

**Advancing Economic Development through Strategic Research and Development
Investment by the Commonwealth of Virginia**

Report from the VRTAC R&D Subcommittee

September 18, 2007

Introduction

The charge given to the subcommittee by VRTAC was to advise and provide recommendations to the Governor on proposed budget and policy related to "Innovation" investments, specifically promoting R&D. Secretary of Technology Aneesh Chopra further indicated he would like the subcommittee to identify three recommendations: a policy barrier or reform that requires no additional investment; a "pilot" project with modest funding to move forward; and a more complete solution.

The subcommittee members are as follows:

- Matt Erskine (co-chair)
- Matt Kluger (co-chair)
- Bob Bailey
- Alan Edwards
- Lisa Friedersdorf
- Jerry Giles
- Alleyn Harned
- Mohammad Karim
- Terry Leslie
- Frank Macrina
- Dennis Manos
- Rob McClintock
- Ken Newbold
- Carole Ottenheimer (staff support)
- Phil Parrish
- Tristen Pegram (staff support)
- Ted Settle
- Steve Walz
- Bill Wasilenko
- Terry Woodworth

The subcommittee met on July 19th and August 27th in Richmond.

The subcommittee used as a starting point the report of the University and Federal Lab Subcommittee entitled "Collaborative Research and Development Strategies and Directions for the Commonwealth of Virginia" (March 2007).

In conducting its work, the subcommittee also reviewed the recommendations from several prominent studies and reports by previous Virginia committees, advisory boards, and commissions. These are listed in Appendix A.

The subcommittee’s work was informed by some guiding principles. The first such principle guiding our work: to present targeted, effective, and high return-on-investment recommendations.

This is consistent with the report, *Innovation America: Investing in Innovation*, co-published by the National Governors Association and the Pew Center on the States: “The biggest lesson learned [from the work done by NGA and the Pew Center] is straightforward: How much a state spends on R&D is secondary. How it is spent is absolutely critical. Key to this truth is the notion that R&D efforts must be considered investments, not expenditures.”

In addition, in consideration of investments, the subcommittee strongly recommends establishing – at the start - clear, shared, and broadly-understood success metrics – in the form of an “Advancing R&D Scorecard.” It is the subcommittee’s firm belief that we “start with the end in mind;” that is, define what success looks like and answer the question “How will we know we are successful?” This will help make a more compelling case for investments. In addition, a Scorecard will literally get stakeholders on the same page. More details follow below.

Recommendations

Overall context

The subcommittee supports the recommendation (made by the University and Federal Lab Subcommittee in their report “Collaborative Research and Development Strategies and Directions for the Commonwealth of Virginia”) to focus the Commonwealth’s investments for strategic growth in three priority thematic research areas:

1. Energy, Conservation, and the Environment
2. Future Microelectronics in Virginia (now Virginia’s leading export)
3. Lifespan Biology and Medicine.

It is important to note that all recommendations of the subcommittee are presented in the context of these three priority areas; all of which complement national goals and should result in enhancement of state and regional economic development.

Summary of Recommendations

1. Develop “Advancing R&D Scorecard” (*essential first step, modest funding*)
2. Establish “Advancing R&D Consortium” with crucial components detailed (*more complete solution*)
3. Develop further the existing, statewide R&D contact database (*modest funding*)
4. Establish Industry Liaisons at Universities (*modest funding*)
5. Establish annual IP commercialization workshop for University, Federal Lab, and Industry R&D partners (*modest funding*)
6. Remove any barriers (real or perceived) related to construction of new research facilities (*policy barrier removal*).

Recommendation Detail

1. Advancing R&D Scorecard

The subcommittee recommends developing a Scorecard for measuring and tracking success; establishing a shared, common nomenclature across the stakeholders; and establishing standard set of metrics for state-to-state comparison. The Scorecard will identify and establish the success criteria/metrics for three priority areas of Energy, Microelectronics, and Lifespan Biology.

Specifically, the Scorecard will be useful in establishing a baseline, and most especially, measuring and tracking success to be reported based on the results of an investment. It will be invaluable in answering the question: “How will we know we are successful in these three focus areas?”

Developing a Scorecard is an important vehicle for “starting with end in mind.” Furthermore, and importantly, this can be a modest investment by the Commonwealth that will yield dividends.

The subcommittee believes there should be two guiding principles for the selection of metrics for the Scorecard:

1. Do the measures (metrics) help link R & D investment in our universities to innovation and economic development/state dividend return on investment?
2. Are the metrics uniformly defined and readily obtainable?

The recommended Scorecard framework is based largely on the three tiers of measures defined in the NGA report *Innovation America: Investing in Innovation*. These tiers represent a helpful way to frame the continuum of R&D from beginning research to commercialization: Research and Development, Development- Start up, Start Up-Growth.

The Scorecard should follow the framework set out below, and should be applied for each of the three priority areas of Microelectronics; Lifespan Biology and Medicine; and Energy, Conservation and the Environment.

Research Results:

Measured by:

- University Research expenditures (\$ and # from federal/industry/other sources). Source: NSF.
- Invention disclosures per \$100M of sponsored research (#). Source: AUTM.
- National research ranking improved (year over year positioning). Source: Center for Measuring University Performance's annual report on Top American Research Universities.
- New (or newly credentialed) nationally recognized centers of research excellence (#). Source: NSF.

Development/Commercialization Results:

Measured by:

- Licenses or options executed (#). Source: annual AUTM Licensing Survey.
- New high-technology companies formed (#). Source: CIT.
- Seed/Angel/Venture investments made (# and total dollar value). Source: PricewaterhouseCoopers/National Venture Capital Association MoneyTree™ Report.

Growth and Economic Impact Results:

Measured by:

- New jobs created in high-technology companies. (#) Source: CIT.
- Industry cluster concentration increased (# by sector). Source: trade assns, US DoC, VEDP/CIT.
- Jobs retained/created in existing industry (#). Source: BLS.

While the proposed metrics contained herein are aligned with the three R&D foci cited in the VRTAC study of March 2007, it is the view of the subcommittee that the same metric elements would apply to any declared research focus.

Data sources are identified, if known. Further work will be needed to provide definitions/shared nomenclature to enable the tracking of metrics within priority areas.

The subcommittee realizes that gathering the above data on an annual basis will require an investment on the part of each university (as well as at a central level within the Commonwealth). Adequate funds need to be appropriated to allow for the collection and analysis of these data.

2. Consortium for Advancing R&D

The subcommittee recommends moving forward with the consortium recommendation from the report “Collaborative Research and Development Strategies and Directions for the Commonwealth of Virginia” report (March 2007), with important added detail around the crucial and interdependent components that should be included in the consortium approach.

The March 2007 VRTAC report described how support for a consortium would enhance economic development, and recommended an investment of \$45 million per year over the next five years from the State, with an additional \$15 million per year in cost sharing from universities, industry and federal laboratories. The proposal provided detailed descriptions of these areas of growth, and provided a plan for the oversight for this state-wide consortium. The recommendations were then endorsed at the VRTAC meeting in March, 2007.

Given its tight time frame and charge, and given the extensive work by the March 2007 report group, this subcommittee believes that the consortium concept should be structured and funded, but did not formally discuss funding levels or arrive at recommendations on such funding levels.

The subcommittee believes that any funding plan needs to be sustainable, and not “one-time.” Importantly, the NGA report *Innovation America* recommends creating “an organization and consistent funding source that facilitates continuity in R&D partnering and spending...” In other words, a sustainable and consistent investment plan is essential.

In addition, the subcommittee believes that a coordinated, collaborative, and comprehensive approach is crucial to long-term and sustainable success; the Commonwealth should not do this in piecemeal fashion. As the NGA report states: “The early adopters of a collaborative approach are likely to gain a competitive advantage. States can head in this direction by steering investment to industry-university collaborations (or even requiring them), building cross-disciplinary centers, and facilitating cooperation between multiple universities.”

The subcommittee recommends including all of the following components in the consortium approach, several of which represent existing funding vehicles. These components are targeted toward comprehensive and essential progress in these areas: importance of recruiting and recruiting star scholars, attracting and supporting key graduate students, matching programs to leverage federal and industry funds, support for equipment and facilities (and leveraging to the best extent possible), and support for commercialization (“where the rubber meets the road”) – all of which are also supported by the NGA report.

Crucial and interdependent components (across the three priority thematic areas):

- Eminent Scholars – recruiting, supporting – existing funding vehicle
- Equipment Trust Fund – existing funding vehicle
- CTRF – existing funding vehicle
- Star Graduate Student stipend/scholarship/recruiting (perhaps this can be linked to tax credits or tax incentives to the business sector to encourage them to support graduate stipends).
- Commercialization loan fund
- Loan/lease guarantee fund for facilities
- Users’ Network (coordination and collaboration with JCOTS) – please see Appendix B for full draft details.

The Georgia Research Alliance (GRA) may provide a structural model for the Commonwealth of Virginia for how targeted, comprehensive, collaborative, and coordinated R&D funding can more effectively spur economic growth. For approximately 17 years, the GRA has been investing significant resources in targeted areas to recruit and retain star faculty, to attract and support key graduate students, to support equipment and facilities, and to be creative in the commercialization of the intellectual property emanating from the Georgia research universities. For example, it is common to see state-supported incubators (“accelerators”) within academic buildings in Georgia. The companies lured to those incubators (whether started by faculty entrepreneurs or from individuals outside of the university) have tremendous opportunity to work with the brain-power within those academic institutions. And, this has resulted in dozens of high-tech companies being located near those research universities.

The structure outlined in the March 2007 VRTAC report may be appropriate for this consortium approach. Another option worth serious consideration would be establishing a Virginia Research and Development Authority (VRDA), similar to the GRA.

3. Develop further the existing, statewide R&D contact database created by VEDP and the University-Based Economic Development group (UBED). As part of this effort, create a research marketing program focused on matching the key research initiatives at the universities with key corporate initiatives. The existing VEDP/UBED database is different in concept from the statewide database on R&D IP and specific capabilities that was tried previously and failed to be sustainable. The emphasis here is on strengthening the connections between the key university, federal lab, and industry contacts that possess the relevant and key information. This recommendation, in conjunction with recommendation #4 below (if approved and funded), would go a long way towards providing the commercial sector within Virginia with the information that they need to establish meaningful partnerships with our universities.
4. Establish Industry Liaisons at Universities in order to address the questions: How do we connect the key industry managers and engineers with the right university professor doing relevant research in areas of interest to the industry? How do we move from connections based upon serendipity to planned, strategic relationships? The subcommittee believes that the funding of at least one Industry Liaison at **each of our research universities** will allow those universities to have a single point-of-contact for the industrial sector, an individual who will oversee the collection of relevant data that will form the “Scorecard,” an individual that will work with the offices of technology transfer and the offices of sponsored programs in developing the contractual arrangements between those companies and the university, and other matters related to the enhancement of the synergy between the intellectual capital at our universities and the private sector.
5. Establish an annual workshop for University, Federal Lab, and Industry R&D partners on sharing best practices on IP commercialization. This initiative needs to be sponsored and supported by the Office of the Secretary of Technology and/or the Secretary of Commerce.
6. Reconsider current practices for planning and funding new research space at public universities. SCHEV’s fixed-asset guidelines call for at least 50% of currently-needed research space to be funded from non-state funds (with certain exceptions). This guideline creates if not a real then certainly a perceived barrier to advancing the research and economic development goals of the Commonwealth. Consideration should be given to: (1) basing research-space recommendations on projected need rather than current need; and (2) increasing the state’s share of research-space cost.