

Minutes of the Research, Outreach and Economic Development Committee

The University of Tennessee Board of Trustees

February 25, 2010
Martin, Tennessee

The Research, Outreach and Economic Development Committee of the Board of Trustees of the University of Tennessee met February 25, 2010, in Room 206C of the Boling University Center on the UT Martin campus.

I. Call to Order

Mr. Don Stansberry, Chair, called the meeting to order at 1:30 p.m. Mr. Stansberry noted that the Committee meeting was being held in a public format but it was not a public meeting. The significance of this format recognizes that speakers will include those individuals asked to make presentations and various Trustees. An agenda will be followed. Mr. Stansberry asked Dr. David Millhorn to call the roll.

II. Roll Call

Dr. Millhorn called the roll and the following voting members were present:

Mr. Don Stansberry, Chair
Mr. Crawford Gallimore
Mr. Tyler Forrest
Mr. Doug Horne
Mr. Jim Murphy
Dr. Verbie Prevost
Ms. Betty Ann Tanner

The following non-voting members were present:

Dr. Dick Gourley
Dr. Karen Johnson
Dr. Richard Rhoda
Dr. Jan Simek
Mr. Glenn Turner
Mr. Sumeet Vaikunth

Commissioner Ken Givens, Ms. Monique Moore Hagler, Ms. Sharon Rollins, Mr. Sumeet Vaikunth and Commissioner Tim Webb were absent from the meeting.

Dr. Millhorn declared a quorum present for the meeting.

III. Approval of Minutes of the Last Meeting

Mr. Stansberry stated minutes of the October 8, 2009, meeting in Knoxville had been sent for review and were in meeting notebooks. He asked if there were any amendments or corrections to be made. There being none, Mr. Stansberry asked for a motion to approve the minutes. Mr. Gallimore moved the minutes be approved and Dr. Prevost seconded the motion. No discussion took place and there were no dissensions in voting to approve. Mr. Stansberry announced the motion carried.

IV. Update on Research, Outreach and Economic Development Activities

Mr. Stansberry noted that in preparing for this Committee meeting and in reviewing the various presentations to be made today, he was reminded of the delightful opportunity to Chair the ROED Committee and thusly to be involved in such a wide range of activities of the University. He noted he should thank Vice Chair Murphy more often for giving him the chance to Chair the ROED Committee and to work with Dr. Millhorn and other individuals in charge of these activities.

Mr. Stansberry recognized Dr. David Millhorn to report on the progress of several activities for the University.

Dr. Millhorn pointed out that a Research Outreach and Economic Development annual report for 2009 had been placed at individual places at the table. The brochure was recently prepared to highlight many of the major activities of the University. The report will be renewed on a periodic basis to keep Board members informed and updated. Dr. Millhorn thanked Vice President Hank Dye and his staff for creating the in-house brochure. He also thanked Dr. Stacey Patterson in the Office of the Executive Vice President for her able assistance in preparing and organizing the brochure.

Dr. Millhorn presented a power-point presentation of ROED activities and initiatives with which his office is involved in on a regular basis. The topics of Biorefinery Grand Opening, Oak Ridge National Laboratory, Tennessee Electronic Research Administration (TERA), US Air Force, Volunteer State Solar Initiative, Memphis Research Consortium, and TNInvestco would be presented at today's meeting. Other topics shown but not to be discussed fully at this particular ROED meeting are: Information Technology (IT), Cherokee Farm, UTC SimCenter, Governor's Chairs, UT Research Foundation, NSF EPSCoR proposal, and Wind Turbine Test Facility.

Dr. Millhorn made brief comments regarding the non-presented topics:

Information Technology, Dr. Millhorn notes, is the nerve center of the University. Three years ago about 80 percent of complaints at the University concerned IT. Today this number has dropped drastically. In a recent survey looking at how IT customer services at UT are perceived, a "4" out of a possible "5" was received for IT services and satisfaction. Dr. Millhorn noted that this improvement can in large part be contributed to the hard work of Dr. Jesse Poore and Mr. Scott Studham, who followed Dr. Poore as UT CIO. Diligence is being given to reducing the costs of IT and in making IT largely customer-driven, i.e., what do the faculty and staff need to do their jobs.

The Cherokee Farm project is progressing well. In a matter of days advertising will go out for bids for infrastructure construction. Shoreline rip-rap work is continuing now after a delay caused by river flooding. Dr. Millhorn noted that copies of *The University of Tennessee Cherokee Farm Campus Development Plan* (February 2010) had been distributed to ROED Committee members. Although not required to do so, officials working on the Cherokee Farm project thought it wise to outline Cherokee Farm development plans in layman terms and thus to produce this set of plans outlining future steps in this project.

UTC SimCenter. UT administration has been working with UTC SimCenter staff for over a year to organize a competitive format for commercializing their products. This work is continuing in terms of intellectual properties development and other improvements.

The Governor's Chair program, begun at UT about six years ago, is growing. When the 2009 ROED annual report was created over the last few weeks, there were seven Governor's chair appointments. There are now eight appointments and additional appointments are pending. Many people are actively engaged in this process and several simultaneous search committees are in place for recruiting outstanding candidates. There is much interest in and for the University of Tennessee within this program.

The UT Research Foundation (UTRF), Dr. Millhorn noted, as reported at the June and October Board meetings, has been reorganized and restructured under the direction of Mr. Stansberry. Dr. Millhorn said he is pleased to report that things are progressing well at both Memphis and in Knoxville. Knoxville interfaces with Chattanooga and Martin. Close monitoring of UTRF will continue in order to promote activity increases which will produce increases in licensing and royalty revenue.

NSF EPSCoR proposal. Dr. Millhorn noted that he had addressed the National Science Foundation (NSF) EPSCoR proposal at a prior ROED Committee meeting. An EPSCoR grant is available only to states whose federal funding is below a certain level. Last fall UT put in an EPSCoR proposal to the NSF to build research infrastructure in Tennessee, with Dr. Stacey Patterson (UT Director of Research Partnerships in the Executive Vice President's Office) taking the lead in preparing the proposal. The grant is for \$20M over five years. Post-proposal interactions with NSF had made UT optimistic about receiving the grant, but it will be several months before official announcements are made by NSF concerning successful grant recipients. UT partnered with several TBR schools in the proposal: Vanderbilt, Fisk University and the campuses of UT. There are funds within the grant for STEM and research monies. It will be a tremendous coup for UT to receive the grant from NSF.

The Wind Turbine Test Facility is a DOE proposal to create a facility that will test large wind turbines. UT submitted a proposal for building a test facility at the Space Institute. Partners were Jacobs Technology and Arnold Engineering Development Center, both out of Tullahoma. UT did not win the award. Feedback reports indicated the UT proposal had high technology scores. However, a matching of up to 25-35 percent was integral to the proposal. Clemson University received the award with a match of 115 percent. They will receive the \$45M grant and they will put \$53M into the project as cost share. This particular proposal emphasizes the importance for the state and other entities to become involved in large-grant projects. Many such proposals require matching funds. For UT to compete there must be a way to be competitive. In the Wind Turbine Test Facility proposal, UT was able to pull together

approximately \$15M, which was far short of the winning \$53M matching monies. This project would have coordinated well with the capabilities at UTSI. UT will continue to seek similar grant opportunities.

The Tennessee Biofuels Initiative has been in progress for over two years now. It was funded in 2007 by the Governor for \$70M (\$40M capital and \$30M operating funds, with the latter funds used primarily for farm-related activities in growing biomass). Dr. Millhorn showed slides of the Vonore biorefinery facility, located at the Niles Ferry Industrial Park, and of the January 29, 2010, facility grand-opening ceremony at which a UT car filled with ethanol produced at the biorefinery was successfully driven. A slide was shown which stated, "You can travel 30,000 miles on one acre of switchgrass!" UT's partner in the facility is DuPont Danisco Cellulosic Ethanol LLC (DDCE). Twenty-five to 35 people will be employed full-time at the facility. The Vonore biorefinery is the most advanced, cutting-edge cellulosic ethanol plant in the world today. Ethanol is being produced at the Vonore site using technologies brought to UT by DDCE and joined with UT's technologies in the biomass areas. This is an R&D facility and was not built to generate huge amounts of ethanol at this initial step in production and operation. Future growth is indicated, as DDCE has announced intentions to build a commercial plant within the state of Tennessee. As America looks at its energy future, the importance of developing alternative fuels is increasing. It is more than cost vs. cost. National security and political considerations are tremendous issues. The U.S. spends an estimated \$700B a year in the Middle East to buy crude oil. Keeping these monies in the U.S. allows reinvestment in our own country as well as prevention of dependence on other countries. Dr. Millhorn showed a slide of a 78-acre switchgrass field in Roane County at harvest time owned by Mr. Clyde Turner, an 85-year old farmer. Mr. Turner's farm has been in the family for generations and the farm is now generating funds for the local economy through switchgrass production. Many farmers involved in this initiative are coming forth with testimonials that growing switchgrass for the Vonore facility is allowing them to literally keep their farms. This past fall 3000 acres of switchgrass was grown for the biorefinery, this year 7000 acres will be harvested. Over 25,000 acres of switchgrass will need to be grown over the next few years to supply a commercial plant to make 20M gallons of ethanol. Two new grants have been received from the Department of Energy. One will enable species comparison tests. Most varieties of switchgrass used around the country come from UT's Institute of Agriculture dating back 20 years. The grant will enable continuing refining and improvement of UTIA's switchgrass. The other grant enables a look at logistics, i.e., how switchgrass is moved from farm to the biorefinery site and related issues. In conclusion, the biomass program is on track and is doing very well.

Oak Ridge National Laboratory: The first 10 years ("From Quonset huts to SNS").

Dr. Millhorn noted that UT's partnership with Battelle in managing Oak Ridge National Laboratory (ORNL) is UT's greatest project and it also involves UT's greatest risk. Dr. Millhorn discussed the history of the first ten years of the UT-Battelle (UT-B) management of ORNL and noted that April 1, 2010, marks the first ten-year anniversary of this partnership. Dr. Millhorn presented highlights of accomplishments and discussed how UT-Battelle has positioned itself to compete for large national awards. Dr. Millhorn showed slides of the Spallation Neutron Source (SNS) facility at ORNL. It is the most modern research instrument in the world and is used to provide atomic images of a wide variety of hard and soft materials. This facility is in vast contrast to the slide shown of a Quonset hut that was at ORNL when UT-B began ORNL management. Prior to this time, ORNL was on DOE's chopping block, as DOE was cutting back

on their national laboratories. After UT-B management began, there has been a major rejuvenation of the Science & Technology infrastructure at ORNL. Literally billions of dollars have been invested in the Laboratory. It has been an amazing facility and technological transformation. Dr. Millhorn showed slides of new buildings at ORNL, including the UT-owned Joint Institute of Biological Sciences (JIBS) building. Dr. Millhorn also showed the new Joint Institute for Neutron Sciences (JINS) building now under construction, another UT-owned facility. Dr. Millhorn complimented the strong leadership management team now at the Lab. There have been three successful Directors of ORNL since UT-B began Lab management: Dr. Bill Madia, Dr. Jeff Wadsworth and Dr. Thom Mason. In addition, Dr. Millhorn noted the capable leadership of Dr. Thomas Zacharia, Deputy for Science and Technology, as being instrumental in driving programs forward. UT is a major factor in the success of ORNL. UT is actively involved in all aspects and issues of ORNL activities and initiatives, including strategic planning sessions. The UT-Battelle partnership is strong and vital. The momentum must be nurtured for ORNL for it to continue to be a preeminent national laboratory.

Dr. Millhorn showed a slide depicting the ORNL FY09 budget funding and staffing. In 2000, when UT and Battelle began managing ORNL, the annual budget was approximately \$400M. Today, it is \$1.7B per year, indicating a growth rate of over \$100M per year. All funds at ORNL are received through competitive awards with other national laboratories and a variety of agencies in continuous proposal processes. The \$1.7B budget can be broken down as follows: \$524M science research, \$328M ARRA (stimulus), \$205M energy research, \$158M national security research, and \$489M other (with work-for-others accounting for the majority of this \$489M, whereby ORNL contracts with companies, other national labs, DOE and other agencies to provide services). Staffing needs are also increasing at ORNL. There are now approximately 4,800 employees at ORNL.

One distinct difference in the Lab and the University is that the Lab can engage in long-term, big-scale research projects with national security significance. ORNL is an energy laboratory and today energy is one of the most important research considerations outside of health issues. The mission of ORNL, DOE's largest science and energy lab, is to conduct basic and applied research that provides innovative solutions to complex problems. Dr. Millhorn discussed the two kinds of nuclear energy; one is fission whereby atoms are split to make electricity. The more efficient type of nuclear energy is fusion energy. The sun is a natural fusion reactor. With current capabilities, research cannot be conducted with fusion energy in a controlled fashion. ORNL is now taking the U.S. lead in multi-national collaborative research efforts to create a fusion reactor. The ITER Project (International Thermonuclear Experimental Reactor) site is located in France. Extremely hot (50M degrees) temperatures and pressure are being created to mimic the sun to create energy. ORNL is ideally suited for this type of research, unlike a university structure. This project and similar projects, however, can involve universities and such research is a great opportunity for UT students and faculty to be involved to help change the course of the world.

Dr. Millhorn discussed the self-evaluation process at ORNL. There is continuous oversight, but examinations by the ORNL Science and Technology Committee must take place three times a year to assure that UT-Battelle is meeting overall science and technology goals and objectives or whether risks are being created in not achieving these goals. An annual report, the ORNL Science and Technology Risk Assurance Review, is then submitted by Dr. Millhorn as Chair of the UT-Battelle Science and Technology Committee to Dr. Jeff Wadsworth and Dr. Jan Simek

as Chair and Vice Chair, respectively, of the UT-Battelle Board of Governors. The report is then sent to DOE. For 2009, self-analyses of “green” (meeting or over-achieving performance goals) in all criteria: delivering and sustaining the world’s foremost center for neutron scattering, delivering and sustaining the world’s foremost center for leadership computing, leadership in materials research at the nanoscale, leadership in systems biology and biotechnology for energy, applying S&T base to deliver impactful national security technologies, and leadership in energy through science. The Department of Energy also gives ORNL a grading each year. A slide was shown comparing DOE report cards for ORNL and its other national laboratories. ORNL received the highest overall rating among the ten national laboratories, an A- in mission accomplishment, construction and operation, S&T project/program management, contractor leadership/stewardship, environment safety and health, business systems, facilities maintenance and infrastructure, and security and emergency management. Dr. Millhorn referred to the close monitoring of ORNL performance: funding remains strong with a total budget of \$1.7B; adding new staff (net growth of staff increased by 185 employees as of September 2009); publishing notable scientific results (top 10 publications in 2009 were cited an average of 23.4 times); and expanding partnerships in 2009 (274 new research agreements, 5 new companies, 567 active international patents, 157 active technology licenses).

Dr. Millhorn noted that ORNL is home to two world-class computers: Kraken, funded by a \$65M NSF award to UT, and Jaguar, a DOE-funded computer. Both computers have now exceeded the petascale and are larger than a petaflop. Kraken is now the world’s third fastest computer and it is the world’s fastest academic computer. Jaguar is the world’s fastest computer. ORNL leads the world in computing capabilities. This tremendous computer power gives inroads to attracting researchers and scientists from all over the world to perform materials, energy, health, astro-physics research.

An update on the UT-ORNL Joint Institutes was given. Dr. Millhorn reminded members that the state had appropriated monies to the University to build several buildings on the ORNL campus. These buildings include the Joint Institute for Computational Sciences (JICS), Joint Institute for Biological Sciences (JIBS) and the Joint Institute for Neutron Sciences (JINS). The Joint Institute for Advanced Materials (JIAM) facility is now under construction at the UT Cherokee Farm campus. Dr. Millhorn noted that JICS houses staff for the 1PF Kraken computer. This staff has already generated \$91M in revenue for UT in NSF-funded projects. JIBS houses one of three DOE biological energy centers, where switchgrass research on molecular structure fits well with the Vonore biorefinery mission, as thus intended. So much research is being conducted at ORNL by visiting scientists from all over the world (3000 visitors annually who stay two months or more) that a guest house is being constructed at ORNL near the SNS to house these guests and to allow them close-access to their work going on 24 hours a day.

A list of key ORNL S&T priorities was shown. Dr. Millhorn met with Battelle leadership a few weeks ago to review this list. One area of review concerns reenergizing the ORNL culture. A large portion of the employee population is near retirement and it is important to bring in young leadership and staffing. A new UT-ORNL graduate student education and research program will promote grow-our-own staff. Graduate students from many different universities will come to participate in this program and tremendous opportunities will encourage them to stay at the Lab after earning advanced degrees. Much focus is given to the

enhancement of ORNL's S&T reputation. Strengthening scientific impact, optimizing productivity and aligning resources are areas receiving close review.

Dr. Millhorn showed a slide of ORNL's main campus. He noted that when he was at ORNL in 1998 to conduct research, the area now shown with numerous new buildings and green areas was a parking lot. The area now resembles a college campus.

In conclusion, Dr. Millhorn addressed Management & Operation recompetition status for UT-Battelle management of ORNL. The first UT-B M&O contract, in 2000, was for five years; in 2005 DOE extended the contract, without recompetition, for another five years. The current contract expires at the end of March and leadership is awaiting word from DOE on renewal status. Dr. Millhorn noted a five-year extension was expected. (NOTE: Subsequent to the ROED Committee meeting, DOE officials informed Congress that it had authorized a noncompetitive extension of up to five years to DOE's contract with UT-Battelle for the M&O of the Oak Ridge National Lab. As the procurement process was not complete at the time of the announcement, no other information was available regarding renewal.) There are huge benefits to be received in such management; however, if this management is not done properly, there are also huge risks. ORNL management has greatly enhanced the image of the University and tremendous progress has been made in national research and science arenas because of UT's position in Lab management. Dr. Millhorn will work to ensure the University of Tennessee is positioned to continue ORNL management, for many years to come, solely or through any other partnership. ORNL is of critical importance to the state of Tennessee, Dr. Millhorn said, and to the University of Tennessee.

Dr. Millhorn asked if there were any questions concerning his presentation. Dr. Millhorn was asked if research was being done at ORNL to reduce transmission loss and he noted that a recent Governor's Chair appointment has been made with this technology expertise. There are DOE-wide programs in this field and ORNL has a role in this research development. Mr. Gallimore noted that recruitment of Governor's Chair appointments seemed to be most successful and he asked about the amount of grants this group is bringing to the University. Dr. Millhorn recognized the ongoing and diligent work of UTK Chancellor Jimmy Cheek, UTK Provost Susan Martin, ORNL officials and the various search committees in recruiting and evaluating outstanding candidates for Governor's Chair positions. Chairholders must generate revenue and most bring in monies with them in the form of grants transferred to UT and ORNL. The exact amount can be calculated. The sum is sizeable. Chairholders must put together entire programs and involve other faculty in producing grants and revenue for the institutions. The ability and credentials to succeed in such an enterprise are what candidates are scrutinized to achieve. Mr. Stansberry noted that Mr. Gallimore's questions can also be addressed as members review Item #8. Ms. Tanner asked Dr. Millhorn how many other national laboratories were in competition with ORNL. Dr. Millhorn replied that there are ten science labs and four nuclear labs under DOE management. ORNL is an "open" science lab with an emphasis on energy science. The biggest competition for ORNL is Lawrence-Berkeley lab in California, Ames, Argonne, and Brookhaven in New York. ORNL leads the nine other national science laboratories in terms of output, grant funds, research portfolio and so forth. Dr. Millhorn noted that most of ORNL's budget of \$1.7 in East Tennessee and it is a big boost to Tennessee's economy. When asked if UT will partner again with Battelle if rebid of the ORNL contract is required and Dr. Millhorn responded that this is correct. The UT-Battelle partnership has been highly successful. Dr. Simek remarked that strategies are in place for

rebid in the event this is necessary, but, again, the likelihood of UT-Battelle contract extension is great. It is about an 18-month process, Dr. Millhorn noted, to put such a huge proposal together and the cost is considerable. Proposal preparation space must be rented off-site from ORNL, staffing must be obtained and any staff presently employed must be removed from DOE dollars and so forth. There are stringent rules in place concerning proposal logistics.

Mr. Stansberry thanked Dr. Millhorn for his presentation.

V. Presentation on Tennessee Electronic Research Administration (TERA) Proposal and Awards Management System.

Dr. Millhorn introduced Dr. Andy Johns, Office of Research Information Systems at the University of North Carolina at Chapel Hill, to give information about and to give a demonstration of TERA (Tennessee Electronic Research Administration), a system used in electronic management of research grants and awards. As a university's grant portfolio grows, with numbers changing every day, it is critical to maintain a data-base to monitor information as well as to ensure proper compliance and related procedures in this process. After much review UT found at UNC-Chapel Hill a system that met the criteria UT believes best meets these needs and requirements.

Mr. Johns thanked the ROED Committee for the opportunity to share with them an exciting project for UT and an opportunity for the region as a whole. Seven years ago UNC began to think of the challenges it faced as a research university. As its research portfolio had increased over the last 10-15 years, while a good thing, a number of challenges were presented. Researchers can spend up to 40 percent of their time dealing with administrative and compliance requirements. This is a significant period of time when faculty and staff are not focused on the work they do best. A software strategy was sought to reduce this downtime as well as to increase the transparency of the full research enterprise to facilitate better understanding and tracking of the resources, knowledge base and capacities available within the university system. Frequent questions such as, "Is there someone at UNC who specializes in X-Y-Z?," needed an accurate, prompt response. Better opportunities to identify and communicate expertise also allow strategic advantages in forming collaborations, bringing industries into the area to promote regional economic development, and so forth. Thus began an endeavor to create software to better manage research information and address the efficiency aspect in administration of these procedures. At this time, seven years ago, the approach was geared primarily towards UNC Chapel Hill. It quickly became apparent, within two years, that this endeavor had benefits for all 17 state universities within North Carolina. The NC Educational Research Administration system (eRA) has thus been implemented throughout North Carolina's state universities, allowing tracking and monitoring of research repositories throughout the state. This system allows identification of synergies, overlaps, and opportunities to better understand what expertise and capacities exist within the state-wide university system. Mr. Johns showed the target areas of "My Research @ Carolina": research development, proposal/award management, clinical trials management, compliance areas (human, animal, federal regulations, etc.), and technology commercialization to the private sector. My Research @ Carolina has named their various software modules: RAMSeS (Research Administration Management System & eSubmission; sponsored research, pre/post/proposal grant management), IRBIS (human subjects/IRB), ACAP/RAMS (animal care, vet services, billing, inventory) BLUE (intellectual property, innovations coming out of the

university for commercialization, patents, marketing), eCOI (conflict of interest, online completion of disclosures, review/management), MyResearch Portal (one-stop-shopping portal for faculty to identify and check status of research endeavors, allows access to all other modules), and Vitae Profile Management (identifying faculty expertise areas). Tennessee has licensed this software and is now in its implementation process. It is vital to have accurate and timely information for management and feedback on strengths and weaknesses. Questions need to be answered (why are we growing in certain areas, why are we not growing in certain areas, what does our research profile look like) in order to make decisions about where to focus resources, efforts and initiatives to grow the research enterprise. As noted previously, historically it's been very challenging for universities to retrieve this information. RAMSeS (and now TERA at UT) enables data to be broken down for individual campuses as well as retrieving data for the entire system of universities within the state. Criteria can be customized to retrieve specific data (i.e., research data for a particular year, non-profit research totals, particular types of research and so forth) to better understand where growth is taking place or not taking place. Mr. Johns gave a demonstration of the research software. Results generated by the system are highly-interactive reports in nature. For instance, if one wanted to know the representation of a certain figure, say local governmental funding, links drill down with increasing detail to obtain specifics of the local funding agency grants. A large source, approximately 50 percent, of UNC funding is from the National Institutes of Health (NIH). UNC via RAMSeS is keenly interested in monitoring success in NIH areas, not just in the total amounts of growth in certain areas but in understanding why this growth took place. A sub-look into program areas within different categories reveals important information to aid in understanding the growth (or lack of growth) rationale and trends related to the information. It is extremely meaningful to researchers and principal investigators to obtain highly-customized, desired information at any point in time, for any segment of time in question. Mr. Johns demonstrated several scenarios in retrieving certain categories of information within the entire research enterprise for an individual campus or for multi-campus. One test requested all proposals submitted within the Departments of Biology, across all NC campuses. These results then led to a request to retrieve data within this range concerning a particular year and so forth. Seeking data on which campuses are conducting research on diabetes was another test demonstrating the system's tremendous capabilities in determining any number of sets of detailed information. Mr. Johns noted that all this data is valuable but it is not available to faculty unless good processes are in place by the departments managing the data. Making it easier for departments to retrieve meaningful, accurate and timely information and then leveraging this wealth of research data to better understand what is taking place and why are the goals of the system. Information, as shown by Mr. Johns' demonstrations, is presented in a visibly graphic manner, enhancing the use and functionality of the system research tools by a wide variety of users. Mr. Johns discussed the importance of knowing available research expertise and data capacity within the university as well as knowing core equipment and facilities capacities. This information knowledge is critical for collaboration within other universities or for economic development growth for industry partnerships in the region.

As previously noted, Tennessee has licensed the UNC eRA software and has rebranded the software as TERA (Tennessee Education Research Administration). The grant management of the software in Tennessee is called PAMS. UT Knoxville and UT Health Science Center in Memphis are scheduled to go live with the software this spring; UT Chattanooga is now implementing the software. Integration is now underway with existing university systems,

particularly the financial aspect to help fiscal efficiency and in understanding the economic regional impact of the research enterprise. Mr. Johns demonstrated how financial information could be obtained for any particular entity and the number of projects taking place at that location in any particular point in time and the economic value of the research the project represents. This type of information is extremely helpful in understanding where strengths and weaknesses are within the research enterprise. This knowledge base also helps political strategists understand what the university is accomplishing across the state and region.

Mr. Johns concluded his presentations and asked for questions. Dr. Steve Schwab thanked Mr. Johns for demonstrating the remarkable capabilities of the eRA system and thanked Dr. Millhorn for bringing the system (now TERA) to Tennessee. To obtain the power of the system, Dr. Schwab noted, the data must be incorporated into the system and he asked Mr. Johns to comment on the resources and mechanisms needed for this aspect. Dr. Schwab also asked if this information could be exportable in terms of awarded grants from such sites as NIH. Mr. Johns explained that many universities were currently managing this kind of data but were doing so in a decentralized approach and, although available, were not easily accessed or leveraged. The eRA mechanism aims to offset this burden and frustration on the part of the campus or unit with efficiencies created elsewhere for net input. In the case, for example, of a proposal, this workflow data will be provided by the investigator or their support staff. Very often grant data is input through the university's research administration office; however, without good data controls and processes, data is not necessarily reliable data or it cannot be leveraged in a way that tells a reliable story. Dr. Schwab asked if eRA allowed input from data collected by or downloaded from multiple formats without the necessity of re-inputting this information. Mr. Johns replied that it does in most cases and gave an example of inputting information from faculty publications. There may be situations, however, where data input must be managed internally. Dr. Karen Johnson inquired about the relational data-base platform design and the ease of computer program modification. Mr. Johns noted that much effort has gone into the design to assure program accessibility to allow compatibility with existing major computer platforms in the market today. Execution of a license with an outstanding third-party commercial firm, Cayuse, based in Oregon, now in partnership with the UNC project, has facilitated such share operations. UNC developed the research data system but as an educational institution it was in the best position to share and implement the system across the country. The third-party commercial firm is a good partner to handle this aspect of the technology. Early on UNC determined to engineer the software to be portal in nature as no two universities or states are exactly alike and requirements different in each situation. Mr. Wharton asked if the capture nature of generated intellectual property promote understanding of the history and management of the property. Mr. Johns replied that the system allows this feature in capturing disclosure and intellectual property information and Mr. Johns demonstrated this capability tool of the system. Technology commercialization managers are also keen in obtaining information to manage their financial operations, marketing and other aspects and Mr. Johns demonstrated the system's access to such detailed transactional information. Ms. Loughry noted the value of users approaching this information from the viewpoint of fiscal stewards of the public domain and she inquired about the IRIS connection in obtaining financial information access within the research software as she had observed this icon in Mr. Johns' demonstrations. Mr. Johns demonstrated opportunities for detailed tracking of fiscal commitments on per-project bases with the software system. Mr. Hall asked for information on the purchase costs associated

the UNC software. Mr. Johns said the sharing of software with UT was more of a partnership nature rather than through purchase by a client; however, costs are involved in the partnership. Mr. Wharton asked about the timeframe of UT's collaboration with the UNC program and Mr. Johns noted this occurred approximately one year ago. Mr. Wharton asked when the same kind of information access demonstrated at the meeting would be available to Tennessee. Dr. Millhorn said a UT team works on this program daily, as well as paid staff in North Carolina, to enable access by October of this year. Mr. Johns was asked about the faculty input process. Mr. Johns said faculty members have embraced the online process, in lieu of filling out paper-based applications, when submitting a grant proposal. Faculty can submit proposals from anywhere in the world now. Mr. Anderson asked if information at UT is held in any proprietary fashion or is it was available to be shared with anyone who wished to have information. Mr. Johns responded that information would be available solely for internal access or to be leveraged at UT's discretion.

Mr. Stansberry thanked Mr. Johns for his excellent report and noted that this presentation was of the caliber that made the ROED Committee such an interesting demonstration of work taking place at the University. Mr. Stansberry also thanked Mr. Johns for making the UNC software program available to the University of Tennessee.

VI. A Case Study on the Role of Business Schools in Research Universities

Dr. Millhorn introduced Dr. Alex Miller, William B. Stokely Professor of Management and Associate Dean for Academic Programs in the UTK College of Business Administration (CBA), who is working with Dr. Dan Stewart (UT Office of the Executive Vice President) in developing research collaborations with the Air Force regarding procurement training. Dr. Miller noted that at his last ROED Committee meeting (June 2009) he had addressed CBA executive education outreach programs and Dr. Miller reminded members that much of this outreach effort is based on research. Today's presentation highlights the Aerospace Defense program and the CBA's efforts to help the University reach its goal of becoming a Top 25 Public Research Institution in the U.S. CBA works on the business side of national security, a big business that is becoming increasingly big in scope and difficult to afford as a nation. The UTK College of Business Administration focuses on two industries--health care and national security through aerospace defense--and develops faculty for these industries. The aerospace defense area is particularly important because of its economic impact. In terms of balancing our trade with other nations, it is the single-most important industry in the U.S. Due to consolidations that took place in the 1990s, there are relatively few players within the aerospace defense industry. The remaining players, however, are huge. One of CBA's principal customers is the Air Force Material Command at Wright-Patterson Air Force Base in Ohio. This unit buys and maintains all the hardware, software and equipment used by the Air Force. It has tremendous economic impact for the nation. If a stand-alone corporation, this segment of the Air Force would be a Fortune 25 Corporation. In addition, there is tremendous impact by the aerospace defense industry on the welfare of the nation's national security. The U.S. has been at non-stop war conflict for nearly 20 years now. A report out last week stated that the most serious threat of terrorism was not from foreign terrorists but from terrorism within the United States. It is becoming more difficult for our nation to afford national security at a time when challenges of national security are multiplying. Addressing the business issues of how we can afford to maintain the security of our country is critical. With UT's faculty experience and expertise in this industry and with national aerospace

defense a major source of federal funding, it is not surprising for the CBA to concentrate its efforts in this enterprise.

Dr. Miller outlined the vision of the CBA National Defense Business Institute (NDBI) to develop:

- public university alternative to defense universities and think tanks, such as the RAND Corporation;
- a globally respected think tank coupled to world-class education and development opportunities; and
- one-stop-shopping access to a network of resources and subject matter experts.

Unlike the RAND Corporation, which primarily conducts studies and research, the NDBI at UT Knoxville provides unique advantages in being positioned to educate and train young people through its training mission and, consequently, in creating a highly-effective feedback pool through which classroom application builds upon research. Additionally, the CBA is the only business school in the nation focused on aerospace defense. This is a great opportunity for UT to be a one-stop-shopping node within the aerospace defense industry. This strategic positioning takes place within a college of business; it could not successfully function as a stand-alone entity. The NDBI program is built upon research and training already occurring within the CBA at UT Knoxville. UT's partnerships with Oak Ridge National Laboratory and the Baker Center for Policy Expertise also provide tremendous opportunities for continual strengthening of the NDBI program, as do other national partners that include MIT, the University of Pennsylvania (Wharton), the University of Texas, Naval Post Graduate School, and Defense Acquisition University. Faculty of these strong partnership institutions works actively with UT faculty on research grants, creating a most impressive league of players. NDBI also has "thought leaders," non-academic organizations and consulting firms doing highly-innovative thinking on issues relating to aerospace defense. One of these groups, the Monitor Group, is a firm created by a group of faculty members at Harvard and Stanford. It has 78 offices around the world, and they are now doing enough work with UT that they are thinking of opening an office in Knoxville. The editor of *Aviation Week*, the leading journal in the aerospace industry, sits on the NDBI board of directors. No other school in the country has a closer relationship with this publication. This involvement indicates the advantages NDBI sustains within UTK.

In 2003 NDBI federally funded research activity was too small to plot. By 2007 NDBI was doing more federally funded research than any other business school in the Southeastern Conference. In 2009 and 2010, NDBI is doing more federally funded research than all the other SEC business schools combined. NDBI is now closing out, due to time limitations, a \$32.5M five-year contract. This contract, however, has resulted in a sole source follow-on contract of \$40M for three years. When the RFP went out for the follow-on contract, no other organization chose to compete with NDBI. "We can do this, we can win" is the mantra of NDBI. Dr. Miller gave examples to follow up on Ms. Loughry's earlier statement in the TERA discussion regarding the practice of good state fiscal stewardship and representing the best interest of the state. Should the College of Business Administration at UTK be in the business of aerospace defense, is this a good thing for the CBA to be doing? To answer this question, the nature of this enterprise must be examined. Dr. Miller discussed the AF5021 project: Air Force Smart Operations for 21st Century. This project was developed in concert with the Air Force Lean initiative, a program designed to remove waste from processes and simultaneously improve availability and quality. Three universities were identified as a potential partner with

the Air Force: the University of Michigan, UT and MIT. UT was selected. UT then designed for the Air Force an integrated suite of research projects and courses which included topics related to contracting, leadership, financial management, and maintenance. Training courses were designed for these areas and over the last three years there have been over 3,500 participants. In the history of the Air Force the AFSO21 is the only known example of a program deemed of such significance that general officer and senior civilian executive participation was mandated. Both the Secretary and Chief of Staff of the Air Force have personally attended these courses at UT, which is an unprecedented level of leadership involvement.

Dr. Miller highlighted additional work samples of NDBI initiatives:

- The Defense Acquisition University (DAU) is the business school for the Department of Defense. Per prior DOD policy, equipment maintenance was paid for on a fix-as-failed basis through cost-plus contracts, creating virtually no incentive for equipment endurance. DOD revised this policy to reflect “pay as she flies” and now pays for equipment only when it was working properly. UT was at the table when the new approach was revised and is the first university to support the new DOD policy mandating performance-based approaches. NDBI has been instrumental in designing commercial applications based on DOD policy and is recognized as a global expert in defense applications of performance-based contracting. The UT trademark for this research is “Bested Outsourcing,” one of top five trends UPS recently identified in outsourcing. Only federal funds (no state funds) were used in creating this capability and it is generating healthy revenue growth for the University.
 - USAF Energy Plan. The Air Force is the single-largest user of energy in the U.S. UT, partnered with the University of Texas, assembled a blue-ribbon panel of top U.S. experts and authored a report to the AF Chief of Staff assessing energy initiatives and recommending strategic improvements. The report endorsed biofuels programs to meet future military and general aviation secure energy needs. Along this line and another example of UT’s strategic position within national and global interests, a recent development Dr. Miller had learned just prior to the meeting in discussion with Dr. Millhorn is that the DOD Task Force for Business and Stability Operations has asked UT and Genera Energy LLC to submit a feasibility proposal for producing and processing switchgrass to deliver comprehensive, tangible on-the-ground biofuels results in Afghanistan and this effort is underway. Involvement in such critical initiatives means UT possesses the research and cutting-edge technology to be a major player in global affairs.
 - USN Destroyer Acquisition Plan. Raytheon Corporation contacted NDBI to serve as an independent think-tank consultant to examine options for acquiring DDG-1000 and DDG-51 destroyers to meet maritime capability requirements. NDBI produced its report in a short turn-around timeframe and Raytheon was so pleased with the information that it has involved UT in other Raytheon studies. UT is thus building a successful reputation on the commercial side of business as well as on the defense industry side.
 - High Velocity Maintenance for C-5. NDBI worked with aerospace-defense MBA alumni in multi-year involvement efforts in Warner Robins, GA. C-5s are gigantic aircraft and there are 112 in the world. The C-5s were being brought in for maintenance every five years and the actual maintenance required a full year on each C-5 due to the

complexity of the aircraft. With NDBI strategic studies, the maintenance period was reduced from 365 days to 240 days. Later refinements cut this time to 160 days. Cost savings for the “lift” capacity in freeing up the C-5s from lost time on the ground is approximately \$2.5B. In wars fought today, 80 percent of casualties come from resupply convoys. No casualties have ever resulted in making supply deliveries in a C-5. Lives are being saved as well as vast sums of money with these improvements. The work involved in this initiative was recognized with an Edleman Prize, which is the top award in the field of process improvement, and it was the first time a governmental institution had won this prize.

- Aqua Chem is a Knoxville company partnering with NDBI for know-how in developing marketing strategies to improve their level of business with the U.S. Government. It’s another example of NDBI services and capabilities.

Dr. Miller responded to the question of “What’s in it for the state?” with five points:

1. Federally-funded R&D strategy. NDBI vision uses DOD funding for research that can be adapted for the private sector. Examples involve performance-based contracting and Lean healthcare. Wing-manufacturing concepts applied to emergency room applications improve thru-put by 40 percent, lower costs 25 percent and improve quality 10 percent. This research is funded by federal research dollars.
2. Improved education. The NDBI program brings in additional faculty and thereby improves UT faculty-student ratios. NDBI faculty brings leading-edge experience into the classroom which provides entirely new cutting-edge curriculum content based on federally-funded research. Within the Executive MBA program of the CBA, an experience base is provided for mentoring students on “million dollar payback” projects. Each MBA student is expected to have a million dollar impact on a company while in the program.
3. Financial support for the university. Every \$1.00 of federally-funded research contracts for direct costs generates up to 48 cents to cover university F&A overhead. The 48 cents is shared by central administration, the college and department, and by the faculty. The portion covering direct costs is also a source of supplemental compensation for faculty (\$3.5 to date, over a six-year period) and this compensation plays an important role in faculty retention. Research contracts also cover graduate assistantships, technology and operating expenses, which saves the university from covering these costs.
4. Economic impact on the region. NDBI has generated \$4M spent locally outside the university over the last three years, including 13,000 hotel room nights and \$1M of meals and local services. Eleven new white-collar jobs have been added to the Knoxville workforce, all funded by federal dollars.
5. Reputation of the university. NDBI is establishing itself as a world-class resource for local firms pursuing federal contracts. The quality and quantity of this work and leadership is recognized by other universities and organizations. A good example of leadership positioning with the national community through institutional strength is Dr. Jan Williams, Dean of the UTK College of Business Administration. Dr. Williams has served as the American Accounting Association Chairman and he is the chair-elect in AACSB, an international accreditation board. Dr. Williams and other UT faculty do not get to these positions by themselves. They are part of an outstanding university with an overall excellent reputation.

Dr. Miller summarized his presentation with bottom-line comments: Being a Top 25 research school is sound state strategy both financially and academically. In-hand success suggests the strategy of federally-funded research can be extended into colleges not historically focused on this strategy. It is not an easy process, as no standing Top 25 research university wants to relinquish its position, but UT's track record suggests this goal can be accomplished. If this goal is attained, this position can be an important driver of economic development to the state and to the nation. Dr. Miller thanked members for their important support in this pursuit.

Mr. Stansberry thanked Dr. Miller for his presentation and noted that time constraints were necessitating that the Committee amend its agenda.

VII. Presentation on Memphis Research Consortium

Dr. Millhorn asked Dr. Steve Schwab, Interim Chancellor of UT Health Science Center, to give a few remarks concerning the Memphis Research Consortium. Dr. Schwab noted that the Memphis Research Consortium is an organization created just within the last month with expectation to help leverage West Tennessee's research resources into a voluntary research network. This initiative is driven in large part by the success of the UTK-ORNL joint venture and which stimulated the Memphis community to create something similar in nature. The lead members of the organization are the UT Health Science Center, the University of Memphis, and the St. Jude Children's Research Hospital. Other members include the Baptist Memorial Health Care Corporation, the Methodist Le Bonheur Healthcare System, Memphis Bioworks Foundation, the FedEx Corporation, Smith & Nephew, Wright Medical Technology, Inc., and Medtronic Sofamor Danek. The Consortium is a non-binding, voluntary organization with institutions which have common research goals. The MOU has been approved and signed and the first meeting of the Consortium took place last week on the campus of UTHSC. Dr. Millhorn was the inaugural speaker, invited specifically to speak to the group about the UTK-ORNL joint research and education program. Subsequent meetings of the Consortium are planned to define areas of focus and potential collaboration and then to seek funding in those areas.

Mr. Stansberry and Dr. Millhorn thanked Dr. Schwab for his report.

VIII. Presentation on TNInvestco

Dr. Millhorn introduced Dr. Stacey Patterson (UT Director of Research Partnerships) and noted that Dr. Patterson has been involved in most of the initiatives discussed today. Dr. Patterson has tracked very closely the Governor's and state's plans to put funds into an investment pool for young start-up companies. Dr. Patterson noted that the Tennessee Small Business Investment Company Credit Act (TNInvestco) had received quite a bit of press since announced by the Governor in July 2009. The Tennessee Department of Economic and Community Development describes TNInvestco as a state-funded venture capital program providing slightly more than \$84M in grants to seed and-early-stage companies. The program is important to the University of Tennessee and the young companies spinning out of its intellectual properties. The program also incorporates an additional focus on high-growth transformational businesses—business that create high-tech and high-paying jobs. The state received 25 proposals for funding organizations and six awards were made. There are four

proposals still pending that might possibly be funded this year. The UT Research Foundation (UTRF) is a major partner in one of the selected funds with Tennessee Community Ventures. Dr. Patterson discussed the timeline of the TNInvestco program: November 5, 2009 funds winners were selected; mid-December 2009 agreements with insurance companies were made for winners to receive premium tax credits and future credits for invested capital; early January 2010 funds became available and the program was rolled out and introduced around the state. Information about the program was presented in Memphis at the UTHSC recently at the UTRF Boot Camp. Further information about the program will be presented at the forthcoming Tennessee Innovation Conference to be held in May by the Tennessee Technology Development Corporation (TTDC) in Nashville. Additional roll-out information will be featured at the Global Venture Challenge, of which UT is a sponsor, in Oak Ridge. First funds investments will be made in the second quarter 2010.

Companies selected as TNInvestco finalists are:

- Tennessee Community Ventures Fund LLC, Nashville
- Innova Fund II LP, Memphis
- Limestone Fund LLC, Nashville
- Tri-Star Technology Fund LLC, Brentwood
- XMi High Growth Development Fund LLC, Nashville
- Council & Enhanced Tennessee Fund LLC, Nashville

In addition to the partnership affiliation with UTRF in the Tennessee Community Ventures Fund, UT also has direct relationships with Innova Fund (affiliated with the Memphis Bioworks Foundation) and Tri-Star Technology.

Dr. Patterson outlined the TNInvestco investment schedule. The schedule will be fast-paced, with 50 percent of the \$84M awards on the streets within the next two years, 70 percent within three years, 80 percent within four years and 90 percent within six years.

Benefits for the University of Tennessee within this program include increased exposure for its intellectual property start-up companies which increase greater funding opportunities. The funds will have the capacity to bridge the funding gap that exists between technologies leaving the laboratory and traditional venture capital investments leading to commercial products. This is a unique, first-time opportunity for such early-stage funding in Tennessee. The program focus strongly complements UTRF's maturation funding process, featuring for-profit companies however instead of research still in the lab. TNInvestco will help develop the culture of investments for technology-based businesses to drive economic development in the state to the next level. This success will increase job opportunities for UT graduates and keep strong workforce talent in Tennessee. Additionally, TNInvestco will provide research opportunities and increased seed funding for new research which will drive innovation to create new business and technology. The success rate for a young company increases dramatically if it is able to withstand the first few years after start-up time and TNInvestco will provide this critical funding support. In general, the TNCV relationship will make available \$1-\$1.5M to UTRF for its technologies. The funds must be invested in start-up, for-profit companies as \$50-200K seed investments. The specific distribution process for these funds is now under development by UTRF.

Dr. Patterson concluded her presentation by showing a slide illustrating how UT (providing an educated workforce, research and intellectual property, technology transfer and start-up companies), TNInvestco (providing financial capital) and small business companies (providing jobs, a tax base and research funding) can work together for Tennessee for strong mutual benefit and growth.

Dr. Patterson was asked what the state expected to receive in return for its seed-funding monies. Dr. Patterson noted that the state will receive a 50 percent share of profits of each TNInvestco, to continue until the program is completed, and that job creation is the prime benefit to the state in this program. In a question from Ms. Loughry, Dr. Patterson noted that TNInvestco is a program that originated by Commissioner Kisber in the Department of Economic and Community Development. TTDC and other organizations helped to shape the legislation as the program was introduced. Mr. Stansberry noted that the program funds were actually tax credits which generated revenue for the program.

Mr. Stansberry thanked Dr. Patterson for her presentation.

IX. New Business

There was no new business

X. Adjournment

Mr. Stansberry thanked members for their participation in the meeting.

Respectfully submitted,

David E. Millhorn, Ph.D.
Executive Vice President