout the day, with each successive simulation demonstrating the advantages of lean principles. The participants begin the day by receiving and processing orders for electronic components in a traditional uncontrolled push environment, with batch processing, laborious approvals, etc. By the end of the workshop, the simulated office is operating utilizing lean techniques demonstrating the advantages of standardized work, point of use storage, pull systems, cellular flow, etc. Productivity, quality and profitability are tracked throughout the simulation for illustrative comparisons. Attendance is limited to 20 participants.

Value Stream Mapping Workshop – Lean 202 – Contact Hours 6

Companies are seeking to improve its operations and strengthen its philosophy of continuous improvement. The goal of this workshop is to apply these newly acquired skills to a specific product family currently in production.

Mapping the Value Stream will focus attention on the non-value added steps of processes and then show how to develop a plan to reduce and/or eliminate them.

Value Stream Mapping is a tool used to create a material and information flow map of a product or process. During this workshop you will use the powerful Value Stream Mapping (VSM) tool to create a current state map for Acme Stamping, a real-world firm featured in a detailed case study. Use the VSM icons and learn the common language of Lean as you draw your current state map for Acme. Next, you will analyze Acme's current state, find the non-value added activities, and then draw a future state map for Acme that eliminates those activities. You will also develop a plan for attacking those non-value added activities.

5S Workplace Organization with Live Simulation Workshop – Lean 203- Contact Hours 8

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

The objective of implementing a 5S approach is to improve the performance of the plant through better visual workplace organization. Typically organizations will see as much as a 30% increase in productivity upon completion of a 5S & Visual workplace initiative.
The 5S – Workplace Organization is a series of activities designed to improve workplace organization and standardization. These activities, all of which begin with the letter S, include: Sort, Set in Order, Shine, Standardize and Sustain. This workshop offers you an opportunity to experience first hand how the 5S System reduces waste in the mounting plate assembly area of stimulated production facility. Participants learn the concepts of the 5S System and then apply them to transform a cluttered, disorganized production area into a clean, organized and orderly workplace.

Setup Reduction Workshop with Simulation Workshop – Lean 204 – Contact Hours 6

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

The objective of reducing the set-up time of a machine is to provide more processing time while reducing downtime. Achieving this goal requires transforming or eliminating the waste inherent to the existing process. A well-defined set-up will be repeatable and produce consistent results, which will allow manufacturers to run smaller lots and respond to changing customer needs. The ability to quickly shift from product to product will favorably impact the productivity of an operation and may impact other areas such as space requirements, material handling, scrap, and quality.

Setup Reduction builds on the principles of the Single Minute Exchange of Dies (SMED) system, developed by Shigeo Shingo, to dramatically reduce or eliminate changeover time. The four-step Changeover Improvement Process is used to help companies design no/low cost solutions to reduce changeover time. Use this workshop to learn the principles of Setup Reduction and the Single Minute Exchange of Dies (SMED) System. Then apply the four-step Changeover Improvement Process to achieve Setup Reduction in life-like simulation exercise. By the end of the workshop, you will experience reduced costs and setup times and see machine capacity increase at the same time.

Cellular/Flow Manufacturing with Simulation Workshop – Lean 205 – Contact Hours 6

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

The creation of a cell to process the "product" through it's various manufacturing steps is one way of reducing most of the waste usually associated with current processes and therefore creating the ability to respond to changes in customer demand, quickly. The waste of, inventory, waiting, defects, extra processing, motion, transportation, and overproduction are minimized using cellular concepts. Implementation of a cell is usually the quickest way to reduce the lead times and costs associated with manufacturing. This workshop teaches, through knowledge and practice, the concepts of Cellular Manufacturing.

Cellular/Flow Manufacturing is the linking of manual and machine operations into the most efficient combination of resources to maximize value-added content, while minimizing waste. Experience the results of Cellular/Flow Manufacturing principles in this workshop as you apply them yourself in a life-like simulation. First, you will learn the concepts of Cellular/Flow Manufacturing. Then you will help transform a traditional batch production area to a cellular layout – and see the dramatic changes in the way the product flows, so that the customer demand is met – on time, every time.

Pull Systems/Kanban with Live Simulation Workshop – Lean 206 – Contact Hours 8

The overall objective for a firm that wants to "go lean" is to eliminate all the various forms of waste in the organization for the purpose of being more customer responsive, efficient and profitable. Lean organizations are tightly linked to their customers and produce products at the "pull" of the customer, in other words, making no more, and no less than is demanded. This is the most efficient and profitable way to run a manufacturing firm.

The creation of a Pull/Kanban system allows processes that are not suited for continuous flow to be linked together and therefore eliminate the waste created by having individual production plans and schedules for each process. Pull/Kanban allows production to respond to the variations in demand from customers, either internal or external through the use of simple, visual concepts. This workshop will teach and demonstrate these concepts through knowledge and a simulated factory exercise.

Pull Systems/Kanban control the flow of resources in a production process by replacing only what has been consumed. Explore the process of designing and implementing Pull Systems/Kanban through classroom instruction and hands-on production simulations in this workshop. This course introduces participants to the principles of Pull Systems/Kanban, applies them in a life-like simulation, and demonstrates how they can be applied to a variety of manufacturing situations.

Total Productive Maintenance with Live Simulation Workshop-Lean 207 - Contact Hours 6

The goal of the Total Productive Maintenance (TPM) workshop is to impart to the participants how important maintenance is in maintaining a productive and safe work environment. Participants are introduced to the concepts of Overall Equipment Effectiveness, Predictive Maintenance, and Standardization. During the workshop, participants will learn what two major causes result in 80% of equipment breakdowns and what the six major equipment losses are.

The specific objectives of this workshop are:

- To provide an understanding of Total Productive Maintenance (TPM).
- To demonstrate the calculation of overall equipment effectiveness.
- To provide an initiative for improving maintenance programs in general.
- To provide an understanding of how TPM fosters improvement efforts in safety, quality, cost and creativity.

Total Productive Maintenance (TPM) is a process to maximize the productivity of your equipment for its entire life. TMP fosters an environment where improvement efforts in Safety, Quality, Delivery, Cost and Creativity are encouraged. Learn about the Overall Equipment Effectiveness (OEE) and how it is related to capacity. Learn how to apply 5S techniques on your equipment and see the tenfold effect they have. Learn about the six major equipment related losses – how to find and eliminate them. Learn what causes 75% of equipment breakdowns. TPM principles demonstrated – be able to apply the techniques as equipment is simulated in a classroom. By the end of the workshop, you will experience how these techniques achieve dramatic improvements in uptime and increased equipment effectiveness.

Administrative Value Stream Mapping – Lean 212 - Contact Hours 8

This workshop provides hands on demonstration of the applicability of lean principles and the powerful value stream process as applied to administrative and transactional processes. Going beyond the application of process mapping, the traditional Six Sigma tool used for office improvements, this workshop vividly demonstrates the power of Value Stream Mapping to develop an accurate portrayal of the current state, and develop an action plan oriented future state. Complexity is transformed into a simple model focused on satisfying customer requirements.

Through a combination of lecture, individual exercises and group sessions, the attendee learns how to use the standard methodology, applies the methodology to a specific case study, and focuses on differentiating value added and non-value added time in the process. Waste concepts such as set up time, first pass yield, roll through yield, inventory, and batching is clearly conveyed. Participants then work to eliminate non-value added steps by identifying and eliminating time traps and unnecessary processing.

Lean Performance Measurement Workshop – Lean 208 – Contact Hours 8

This event provides a comprehensive overview of how traditional accounting measurement systems do not enable lean thinking. Using generally accepted accounting procedures as the basis,

participants learn how behaviors in manufacturing operations are driven by performance measures. Widely accepted concepts such as standard costs, overhead liquidation, and inventory absorption for short-term decision-making are challenged. Learn how these concepts can lead to over production, excessive waste, over reliance on market forecasting, and increases in work in progress and finished goods inventories.

Starting with strategic objectives, the deployment of lean performance measures is introduced using a combination of lecture and case study development. The concept of aligned measures for the entire enterprise is then introduced. Strategic objectives, supported by department, value stream and cellular goals, are introduced in a "starter set" format. The participants in a manner that reinforces concern over traditional accounting approaches explore the value of aligned measures, including advanced lean concepts such as Overall Equipment Effectiveness (OEE).

Value Stream Mapping Facilitation for Manufacturing or Administration - Contact Hours 24
This event combines either the VSM manufacturing or administration workshop into a three day hands on event. Day 1 involves completing the workshop to learn the tools to be applied. Days two and three involve completing a current state of an actual client process, developing a future state for that process, and the action plan to achieve the future state. A priority plan is developed to achieve the future state, for presentation and approval from sponsoring management.

3-Day Kaizen Blitz – Contact Hours 24

The objective of this project is to increase the bottom line results of the enterprise through the use of "Kaizen " process improvement techniques. These improvements focusing on lean concepts, will typically, reduce lead-time, increase quality, reduce floor space, reduce direct labor and increase productivity. Kaizen's are also used as a tool to achieve the Future state mapped out in a previous value stream mapping exercise.

Formation of a cross-functional team made up of no more than 7 key plant personnel and 2 VPMEP project managers are needed for this project. A half-day Kaizen orientation session will take place then an intensive two and one half (2-1/2) days hands-on Kaizen event on the plant floor.

5-Day Kaizen Blitz – Contact Hrs 40

The objective of this project is to increase the bottom line results of the enterprise through the use of "Kaizen " process improvement techniques. These improvements focusing on lean concepts, will typically, reduce lead-time, increase quality, reduce floor space, reduce direct labor and increase productivity. Kaizen's are also used as a tool to achieve the Future state mapped out in a previous value stream mapping exercise.

Formation of a cross-functional team made up of no more than 7 key plant personnel and VPMEP project managers is needed for this project. A half-day Kaizen orientation session will take place then an intensive four and one half (4-1/2) days hands-on Kaizen event on the plant floor.

Lean Supply Chain Workshop – Contact Hours 8

Logistics for lean operations is a hands-on workshop focusing on supply chain logistic optimization using a live simulation model. The model combines working physical components and a financial model to demonstrate various scenarios. This format is an excellent way to put supply chain enterprise concepts into a practical demonstration to teach individuals how these concepts work.

Attendees can easily observe the interactions of an entire working supply chain from a functional perspective. The workshop provides a learning experience that dramatically impacts the perception of attendees about the concepts of Supply Chain, Lean Enterprise, and Just-In-Time Management. Cash management and profitability is portrayed throughout each simulation round, providing rapid dollars and sense feedback to the participants.

The simulations reinforce supply chain logistics theories, concepts and methods assisting organizations to improve their competitiveness, profitability and performance. Attendees come away from the workshop better prepared to understand how lean enterprises succeed in today's global economy.

Lean Six Sigma Executive Training – Contact Hours 16

This 2-day course is designed to prepare key managers to perform their oversight roles during a Lean Six Sigma deployment. The course provides managers with a working knowledge of the Lean Six Sigma program, methodology and processes. The course also provides guidelines for performing their management roles.

The first day of the course is delivered as an interactive, business simulation. This simulation has the participants assume roles within an organization and apply the DMAIC improvement methodology and improvement tools on the simulated process. As a team, they move a poorly functioning process to higher levels of performance through the use of the methods and tools including project chartering, process capability, process mapping, narrowing critical process variables, Pareto charts, histograms, box plots, descriptive statistics, run charts, cause and effect matrix and developing and implementing pilot solutions.

The second day provides additional information on the history of Lean, Six Sigma, and Lean Six Sigma, the key roles in a deployment, additional tools and key management processes to support a Lean Six Sigma deployment including project identification, project selection, selection of Black Belts and Green Belts, performing Gate Reviews, communication of the program goals and status and sharing organizational best practices. After completing the course, participants will apply the concepts to overseeing their own BB project for the next 3-5 months. The course is staffed with 2 instructors.

Lean Six Sigma Champion Training – Contact Hours 24

The purpose of the workshop is to train Lean Six Sigma Champions to perform the critical functions of their roles, including:

- Communicating the organizational goals and methods that Lean Six Sigma will employ to achieve these goals
- Identifying, prioritizing and staffing the critical few projects for the organization
- Estimating and tracking the results of the Lean Six Sigma projects
- Acting as Gate Review monitors, ensuring selected projects are meeting requirements before moving forward to the next stage of implementation
- Designing and maintaining the Lean Six Sigma organizational infrastructure

The 3-day course is designed to walk the champion through the approaches for identifying and selecting projects for the Lean Six Sigma program. The participants are required to bring relevant organizational data and strategic planning information with them for use in applying the following tools: process classification, process decomposition, Kano analysis, and financial statement / cost decomposition and customer requirement analysis. The class is approximately 35% lecture and 65% exercises using their own supplied data.

The course also focuses on topics relating to Lean Six Sigma program management. Key topics include communications plan development, best practice transfer, addressing change management, organizational design and role definition, and ongoing project portfolio management. After satisfactory completion the course, participants are able continue applying the tools to generate a queue of projects for future assignment to Black Belts. The course is staffed with 2 instructors.

Lean Six Sigma Executive (1-Day) – Contact Hours 8

This course is delivered to all levels of an organization to provide an overview of the history of Lean Six Sigma, describe the improvement approach, allow all participants to experience an actual project implementation lifecycle through a business simulation. This simulation has the participants assume roles within an organization and apply the DMAIC improvement methodology and improvement tools on the simulated process. As a team, they move a poorly functioning process to higher levels of performance through the use of the methods and tools including project chartering, process capability, process mapping, narrowing critical process variables, Pareto charts, histograms, box plots, descriptive statistics, run charts, cause and effect matrix and developing and implementing pilot solutions. The course is staffed with 2 instructors.

Lean Six Sigma Black Belt Course – Contact Hours 128

This five week course provides the Lean Six Sigma Black Belt candidate with an integrated Lean and Six Sigma curriculum enabling them to apply the **DMAIC methodology** (Design—Measure—Analyze—Improve—Control), **Six Sigma problem solving tools** including; Process Mapping, value-stream mapping, Value Analysis, Brainstorming, Statistical Process Control, Check Sheets, Run Charts, Histograms, Scatter Diagrams, Control Charts, Pareto Analysis, Cause & Effect/Fishbone Diagrams, Nominal Group Technique/Multivoting, Affinity , Interrelationship Digraphs (ID), Force Field Analysis, Gage R&R, Cp & Cpk, Multivariate Chart, Box plots, Main Effects Plots, Interaction Plots, Regression Analysis, Analysis of Variance (ANOVA), C&E Matrices/QFD, Failure Modes & Effects Analysis (FMEA), Design of Experiments (DOE),

Hypothesis Testing and Response Surface Methodology and critical **Lean Improvement tools** including; "Time Trap" identification and improvement, Process Flow Analysis, Lean Production design, Poka-Yoke, Sales and operations planning, stocking strategy, Materials management, Shop floor controls, Kaizen Blitz, Vendor certification/scorecards/lead-time reduction, pull system design and cycle time reduction.

This unique course is particularly applicable in complex processes where quality improvement, speed and process cycle time reduction are critical for organizational success. Successful completion of the Black Belt course requires attendance of all 4 weeks of training and passing three quizzes and final exam with a grade of 70% or higher.

All required training materials; textbooks, classroom exercises and supplies are provided. Virtual Coach software, Minitab statistical analysis software is recommended and is available as support training items. This training is delivered over the course of 4-5 months with three weeks of improvement project work between the four one week training classes. To obtain certification, it is expected that Black Belt candidates complete pre-work assigned prior to class, pass all examinations and successfully complete an assigned improvement project. The course is staffed with 2 instructors.

Lean Six Sigma Black Belt for Service (Transactional) – Contact Hours 128

Lean Six Sigma Black Belt for Service training provides individuals and teams with the principles, practices, and tools of Lean Six Sigma to maximize cost reductions and improve customer satisfaction in service environments and business processes. The course is designed to provide 30% classroom lecture and 70% group and individual exercises to enhance and reinforce key learning's. This is a four-week session of rigorous and applied training over a four-month period (Total 132 Hours). Successful completion of the Black Belt course requires attendance of all 4 weeks of DMAIC training and passing three quizzes and final exam with a grade of 70% or higher.

Topics Covered include an overview of Lean Six Sigma, goal setting, establishing voice of the customer, team launch, Minitab overview, process mapping, value-stream mapping, basic six sigma tools, introduction to variation, financial fundamentals, sampling and data collection, control charts, measurement system analysis, process capability, cause and effect matrix, project management, simple regression, failure modes effects and analysis, value and cycle time analysis, multiple regression, design of experiments, process control plans, commercial simulation, piloting and implementation planning, SIPOC, RACI, Line Balancing, Pull Systems, Process flow improvement, total preventive maintenance, kaizen, quality function deployment (QFD), developing design concepts, developing high-level design, developing detailed process designs, executing pilots, analyzing results.

To obtain certification, it is expected that Black Belt candidates complete pre-work assigned prior to class, pass all examinations and successfully complete an assigned improvement project. The course is staffed with 2 instructors.

Design for Lean Six Sigma Black Belt – Contact Hours 160

Objectives of the Course: Design for Lean Six Sigma (DFLSS) is similar to Six Sigma in that the focus is on improving quality, time to market, and delivering measurable financial results. However, where Six Sigma is focused on improving existing processes, DFLSS is focused on creating new designs or new processes (transactional and/or manufacturing). DFLSS is focused on designing-in quality rather than addressing quality problems down the road.

Achieve a flawless launch of new high-value products that meet the cost and timing goals of the business while delighting customers

- Comprehensive curriculum that incorporates all phases of new product development including market segmentation, requirements gathering, concept selection, system design, detailed design, pilot, and production.
- Emphasis on Voice of the Customer throughout design and development ensures market enthusiasm for the new product offerings.
- Integrated Lean methods focus on speed and efficiency.
- Well-balanced curriculum incorporates both human factors and technical toolkits.

The course also provides Black Belts with a 1-week Team Accelerator coursed designed to generate fast, effective teamwork with those directly involved in the execution of Lean Six Sigma. The Team Accelerator workshop accomplishes this by investigating Leadership Styles, Team Performance, Conflict Resolution, Meeting Effectiveness, Double Loop Learning, Productive Teams, Team Roles, and performing 2 Learning Cycles during the course. Team Accelerator is highly recommended for optimum results, but is optional.

The five weeks of classroom (50% instruction, 50% hands-on exercises) are spread out over 4-6 months to allow work on projects in between training weeks.

To obtain certification, it is expected that Black Belt candidates complete pre-work assigned prior to class, pass all examinations (scoring at least 80%) and successfully complete an assigned improvement project. The course is staffed with 2 instructors (except for the Team Accelerator).

Green Belt Training—Lean Six Sigma – Contact Hours 64

This two-week course provides Green Belt candidates with the understanding of Lean Six Sigma, Lean Six Sigma improvement tools and project management fundamentals to be active contributors to a Black Belt project or lead small-scale Lean Six Sigma improvement projects.

Topics addressed in this course include establishing effective improvement teams, understanding the voice of the customer, process mapping, Pareto charts, histograms, Failure Modes and Effect Analysis, the value of process cycle time compression, control charts, measurement system analysis, sampling and data collection, process capability, Kaizen events, 5S, Setup reduction,

process value analysis, introduction to DOE, ANOVA and process control. This course is a mix of case studies, simulations and presentation.

Green Belt certification is obtained by attending all classes, successfully passing all examinations (score of 70%) and completing or contributing to one successful improvement project. The course is staffed with 2 instructors.

Green Belt Training Lean Six Sigma for Service – Contact Hours 64

This two-week course provides Green Belt candidates with the understanding of Lean Six Sigma, Lean Six Sigma improvement tools and project management fundamentals to be active contributors to a Black Belt project or lead small-scale Lean Six Sigma improvement projects.

Topics addressed in this course include establishing effective improvement teams, understanding the voice of the customer, process mapping, Pareto charts, histograms, Failure Modes and Effect Analysis, the value of process cycle time compression, control charts, measurement system analysis, sampling and data collection, process capability, Kaizen events, 5S, Setup reduction, process value analysis, introduction to DOE, ANOVA and process control. This course is a mix of case studies, simulations and presentation.

Green Belt certification is obtained by attending all classes, successfully passing all examinations (score of 70%) and completing or contributing to one successful improvement project. The course is staffed with 2 instructors.

Team Accelerator Training (4 day) – Contact Hours 32

The Team Accelerator workshop provides participants with insight into their own personal leadership, along with practical steps for interacting more effectively with others. Effective interaction and collaboration are critical to success. When employees are engaged and working together effectively, your organization will be better able to meet the challenges of today - and tomorrow. Min. participants: 10 Max. participants: 25.

Outcomes from the Workshop include:

- More rapid and effective decision making
- Effective use of conflict resolution and feedback skills
- Commitment, not just compliance
- Shorter, more focused meetings
- Maximized use of resources
- Ability to resolve "undiscussible" issues that create barriers to progress

Lean Six Sigma Project Sponsor Training (3 days)- Contact Hours 24

At the heart of any continuous improvement initiative is the establishment of process *ownership* and *accountability*. Lean Six Sigma accomplishes this by actively engaging P&L managers, process owners, key stakeholders and enablers as Project Sponsors. This workshop also builds on the foundation of the Executive Workshop and further encompasses:

- Process Owner Roles—Understand expected roles and responsibilities for process owners
- Improved accountability and ownership for project results
- Fundamental Lean Six Sigma concepts/tools
- Project Impact—Understand how financial guidelines work; how to value project results
- Gating Process—Training on Process Owner's role in gating process to ensure effective and thorough completion of each phase within DMAIC

Project Charter—Understand how to create the document that serves as project contract or "blueprint" that may ultimately enable ***enterprise-wide best practice sharing.***

For all VT Credit Requests and Information:

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Appendix 14

FOR IMMEDIATE RELEASE
CONTACT: Linda Lancaster
VPMEP Marketing Manager
276.666.8890 x226
llancaster@vpmep.org

Applied Felts Contract Represents Milestone for the Advanced and Applied Polymer Processing Institute

MARTINSVILLE, February 15, 2005 – Virginia's Philpott Manufacturing Extension Partnership (VPMEP) and the Institute for Advanced Learning and Research (IALR) announce the first contract for the Advanced and Applied Polymer Processing Institute (AAPPI) involving commercially-sponsored, university research for a Southside company, Applied Felts, Inc. of Martinsville.

The collaborative project involves VPMEP's Bill Donohue and Virginia Tech Research Associate Professor and AAPPI Director Ron Moffitt working in conjunction with Applied Felts' Charles Mattox and Mark Sanders. VPMEP and the AAPPI will provide the necessary engineering and technical expertise to provide Applied Felts with the ability to determine, evaluate, develop, and design suitable new bonding processes for felt to felt and TPU outer layer bonding construction.

"This project is an exciting example of technology transfer to industry," says Jeff Kohler, Executive Director for VPMEP. "Progressive clients like Applied Felts greatly benefit from advanced research and expertise. This was made possible through our expanding collaboration with Virginia Tech and the IALR to bridge the gap between current industrial capabilities and future innovation required to compete globally."

The AAPPI's advanced polymer testing and research infrastructure provides Southside's industries, like Applied Felts, with facilities utilizing state-of-the-art equipment and polymer processing expertise.

AAPPI Director Ron Moffitt expressed his excitement about the Applied Felts contract. "This Applied Felts, Inc. sponsored research project is a key milestone in the AAPPI research and technology transfer mission, constituting the first of several research relationships the AAPPI will cultivate with regional polymer industries," said Moffitt. "Moreover, the AAPPI's partnership with VPMEP in securing this commercially funded project demonstrates how our two organizations can provide an effective mechanism for technology transfer to the polymer industries in the Southside region aimed at economic development and the creation of new opportunities for the area."

Applied Felts, Inc. is the first private firm to contract with an IALR research center. This relationship represents an important milestone in the history of IALR, and serves to illustrate the economic impact that IALR research will have on the Southside region.

General Manager Charlie Mattox is eager for the project to begin at Applied Felts. "I am very excited about this research project," adds Mattox. "I have searched several years for the proper avenue to accomplish the work being undertaken. The resources of both VPMEP and AAPPI are a perfect fit to assist Applied Felts in improving our processes and ultimately our bottom line. The Institute offers companies in Southside significant capabilities and will prove to be a tremendous asset to the region."

"This contract represents an important relationship for Applied Felts, VPMEP and the AAPPI," said Timothy V. Franklin, Executive Director of IALR. "It also signals the value that AAPPI and the Institute for Advanced Learning and Research can and will bring to small and medium sized companies in Southside who wish to partner in developing technologies to strengthen their businesses. Charlie Mattox, Bill Donohue and Ron Moffitt deserve credit for their vision in moving this project forward at this time."

# # #

Appendix 15

FOR IMMEDIATE RELEASE

CONTACT:
Linda Lancaster, VPMEP
276-666-8890 x226

VPMEP Announces Positive Results From Clinical Research On New Rehabilitation Equipment Product

Roanoke, VA – Virginia's Philpott Manufacturing Extension Partnership (VPMEP) recently sponsored the clinical research needed to determine the potential therapeutic value of *Flex-O-Chair*, and fully supported exercise chair designed for use by Physical Therapists. The product was developed and patented by REHABCO, LLC who retained the consulting services of VPMEP. *Flex-O-Chair* is designed to serve both as an exercise and a rehabilitation chair to address the needs of the elderly and to provide a rehabilitative function for a variety of patients.

Thomasson Consulting, an approved third-party provider of services to VPMEP, oversaw the design and implementation of the clinical testing. The Locomotion Research Laboratory at Virginia Tech conducted the research under the guidance of professor Thurmon Lockhart. Lockhart is an assistant professor at the Grado Department of Industrial and Systems Engineering at Virginia Tech.

The purpose of the research study was to determine the potential therapeutic value *Flex-O-Chair* and project all of the clinical applications of using the product. Ten subjects were put through an exercise program consisting of the *Flex-O-Chair* and vigorous walking and the effects of each were compared. The results support the premise that *Flex-O-Chair* offers an excellent level of physical activity with the patient in a fully supported position. The primary research demonstrated that exercising 20 minutes using *Flex-O-Chair* was equivalent to 13 minutes of a vigorous walk in terms of cardiac performance as well as muscle performance for the elderly.

The simple design of the chair is beneficial for the elderly who prefer equipment that is very easy to use while still providing the much needed exercise. Based on the findings of the research, *Flex-O-Chair* is projected for use in cardiac rehabilitation, stroke recovery, hip fracture and hip replacement rehabilitation, and relaxation therapy for dementia patients. An added advantage exists for physiotherapists to strength train their patients with the adjustability of the chair's resistance.

The clinical results of the research will be used to attract investors in Rehabco. The company plans to launch *Flex-O-Chair* into the rehabilitation market in the near future.
For information on the product, contact Thomasson Consulting at 540-342-5940.

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Appendix 16

Governor's Working Summit on Advancing Manufacturing in Virginia: A Call to Action
Hotel Roanoke
October 13-14, 2004

Wednesday, October 13, 2004

6:30 p.m. - 8:30 p.m.	Summit Opening Reception/Networking Session (Cocktails & Hors de Oeuvres) Welcome: Michael J. Schewel, Secretary of Commerce and Trade Sign Up for Key Issues: Mark Marheineke, Lead Facilitator Introduction of the Governor: Secretary Schewel Governor's Remarks: Governor Mark Warner

Thursday, October 14, 2004

7:30 a.m.	Coffee, pastries, sign-up, materials, etc.
8:00 – 8:15	Getting Started Mark Marheineke, Lead Facilitator
8:15 – 9:00	Advancing Manufacturing in Virginia: Creating a Competitive Advantage - Why We Are Here? Michael J. Schewel, Secretary of Commerce & Trade
9:00 – 9:20	Instructions & Ground Rules for Small Group Sessions Mark Marheineke, Lead Facilitator
9:20 – 9:30	*Break 1*
9:30 – 10:45	**Small Group Session A**: Understand & Clarify the Issues Four (4) breakout groups composed of a cross-section of representatives from industry, government, and education – based on sign-up from pre-summit or morning registration. Agenda: (1) Clarify and refine the assigned issue: e.g., "What is the current status of our assigned issue?" and "What are current barriers/challenges limiting our competitiveness in Virginia?" (2)

	Facilitator uses pre-formatted flipcharts for planning 5-minute team report-out summary; choose presenter.
10:45 – 11:15	Plenary session: 5 min. reports from breakout groups - Session A
11:15 – 11:30	*Break 2* – Get lunch and go to Small Group Session B
11:30 – 1:15	**Small Group Session B**: Brainstorm Potential Actions…working lunch Agenda: (1) Brainstorm actions that can be taken to create a competitive advantage in order to advance manufacturing in Virginia (2) Facilitator uses pre-formatted flipcharts for planning 5 minutes team report-out summary; choose presenter.
1:15 – 1:45	Plenary session: 5 minute reports from breakout groups – Session B Possible Actions
1:45 – 2:00	*Break 3*
2:00 – 3:45	**Small Group Session C:** Action Planning Agenda: (1) Refine and narrow list (2) Use pre-formatted action plan flip charts to flesh-out action plans: WHAT, WHO, HOW and BY-WHEN for each key action (3) Prepare 10-minute report-out; choose presenter.
3:45 – 4:00	*Break 4*
4:00 – 4:45	Plenary session: 10 minute reports from breakout groups on **ACTION PLAN** to create a competitive advantage and advance manufacturing in Virginia
4:45 – 5:00	Final Observations … Where We Go From Here Secretary Schewel

Appendix 17

Virginia Small Manufacturing Assistance Program
(VSMAP)

Situation:

Over the past several years the Commonwealth of Virginia, along with the rest of the United States, has experienced significant job losses and plant closings in the broad manufacturing sector. The impact has been especially significant for small manufacturers.

Small manufacturers, especially in rural and distressed communities, often do not have the resources, time, and necessary expertise, or are otherwise unable to make the needed reinvestments in lean manufacturing training, operational, product and technology improvement, etc., on their own. As a result, they often fall victim to changing technology and remain mired in outdated processes, business practices, operations, and product development - and thus remain especially vulnerable to the increasingly competitive global marketspace.

Objective:

Create new or retain existing manufacturing jobs in rural Virginia by solving challenging technical and business-oriented problems specific to Virginia's small manufacturers. Assistance will be targeted to move them to more advanced manufacturing processes and technology and thereby enable them to increase competitiveness and expand. The idea is to address cost efficiency as well as the creation of higher value products and services. Possible areas of expertise desired by the small manufacturers can include but are not limited to process improvement, lean manufacturing, supply chain management, product development, product design and functionality, marketing, business planning, and finance

VSMAP will use existing, proven state organizations in a new way to provide a new approach and new tools for the segment of Virginia's manufacturing industry that needs it the most. Furthermore, the program will require a match from participating companies to ensure "skin-in-the-game".

Partners:

The Virginia Small Manufacturing Assistance Program will be a virtual organization. The partners will include the Center for High Performance Manufacturing (CHPM) at Virginia Tech, the Business Technology Center (BTC) at Virginia Tech and Virginia's Philpott Manufacturing Extension Partnership (VPMEP). The leadership team for VSMAP will consist of the directors of these three organizations, along with the director of the Office of Economic Development at

Virginia Tech. VSMAP will be a proactive collaboration to more effectively leverage resources and specific expertise and more effectively provide services to the customers.

Term of Project:

The VSMAP effort will be a one-year pilot. If the assistance enables small manufacturers to become or remain competitive, then the Commonwealth may decide to extend and expand its investment. But, if experience falls far short of expectations and VSMAP does not result in significant manufacturing job creation or retention, an assessment and review will be conducted with a recommendation to the Governor and General Assembly as to whether the program should be extended. Detailed metrics on the following page will be measured as part of the independent survey process managed by the National Institute of Standards and Technology Manufacturing Extension Partnership.

How It Works:

A. Goal

"To provide targeted assistance and expertise to the start-up of new, and the expansion of existing, small advanced manufacturing businesses in rural and distressed Virginia".

B. Metrics

1. Increased and retained sales.
2. Inventory reduction.
3. Cost savings.
4. Job retention or creation.
5. Investment increased.
6. Increased profitability.
7. Increased productivity.

C. Executive Committee (EC)

1. The EC will be John Politis (or the new BTC Director), Ted Settle, Bob Taylor and Jeff Kohler (Chair).
2. Individual client proposals will be approved by all parties (either the director or the liaison), using email to expedite.
3. Meetings will be held monthly in Blacksburg to administer the program.

D. Client Criteria

1. Size either 150 or fewer employees or less than $30 million in sales at manufacturing facility location.

2. Advanced manufacturing businesses to include any manufacturer committed to integrating technology into their organization and improving company performance.
3. Rural Virginia to include all areas with at least one qualifying distress variable (see attached map). Marketing focus will be primarily Southwest and Southside Virginia.
4. Clients will pay one-third of the project price. Maximum client cash contribution to be $16,667.

E. Project Selection

1. Total project price not to exceed $50,000 ($33,333 VSMAP plus $16,667 client), unless client contribution exceeds 1/3.
2. First come, first serve basis.
3. Type of company and project – to include evaluation of client commitment to improvement, growth, and integration of new technology and new business processes. Furthermore, the difficult questions should be asked, e.g., is it a "company-saving" project or is it a "company growth and improvement project"? Is it a successful company or a struggling company? What is the projected impact of the VSMAP project on the company?
4. Reasonable balance of projects across BTC, CHPM, and VPMEP.
5. Client diversity will be encouraged.
6. Extenuating client circumstances.

F. Proposals

1. Proposals will be run through the VPMEP system.
2. Overhead rates will be kept at a minimum.
3. Proposals will normally be for a fixed dollar amount.

G. Project Management

1. Each project will have a project manager.
2. The project manager is responsible for meeting the needs of the client, managing the project, monthly reporting information, and collections.
3. The EC will review project status at the monthly meeting.
4. VPMEP will dedicate half the time of one project manager to assist.

H. Financial Tracking

1. Cumulative financial information will be available before the end of the month for the prior month.
2. VPMEP monthly schedules will need to be followed to meet the above timing.
3. VPMEP administration costs will be a flat monthly rate of $3,000.

I. Marketing

1. The BTC, in coordination with the EC will develop a marketing plan and associated budget. The EC will determine appropriate roll out.
2. Components of marketing plan:
    a) **Mailing List:** The BTC will create a mail list using the Harris Selectory and other available sources to identify manufacturing establishments in rural Virginia. This database will be used to track client activity. In addition to manufacturing establishments, the mail list will include legislators and economic development officials in selected counties and cities.

    b) **Brochure:** A brochure will be created by the BTC and outsourced for printing.

    c) **Web Page Design:** BTC will develop an informative, user-friendly web page for the VSMAP program. The actual web design/source code will be outsourced. A VSMAP website will be created with links to various existing entities.

    d) **Press Release:** Newspaper advertising will start in June with requests for client applications. A press release will be prepared by the BTC.

    e) **PowerPoint Presentation:** The BTC will develop a PowerPoint presentation suitable for use as a standard VSMAP pitch at conferences, seminars, etc.

3. The EC will select a few complete projects to generate success stories.

J. Sales

Sales will be a collective effort among all partners.

K. Stakeholder

A stakeholder group may be utilized.

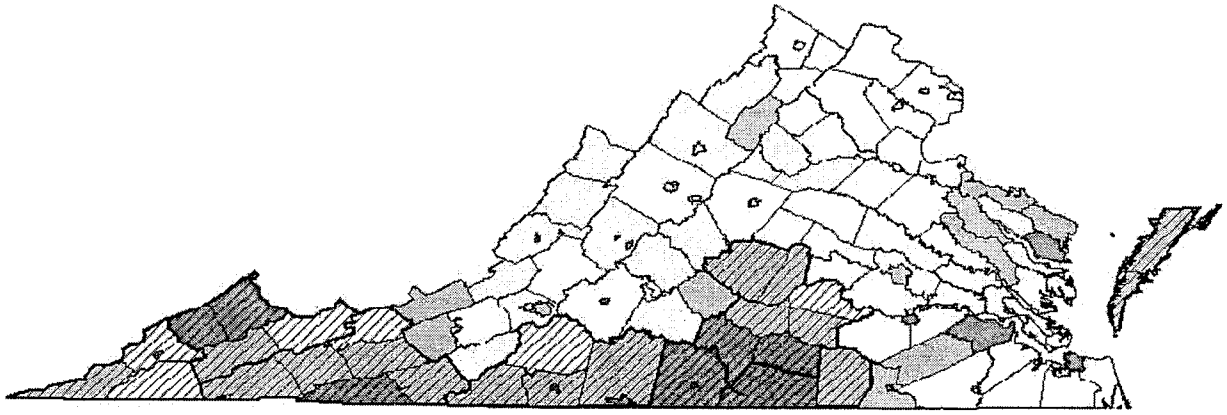
L. Office of the Secretary of Commerce and Trade

Will advise the EC in an ex-officio role.

M. Other Issues

A few early successes are critical to gain traction.

Distressed Localities and Areas



Locality with one qualifying distress variable
Locality with two qualifying distress variables
Locality with three qualifying distress variables
Distressed Area

Appendix 18

COMMONWEALTH of VIRGINIA

Office of the Governor

Mark R. Warner
Governor

June 23, 2005

Mr. Jeff Kohler
Executive Director
Virginia's A. L. Philpott Manufacturing
Extension Partnership
645 Patriot Avenue
P.O. Box 5311
Martinsville, Virginia 24115

Dear Mr. Kohler:

On behalf of the citizens of the Commonwealth of Virginia, I am pleased to congratulate Virginia's Philpott Manufacturing Extension Partnership (VPMEP) on receiving the 'Excellence in Manufacturing and Productivity' award from the Association for Manufacturing Excellence (AME).

During the past decade, VPMEP has been a leader in providing education and consulting to Virginia companies that are working on new ways to increase their competitiveness in the marketplace. By using the supply chain management technique, along with other innovative approaches, many companies have benefited as a result of the assistance provided by VPMEP.

Again, congratulations on receiving this honor, and I wish VPMEP and its clients and affiliates continued success in all future endeavors. Thank you for your service to the manufacturing community of our Commonwealth.

Sincerely,

Mark R Warner

Mark R. Warner

State Capitol • Richmond, Virginia 23219 • (804) 786-2211 • TTY (804) 371-8015 • www.governor.virginia.gov