North Carolina's Strategic Plan for Aerospace Workforce Development 2008 - 2012

This Strategic Plan was prepared by
The Advanced Vehicle Research Center
under a contract with the
National Aerospace Development Center.

Co-conveners in the development of this strategic plan included;

North Carolina Department of Commerce

North Carolina State University

The Kenan Institute for Engineering, Technology-Science

The North Carolina Community College System

The National Aerospace Development Center

"Skilled Workforce, a Fundamental Need for Aerospace Industry Expansion in North Carolina"

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History

On November 18, 2002, the President's Commission on the Future of the Aerospace Industry completed a landmark study on the condition and future of the national aerospace industry.

The study showed that one of the greatest challenges confronting the United States was the aging workforce that supports the industry, and that action must be taken to ensure continued global leadership in this key industry.

In 2005, the North Carolina Space Initiative published an AeroSpace Industry snapshot (Brown et al. 2006) designed to explore our state's footprint in the aerospace sector in comparison to other states and benchmarked to national data. Overall, the study found that North Carolina's economy could benefit from an expansion of its aerospace industry sector and that it will impact nearly all geographic sections of the state.

This study garnered widespread attention. North Carolina was selected as one of three states supported by the National Aerospace Development Center (NADC) to develop a comprehensive statewide workforce development strategy. A memorandum of understanding between the NC Department of Commerce, NC State University, the NC Community College System and the NADC was signed for the purpose of creating the strategy. A steering committee of industry and resource organization representatives was formed and has been active.

Clearly, aerospace will be a core industry in North Carolina in the 21st century. North Carolina has experienced significant growth in the aerospace industry, and an effective strategic plan for workforce development is crucial to support that growth.

Indeed, North Carolina represents a microcosm of the aerospace industry, with a commercial aviation network that includes the Charlotte-Douglass International Airport, and a rapidly expanding Raleigh-Durham (RDU) International Airport, and some 70 other aviation facilities throughout the state.

North Carolina is home to two aircraft manufacturers including Atlantic Coast Seaplanes and most recently, Honda Jet Aircraft. Honda Jet Aircraft and supporting industries will bring an additional 788 jobs to the state and the impact on new industry supplier base will include such industries as GE Aircraft Engines, who will supply the engines for the newest VLJ (Very Light Jet) in the world marketplace.

North Carolina is home to six major military installations including: Fort Bragg, Camp LeJeune, Pope AFB, New River Air Station, Cherry Point Naval Air Station, and Seymour Johnson Air Force Base, There are opportunities to provide products and services to these installations and also to retain skills of military personnel in this state.

The state's universities are also pressing forward with research to support the aerospace industries. For example, research at NC A&T will provide advanced materials for the next generation space vehicles. Small satellite research and development is underway at North Carolina State University supported by the National Science Foundation and NASA.

North Carolina has been identified as one of the top five states in which to do business, and one of the main reasons for this was identified as our excellent workforce. *Ref: MCNBC News.* Our challenge in the strategic timeframe will be to maintain that position of leadership and excellence, and to do so with an aggressive plan to support workforce development in the aerospace industry

Mission Statement

"The North Carolina AeroSpace Workforce Development Strategic Plan has been developed to ensure that workforce needs of the growing North Carolina Aerospace industry are met for the strategic timeframe, and by doing so help to position North Carolina as a recognized leader in AeroSpace technology."

Scope

This Strategic Plan initiative recognizes that North Carolina closely matches the national aerospace industry profile, which is well defined by the President's Commission;

"The (*President's*) Commission defined the U.S. aerospace sector as the sum of those activities needed to develop, operate, and/or use aerospace capabilities, including the activities of commercial enterprises and government—from general aviation to space exploration, and from civil transport to national security. The human capital, national infrastructure and research needed to support these activities were also considered to be key elements of the sector." *Source: The Final Commission Report on the Future of the Aerospace Industry*

We have focused our North Carolina initiative on a state-wide aviation and aerospace industry which spans all of those sectors that exist in our national industry, from commercial aviation to aerospace research, from aircraft manufacturing to military aviation support.

Environment

- The US Aerospace Industry is a crucial component of the national economy, with an annual production output in excess of $380 billion USD. *Source; IMPLAN data*

- North Carolina's Aerospace Industry has been under-represented in past years, with an annual production output of only $4.6 billion USD in 2004, the latest year for which audited data is available. *Source; IMPLAN data*

- The North Carolina Aerospace industry sector is growing rapidly with the addition of new aircraft manufacturers including; Atlantic Coast Seaplanes, VX Aerospace and Honda Jet Aircraft.

- The economic impact of commercial aviation on the state is estimated at $11.8 billion dollars, providing more than 88,000 jobs that directly or indirectly support the industry. *Source: NC DOT, Department of Aviation*

- There is a national shortage of skills in aerospace manufacturing. Proper attention to workforce development can position North Carolina to take advantage of coming industry growth.

- A NC study projected growth of approximately 1,532 aerospace industry manufacturing jobs in North Carolina by 2017 for a total of 4,727 jobs. *Source: US Department of Labor and EMSI, Economic Modeling Specialists, Inc.*

- We believe this may be significantly understated. Job growth in the aviation and aerospace industry in North Carolina has already exceeded 1,688 additional jobs in just two years, and continued growth indicates that this growth rate will continue if we can supply the skills necessary to support that growth. . *Source: US Department of Labor and EMSI, Economic Modeling Specialists, Inc.*

Process and Approach

A Memorandum of Understanding was signed on April 13, 2007 including the following organizations;

- NC Department of Commerce
- NC State University
- NC Community College System
- National Aerospace Development Center

This Memorandum of Understanding facilitated support to develop a comprehensive state-wide strategic plan for workforce development in the aerospace industry in North Carolina.

An independent consulting firm, the AVRC, was selected to establish a steering committee of members from the state aerospace industry, state educational resources, and the state organizations that support the aerospace industry in North Carolina.

Three meetings were held to collect comments, concerns and recommendations from these state and private members.

First meeting held on May 22, 2007 comprised of state resource organizations.

Second Meeting held on August 3, 2007 comprised of state aerospace industry representatives.

Third meeting held on September 25, 2007 comprised of additional representatives from both groups.

(A complete list of attendees for each of these meetings is included at the end of this document.)

Comments, concerns and recommendations indicate that several opinions about the state's workforce are almost universally held, and action plans can be implemented to assist the state in maintaining a leadership position in aerospace. The steering committee concerns and recommendations can be grouped into three focus areas, which follow.

Three Strategic Focus Areas and Governance

Marketing and Public Relations
Workforce Excellence
Technology Leadership

First, it is strongly felt among the committee members that North Carolina is well positioned as far as workforce, training and infrastructure are concerned. A recent MSNBC news article ranked North Carolina among the top five states for high technology businesses, citing the skilled workforce as one of the primary advantages in the state.

However, it is generally felt that outside North Carolina, we do not have the reputation for technical leadership and excellence that does, in fact, exist in the state. We are, in the opinion of some members, still a 'well kept secret'. In addition, our skilled workforce may not be keeping up with demand as many students in primary and high schools are not aware of the desirability and benefits of high paying jobs in aerospace including high tech machinist and aerospace assembly technicians.

Committee recommendations indicate that the state could realize a significant benefit and workforce increase from a relatively small investment in **Marketing and Public Relations**, which is focus area number one.

Secondly, it is a consensus of members that maintaining growth in the aerospace industry will require some measures that will result in a continuing growth in skilled technical workforce. We should expand on selected state-supported programs such as Learn and Earn, tuition assistance, and tuition refund for those students who are on a track for high tech aviation and aerospace skills that do not require a four year college education.

We need to retain those skilled workers from our state military installations with targeted incentives for those highly skilled individuals to stay in North Carolina when they complete their military service.

Most, if not all, of these recommendations will allow us to continue our current and near term requirements for workforce, developing a comprehensive set of tools for **Workforce Excellence,** which is focus area number two.

And thirdly, the aerospace industry is undergoing major changes in technology such as new, advanced materials requiring completely new skills in handling and assembly. We have the benefit of our nationally recognized state university system that conducts needed research to support these industry needs for technology advances. The state must take a leadership role in supporting aerospace research.

Industry and skilled workers will come to the states that have developed a reputation for **Technology Leadership,** focus area number three.

Finally, the formation of an **NC Aerospace governing body**, charged with implementation of this strategic plan is critical for success.

Costs have been redacted from this document.

Marketing and Public Relations

There are three recommendations in this focus area. They are;

M-1 Develop an awareness campaign for the NC Community Colleges' capabilities

The North Carolina Community College system provides services for which the public is relatively unaware; therefore these services by all appearances seem to be underutilized and undervalued. The Community College system could develop a communication plan for each of its client groups: High School students, Guidance counselors, Industry, and Adult Learners, including military retirees, as well as the general public.

M-2 A program to improve the image of NC for Aerospace & the image of the vocational skills, to include TV & Radio commercials, brochures, etc.

Step up the state's marketing and awareness programs to use on internet and other media channels. As a model, Michigan has been very visible on television and internet 'viral marketing' programs. Show our skilled people at work in the industry and the research going on in our universities to draw attention to the North Carolina aerospace industry.

M-3 Formalize the Aerospace Industry mapping application

A prototype application has been developed that would be a valuable tool for state agencies and the state's aerospace industry. The application allows for geographical analysis and easy look-up of suppliers, manufacturers and resources across the state. To turn the prototype into a finished application, an investment would need to be made to provide hosting and further development of the website and application.

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Workforce Excellence

There are seven strategic actions in this focus area. They are;

W-1 Tuition Assistance and/or refunds for critical skills, starting with machinist

Securing resources and funding for needs-based training must be considered critical for enabling several operational needs. Assessing projects that require minimal funding can help meet the needs of industry here and now, and retaining these companies should be considered paramount. This program could be quickly implemented to address the problem presented by aerospace companies that are asking for immediate help in filling machinist positions.

W-2 Expand Learn & Earn to include critical skills / Community Colleges

Like strategic action W-1, this action plan will encourage growth in the skills base being developed in the state's community colleges.

W-3 Develop and Implement a formal process for tracking critical skills

North Carolina needs a formal process to assess the supply and demand of critical skills across the state geographically. This information will be used to address skills shortages at all levels of the education system (K-12, Community College, and Universities) and to market NC's skilled workforce.

W-4 A program to optimize retention of military skills & personnel in NC

With six large military installations in North Carolina, there are a large number of skilled military personnel who leave the state when they leave the military. These individuals offer a high level of skills and military work ethic that could be an asset to the state. We should encourage these individuals to remain in the state, possibly with financial incentives to retain valuable skills and experience.

W-5 Aviation and Aerospace Training and Education Center (AATEC)

This center will assist North Carolina's growing aviation and aerospace industries in providing high skilled workers. AATEC will provide an environment for a broad partnership between industry, universities and the community colleges.

W-6 Industry Needs Assessment Survey

Expected shortages of Aerospace Engineers and other highly skilled Aerospace workers with engineering specialties can be measured and responded to more effectively through an Industry Needs Assessment survey. This survey will be

critical to assess supply and demand and provides a gap analysis of the current and future workforce needs of North Carolina's aerospace industry.

W-7 Aviation Career Education (ACE) Summer Academy

The North Carolina Division of Aviation, working with community colleges, the FAA, and industry, has established plans for several week-long Camps for both high school and middle school students. The academy experience is envisioned as an environment in which young people are enabled with an understanding of how important aviation is to our society, how aviation grew to what it is today, and how they can prepare for career opportunities in Aviation.

Technology Leadership

There are seven recommendations in this focus area. They are;

T-1 A program where NC provides matching cost share of 20% for Federal Research Grants

Establish a state "Research Fund" of $5,000,000 that can be used to apply for Federal research grants that will bring Federal research activities to the state. This trial program could result in as much as $20,000,000 in additional research funding in the state. If successful, the program could be expanded in future years. Matching funds should also be provided for private industry, up to 20%, which will encourage growth of the research industry in the state.

T-2 2008 NC Aerospace Conference

North Carolina State University has expressed an interest in hosting an Aerospace Conference in 2008. The Aerospace Conference will promote the strategic plan, showcase NC aerospace companies, promote growth in the cluster by identifying and promoting key NC suppliers outside the core industry The Conference will also promote economic development in the aerospace industry and disseminating research findings.

T-3 Advanced Manufacturing Center

Manufacturing technologies are evolving at an ever increasing pace. New technologies must include means of manufacturing and assembling parts made from composite materials and new processes. Other states have successfully developed centers of excellence for advanced manufacturing. North Carolina should do the same, utilizing the state's expertise in composites and advanced materials.

T-4 A feasibility study to evaluate commercial space opportunities

The commercial space industry is beginning a period of major expansion. There are more than 3,000 commercial satellites now in orbit with the demand for new space services expanding rapidly. New commercial space activities include satellites for mapping, GPS, weather and geophysical research, energy and fuel resource exploration, communications and internet. While North Carolina is not considered to be a "space state", we should investigate and better understand the impact, cost and benefit of the increasing commercial and military space industry.

T-5 Feasibility study for an Aerospace Business Park in Piedmont Triad area

The Piedmont-Triad Economic Development team has demonstrated specific interest in bringing commercial Aerospace companies and their suppliers to the airport and the new aerospace business park in the vicinity of the airport. An industrial assessment survey could be the first step to developing industrial matching capabilities.

T-6 Advanced Space Technologies Research and Education Center ASTREC

The current U.S. National Space Policy is forcing the aerospace industry to provide lower-cost, more-responsive space systems. Transitioning to small satellite systems is key to that approach, but such systems have technical challenges. This center would develop small satellite systems in collaboration between a NCSU I/UCRC, NCA&T and Eastern Carolina University State. ASTREC has already received initial seed funding from the National Science Foundation. State support can help to establish this Center at NCSU.

T-7 North Carolina Division of Aviation Next Generation Center of Excellence

NCDOT Division of Aviation is teaming with the NCSU ITRE organization to create a Center of Excellence in support of the FAA's Next-Generation Air Transportation Management system. In support of this, the Division of Aviation has put together three technology oriented demonstration projects. These projects include demonstrating how ADS-B can work with UAV/UAS systems for air traffic control as well as monitoring aircraft deployment for military command centers and communicating with forest fire fighting planes from a command scout plane.

Governing Body Formation

P-1 Governing Body for Implementation of Strategic Plan for NC Aerospace Workforce & Economic Development

A single governing body, funded and supported by the state, should be established to have oversight of aerospace strategic plans, to be similar in scope and mission to the North Carolina Biotechnology Center. This organization, which could be named the North Carolina Aerospace Resource Center, would have specific responsibility for oversight and, in some cases, management of the strategic plans in this document.

Policy and Implementation

The Road Forward

The strategic planning process brought together a steering committee of Academia, Industry, and North Carolina Governmental Agencies. Members were involved and committed to the effort to a high degree that was not expected.

It is clear that there is a consensus among the steering committee that the while the state is doing well, it cannot afford to rest in its ongoing efforts to achieve and maintain a leadership position in the aerospace industry.

Representative comments from steering committee members have been added to this document that gives a very true picture of the group opinions.

The next major challenge will be implementation of the strategic plan, which will include a process of distributing the plan and educating members of the legislature on the merits and needs of the aerospace industry, and the need to implement a strategic plan that will prevent future workforce shortages and loss of opportunities for growth in the industry.

One of the primary concerns that we must address immediately is that there is no coordinating agency that is responsible for the process of implementing this strategic plan (recommendation P-1).

There are a number of options that should be considered in the choice of a coordinating agency, but whichever option is chosen, that body must be properly funded and sanctioned to oversee the process.

Choices might include the Department of Commerce, NC State University, the Kenan Institute for Engineering and Research, the North Carolina Aerospace Alliance, the North Carolina Department of Transportation Aviation Division, or possibly a new independent entity, similar in organization to the North Carolina Biotech Center.

Ownership of individual recommendations (recommendations) must be assigned, and funding must be dedicated where applicable. The most difficult part of any strategic plan is implementation, and a significant level of commitment is required for success.

North Carolina is poised to take a major step forward in the aviation and aerospace industry, and members of this steering committee encourage an action plan that maintains a leadership position.

There is one recommendation associated with this strategic focus area.

Strategic plan recommendations;

- M-1 An awareness campaign of the NC Community College capabilities
- M-2 An awareness program to improve the image of NC for Aerospace & the image of the vocational skills, to include TV & radio commercials, brochures
- M-3 Aerospace Industry mapping application
- W-1 Tuition Assistance and/or refunds for critical skills, starting with machinist
- W-2 Expand Learn & Earn include critical skills / Community Colleges
- W-3 Develop and implement a formal process for tracking critical skills
- W-4 A program to optimize retention of military skills & personnel in NC
- W-5 An Aerospace Training and Education Center (ATEC)
- W-6 Industry Needs Assessment survey
- W-7 Aviation Career Education (ACE) Summer Academy
- T-1 A program where NC provides matching cost share of 20% for Federal Research grants
- T-2 Spring 2008 NC Aerospace Conference
- T-3 Advanced Manufacturing Center
- T-4 A feasibility study to evaluate commercial space opportunities
- T-5 Feasibility study for an Aerospace Business Park in Piedmont Triad
- T-6 Advanced Space Technologies Research and Education Center
- T-7 North Carolina Division of Aviation ADS-B Center of Excellence
- P-1 Governing Body for Implementation of Strategic Plan for NC Aerospace Workforce & Economic Development

Marketing and Public Relations

Marketing Policy Recommendation M-1

Title: Develop an awareness campaign for the NC Community Colleges capabilities and & the image of the high tech vocational skills in the aerospace industry.

Executive Summary:

The North Carolina Community College system provides services for which the public is relatively unaware; therefore these services by all appearances seem to be underutilized and undervalued. The Community College system could develop a communication plan for each of its client groups including: High School students, Guidance counselors, Industry, and Adult Learners as well as the general public.

While there are existing media products to promote the state's community college system, none are up-to-date that emphasize the aerospace industry and supporting vocations.

Participants agreed that the Community Colleges can supply the skills needed but there are not enough students in the pipeline to meet current and projected needs. Many students still look at the job of machinist as a dirty, low tech, low paying job.

Frequently the high school guidance counselors are faulted for not bringing these careers to the attention of students. However, the guidance counselors cannot do this without the tools to accomplish the task.

Recommendation:

Assign a small team to develop these communication tools for the Community College system. Integrate with the existing NCCC system marketing strategy to increase public awareness of the services provided. The "New Media" should be utilized, including internet, YouTube, and 'viral marketing' techniques.

Responsible Agencies (RA's) for this recommendation:

NC Community College System
NC Department of Commerce

Implementation Plan:

A small working group of one representative from each of the three RA's should meet with a media consultant or consulting agency to map out the program, which will include one or more video marketing tools and a test marketing program.

Marketing Policy Recommendation M-2

Title: A program to improve the image of NC for Aviation and Aerospace Technology, to include TV & Radio commercials, brochures, DVD, viral marketing.

Executive Summary:

While the state has been successful in landing industries once they start looking at North Carolina, we need to do more outreach to the aerospace industry as a target sector, and the proper marketing tools must include this program.

We have an excellent opportunity to leverage the state's rapidly expanding aerospace industry with partnerships to showcase groups like Honda Jet Aircraft, Antilles Seaplane, and the state's supporting organizations and resources such as the GTP.

Other states have been advertising nationally to attract specific high tech industries, Michigan is one example. North Carolina should also have a proactive marketing campaign.

Recommendation:

Assign a small team to develop these communication tools for the Community College system. Integrate with the existing NCCC system marketing strategy to increase public awareness of the services provided.

The "New Media" should be utilized, including internet, YouTube, and viral marketing techniques. On-screen 'talent' should be considered for the best impact.

High tech industries are attracted to high tech areas, and North Carolina can compete with the best of them.

Responsible Agencies for this recommendation:

Department of Commerce

Costs: REDACTED

Implementation Plan:

- Meet with state aerospace companies to determine level of participation and possible advertising partnerships.
- Develop the marketing plan and storyboard with NC Department of Commerce
- Shoot, produce and deliver.

Marketing Policy Recommendation M-3

Title: North Carolina Aerospace Resource Web Mapping Application

Executive Summary:

The North Carolina Aerospace Resource Application is being developed by Donna Safley, Capital Area Research, LLC under a contract for the National Aerospace Development Center. This product is being developed in a very cost efficient manner using open source software. The application when complete will provide:

1. a directory of companies in aerospace industry & key suppliers
2. a directory of education and training resources
3. a directory of professionals, educators, and policy makers
4. a directory of organizations and resources specific to the aerospace industry
5. a web-based mapping tool of these resources

The goal is to provide a one stop resource of information for the aerospace industry. A working protocol of the web mapping application and the directory application is available for demonstration.

Other key aerospace states such as Texas and Connecticut have either developed similar systems or have recommendations in their strategic plans to develop such systems to improve buyer/supplier relationships within their states. For example, Connecticut has developed a directory of aerospace companies that is searchable by various capabilities (see: http://www.aerospacecomponents.org/search.asp) that is similar to the directory application, but it does not have web mapping capabilities. Such an application will promote the North Carolina aerospace industry and serve as a tool for economic development.

This application has been shown to aerospace industries executives and state economic developers and their reception has been extremely positive. The tool can be used to support the state's extensive aerospace supply network and also to attract new industry.

Recommendation:

Secure funding to complete the development of the application. Either secure funding to host the application or identify a partner to host the application.

Responsible Agencies for this recommendation:

Donna Safley, Capital Area Research

Costs: REDACTED

Development: REDACTED

Recurring:

Hosting costs will depend on expected traffic and the size of the system which depends on scope of project. The following cost will be incurred: Salaries for system administrator (not full time) and developer/database administrator, server hardware, network bandwidth, environmental (AC, electrical), system backup, and any ongoing data access fees.

Implementation Plan:

2008;

- Document all system capabilities
- Enlist an independent agency (IBM, SIS, or other?) to perform an application audit
- Establish hosting services
- Beta Test

2009;

- Rewrite as required and implement

Workforce Excellence

Workforce Policy Recommendation W-1

Title: Tuition Assistance and/or refunds for critical skills, starting with machinist

Executive Summary:

Securing resources and funding for needs-based training must be considered critical for enabling several operational needs. Assessing projects that require minimal funding can help meet the needs of industry here and now, and retaining these companies should be considered paramount. This program could be quickly implemented to address the problem presented by aerospace companies that are asking for immediate help in filling machinist positions.

Recommendation:

An analysis has been done of the current machinist training programs offered by the state Community Colleges. While they can meet the demand, not enough students are enrolling. These positions are also suffering from outdated perceptions that machinist jobs are low skilled labor positions in uncomfortable environments, while in fact these new jobs are skilled work that pays exceptionally well. We recommend that consideration be given to a tuition refund for qualified students who commit to being machinists. We see only one problem with this proposed solution in that there must be an increase in the metal shop training capabilities state-wide, as well as improving the image of the machinist vocation.

Responsible Agencies for this recommendation:

NC Department of Commerce
NC Community College System
NC High School Systems, and/or Department of Public Instruction

Costs:

The trial program cost could be calculated by a Community College needs-based analysis of how many machinists should be trained in the coming year. Short term (first year) cost funding must be addressed.

Implementation Plan:

1) Identify three representatives from responsible agencies
2) Determine number of students to be involved in the first year trial program
3) Short-term funding can only be done with top-down directive, so there is a need to align the administrative support here

4) Inform the high school guidance counselors of the program, as well as future planned programs- take applications based on aptitude, ability and recommendations from teacher or other educator.

Workforce Policy Recommendation W-2

Title: Expand the Community Colleges' Learn and Earn Program to Include Critical Skills

Executive Summary:

The Community College's Learn and Earn Program allows qualified students in participating high schools to take a variety of online college-credit courses at no cost to them or to their families. Students can earn both high school and college credit for completed courses. Access to these courses is provided during the regular school day and an online course facilitator will assist students in the classroom.

It is recommended that this program be expanded to address critical skills shortages. The program should not be limited to online programs, but should be expanded to any community college program that addresses critical skills shortages. Example: Lenoir Community College's mobile machinist program.

Recommendation:

Draft a funding bill to submit to legislature to expand the Learn and Earn Program. This should incorporate funding for the implementation of the identification of critical skills tracking. The goal is to legislate funding for a flexible system to quickly address skills shortages as they arise across North Carolina.

Responsible Agencies for this recommendation:

NC Community College System
Department of Public Instruction

Costs:

Use cost per student from current program. Provide cost estimates based on target numbers.

Implementation Plan:

1) Identify a small group to draft an addendum to the Learn and Earn program legislation to include critical skills tracking and the expansion of Learn & Earn.
2) Collect data on the current program costs.
3) Collect data on the expected return on investment and quantification of why this program should be funded.
4) Draft the funding bill.

Generate support for the bill. Provide letters of support to legislators.

Workforce Policy Recommendation W-3

Title: Develop & implement a formal process for tracking critical skills.

Executive Summary:

North Carolina needs a formal process to assess the supply and demand of critical skills across the state geographically. This information will be used to address skills shortages at all levels of the education system (K-12, Community College, and Universities) and to market NC's skilled workforce.

Recommendation:

Assign a small team from industry, education and state government to develop a formal system that works reliably to track critical skills. The team should include those who would collect and maintain the data as well as those who will use the data.

The Matchforce program that has been developed and maintained by the North Carolina Military Business Center may be the best vehicle for delivery of this product, since it already incorporates job posting services.

Responsible Agencies for this recommendation:

NC Community College System
NC Employment Security System
The North Carolina Military Business Center

Costs: REDACTED

Implementation Plan:

The NC Community College System should take the lead in this project. The NCMBC should review their current program and report on the cost and difficulty of building this application into the current Matchforce program.

Workforce Policy Recommendation W-4

Title: A program to optimize retention of military skills & personnel in NC

Executive Summary:

Military personnel possess skills that are in high demand in the aerospace industry, as well as other industries in North Carolina. It would benefit North Carolina to refine and improve existing processes to quickly transition military personnel with critical skills and occupations that are in high demand. This will require developing a formal system to incorporate the transition of military and civilian occupations into the current job matching system.

It will require the development of specialized training programs for specific high demand occupations. It will also require refining the timing and marketing of existing programs that allow military to participate in training while retaining their income, such as the NC DOL apprenticeship programs.

Recommendation:

Job matching services are now minimal at the state's major military installations.

Responsible Agencies for this recommendation:

The NC Military Foundation
The North Carolina Military Business Center
Department of Commerce
Representatives from NC Military DOD, Air Force, etc.

Costs: REDACTED

Implementation Plan:

Primary implementation responsibility could be from the NC Military Foundation or the NC Community College System.

First steps will be to evaluate the military skills that are available and what transitional skills need to be delivered.

Meet with HR directors of the state's military installations for input to the process.

Workforce Policy Recommendation W-5

Title: An Aviation and Aerospace Training and Education Center (AATEC)

Executive Summary:

The new Biomanufacturing Training and Education Center (BTEC) being constructed on N.C. State University's Centennial Campus will be the largest facility of its kind in the nation and will help answer the state's requirements for biomanufacturing training. It has been suggested that a similar Training and Education Center, dedicated to Aviation and Aerospace manufacturing training would support an environment for generating partnerships between community colleges with distance education and on-site programs that might train up to several thousand students and prospective employees annually for the Aviation and Aerospace Industry.

An AATEC would simulate an Aviation or Aerospace manufacturing facility, providing support, training and education. The facility will provide real world value in terms of how it is outfitted with equipment; students will gain experience using the same large-scale equipment they would be using at their place of employment . This program, partnered with an Advanced Manufacturing Center, would create the optimal environment for economic development in both attracting and retaining Aviation and Aerospace companies to North Carolina.

Recommendation:

Golden LEAF provided approximately $34 million to design, build and equip the NCSU-BTEC, to benefit five regional skill centers in the North Carolina Community College System (NCCCS). We believe that an investment of about half that amount would be required for an AATEC: $17 million. Furthermore, we also recommend a program of aggressive industry recruitment by the organization identified in recommendation P-1 to ensure that the AATEC becomes self-sustaining and industry-driven within four years.

Responsible Agencies for this recommendation:

North Carolina Community College System
North Carolina Department of Commerce
North Carolina State University

Costs: REDACTED

Workforce Policy Recommendation W-6

Title: Conduct an Industry Needs Assessment (survey of aerospace companies)

Executive Summary:

A needs assessment for the purposes of conducting an inventory of skills and needs is already being pursued by the Mechanical and Aerospace Engineering (MAE) Department at NCSU. This data is critical for securing funding for needs-based training. Understanding the gap between the skills-sets the NC-UNC educational system are producing and the skill-sets that are desired by the Industry is key.

Recommendation:

First, develop a tool, a web-based application that would augment an on-going survey of aerospace and aviation companies. Such a tool would be served from NC Department of Commerce servers, and would function to strip critical information of proprietary nature from the key information needed to complete a gap analysis, essentially preventing competitors from using it to gain unfair advantage in the marketplace.

Second, increase the funding for the on-going NCSU MAE Industry Needs Assessment program. Include NCA&T and ECU as additional stakeholders in supporting the effort, and make certain that the gap analysis concludes with data based on real-world, 5-year hiring plans from the Aviation and Aerospace Industries surveyed.

Third, publish the first draft of the survey, or provide real-time results from the web-based application referred to above after notifying Industry that the survey was in it's final form. Provide a forum or feedback mechanism to allow the Aviation and Aerospace Industries in North Carolina to comment on this survey.

Fourth, develop an architecture for the web-based application to continually update the survey through Industry input year-long. Industry could be tapped on to supplement funding for the program once it entered into this fourth phase.

Responsible Agencies for this recommendation:

NCSU Mechanical and Aerospace Engineering
NC Department of Commerce

Costs: REDACTED

Workforce Policy Recommendation W-7

Title: Aviation Career Education (ACE) Summer Academy

Executive Summary:

There are currently over 88,000 jobs supported by aviation in the state of North Carolina. This number is expected to grow substantially in the very near future. Adding to this issue is the fact that a great deal of the aviation workforce is reaching retirement age, and replacements are needed to fill those positions. Aviation career recruitment is an issue that can no longer be postponed.

The North Carolina Division of Aviation, working with community colleges, the FAA, and industry, has established plans for several week-long Camps for both high school and middle school students. The Aviation Career Education (ACE) Summer Academy experience is envisioned as an environment in which young people are provided with an understanding of how important aviation is to our society, how aviation grew to what it is today, and how they can prepare for career opportunities in Aviation.

A series of camps in the state, targeting middle school and high school aged students, staged every summer, will discover, inspire and guide young aviation enthusiasts into a rewarding career in the North Carolina aviation and aerospace workforce.

Recommendation:

Support the Division of Aviation in developing the first ACE 'pilot' program in early summer, specifically with an eye to implementing the program in a dozen more camps across the state. Division of Aviation believes that it will be very feasible to replicate the camp experience in several places around the state, modifying the curriculum where necessary to take advantage of local activities.

Responsible Agencies for this recommendation:

North Carolina Division of Aviation

Costs: REDACTED

Implementation Plan:

Primary implementation responsibility should remain with the NC Division of Aviation. The program will actively recruit industry for additional support, and would be developed with the goal of being self-sustaining at the end of three years.

Technology Leadership

Technology Policy Recommendation T-1

Title: A program where NC provides matching cost share of 20% for federal research grants

Executive Summary:

The Federal government spends billions of dollars each year on defense and aerospace research. Typically this research is conducted with contractor participation in the form of cost share. Non-profit and educational institutions may be asked to contribute 20% of the total project cost to receive the 80% paid by the government.

For-profit organizations may be asked to pay 50% of the cost share. This often prevents a small company from ever applying for a specific research grant.

Clearly the opportunity to leverage $4 in federal matching funds for each dollar of state investment is a good investment (based on sound judgment of the research project and research organization capabilities.)

If a state matching funds program also can be applied to private industry, it provide a powerful tool to recruit and retain high tech industries that conduct research.

Recommendation:

Establish a state "Research Fund" of $5,000,000 that can be used to apply for Federal research grants that will bring Federal research activities to the state.

This trial program could result in as much as $20,000,000 in additional research funding in the state. If successful, the program could be expanded in future years.

Matching funds should also be provided for private industry, up to 20%, which will encourage growth of the research industry in the state.

Responsible Agencies for this recommendation:

Office of the Governor
Other TBD

Costs: REDACTED

Implementation Plan:

This strategic action is dependent on the establishment of a governing body for aerospace (plan P-1 in this document.)

Technology Policy Recommendation T-2

Title: 2008 NC Aerospace Conference

Executive Summary:

In the last two years, it was frequently noted by individuals in Industry, Academia and Government in North Carolina that the face of both Aviation and Aerospace in the state was changing very rapidly during a period of growth. Furthermore, it was also noted that there was increasing difficulty in getting a accurate picture of where the Aviation and Aerospace Industry were headed, and where North Carolina could best spend its efforts in enhancing retention and acquisition of existing and new companies.

The first step to determining a more concerted economic development strategy than exists now is to host a 2008 North Carolina Aerospace Conference early in the year. Some of the advantages this conference can offer:

- promote the strategic plan
- showcase North Carolina aerospace companies
- promote growth in the cluster by identifying and promoting key North Carolina suppliers outside the core industry
- promote economic development in the aerospace industry by inviting strategic potential companies
- disseminate research findings
- introduce the cluster tools developed to assist the industry
- galvanize and refine legislative input from the strategic plan

Recommendation:

In addition to providing the benefits outlined above, an Aerospace Conference will create a more enduring and meaningful relationship between Industry, State Government, and Academia. It would be beneficial to framing the context and maximizing the communication between these three types of stake-holders. Either the organization referred to in recommendation P-1 or the NC Department of Commerce drive this conference. North Carolina State University has expressed an interest in hosting an Aerospace Conference in 2008 as well as NCA&T, and we therefore recommend that this Conference not be driven by a single University but designed as a collaborative event of the entire UNC education system, including the NC Community College system.

Responsible Agencies for this recommendation:

NC Department of Commerce

Costs: REDACTED

Technology Policy Recommendation T-3

Title: Develop an Advanced Manufacturing Center

Executive Summary:

Manufacturing technologies are evolving at an ever increasing pace. New technologies must include means of manufacturing and assembling parts made from composite materials and new processes. In addition, manufacturers face greater demand for manufactured goods, a potential shortage of skilled labor and an unrealistic negative image of the Industry.

An Advanced Manufacturing Center would address these issues and initiate, support and coordinate research and education in advanced manufacturing and materials processing as well as disseminating the results of this research to potential users. Promoting and providing resources for education in this field would also be enabled by this center.

An excellent model can be found at the University of Texas;

http://www.engr.utexas.edu/amc/index.cfm

and at the Francis Tuttle Oklahoma Advanced Manufacturing Center

http://www.francistuttle.com/
http://www.francistuttle.com/classes/ctp/details.aspx?PRGID=16

Recommendation:

The Advanced Manufacturing Center will serve as an applied research facility where new manufacturing techniques can be developed and deployed to industry and as a pipeline to provide trained craftsmen, technicians and engineers for existing and projected jobs in manufacturing in North Carolina. A feasibility study followed by an implementation plan could fast-track one of the key recommendations of this proposal.

Responsible Agencies for this recommendation:

NCSU Mechanical and Aerospace Engineering
NC Community College System;

Costs: REDACTED

Technology Policy Recommendation T-4

Title: A feasibility study to evaluate commercial space opportunities

Executive Summary:

Our strategic planning activity showed that the commercial space industry is beginning a period of major expansion.

Space development is no longer science fiction. With more than 3,000 commercial satellites now in orbit, the demand for new space services is expanding rapidly. New commercial space activities include satellites for mapping, GPS, weather and geophysical research, energy and fuel resource exploration, communications and internet, and more.

There is also a growing need to replace existing satellites with newer technology, since most of the satellites now in orbit are technologically obsolete.

Space tourism is also becoming a reality. The cost for the first space tourists was several million dollars. Several private agencies now offer upcoming space flights for less than $100,000, and that number will drop again, possibly to less than $10,000 within the next decade.

Space manufacturing will be next, and also new biotech research that is only possible in space. These opportunities tie in to research now being conducted at each of the state's major universities.

We simply do not know how large the opportunity may be for North Carolina in this new market. We do recommend, however, that a serious analysis be done to evaluate the coming opportunity and make a report to the state.

Recommendation:

Do a comprehensive study on the space economy, using all available data and input from space industries, to evaluate the potential for space based industries.

Responsible Agencies for this recommendation:

NC Department of Commerce

Costs: REDACTED

Technology Policy Recommendation T-5

Title: Support development of Aerospace Business Park in Piedmont-Triad Area

Executive Summary:

All seven of the NC Economic Development Partnerships were contacted for a briefing on this project, and four (RTRP, Advantage West, NCNE, and Piedmont-Triad) accepted the offer. Of these four, Piedmont-Triad demonstrated specific interest in bringing commercial AeroSpace companies and their suppliers to the airport and/or a new aerospace business park in the vicinity of the airport, and this desire should be explored.

Recommendation:

A four-part study should be conducted:

1. Capability analysis of Piedmont-Triad counties existing business and aviation infrastructure
2. Needs analysis of selected United States and foreign AeroSpace companies and their suppliers
3. Match analysis: determine which companies' needs can be served in the Piedmont-Triad area
4. Develop plan to promote the Piedmont-Triad area to selected companies

Responsible Agencies for this recommendation:

Piedmont-Triad Economic Development Partnership

Costs: REDACTED

Implementation Plan:

1. Align Piedmont Triad economic development goals with Aerospace Workforce Development project
2. Create study team including appropriate Piedmont Triad EDP, NC DOC, and Aerospace Workforce Development project personnel
3. Determine cost and timeframe of study
4. Determine cost and timeframe of promoting Piedmont Triad to selected AeroSpace companies

Technology Policy Recommendation T-6

Title: Advanced Space Technologies Research & Education Center (ASTREC)

Executive Summary:

The current U.S. National Space Policy is forcing the aerospace industry to provide lower-cost, more-responsive space systems. Transitioning to small satellite systems is generally agreed by US Space Policy analysts as key to that approach but such systems have technical challenges such as stringent low power, low volume/mass constraints, and other unique constraints in supporting infrastructure of space operations.

It is in the interest of the State to fund a center with an emphasis on small satellite systems to provide interested parties with (i) rapid access to space, (ii) new technology drivers (mass, volume, power constraints) and (iii) more economically feasible; design-build-fly approach programs; it is worth noting that such programs often have budgets of less than a million dollars over the project lifecycle.

The development of this center has already begun. The Advanced Space Technologies Research and Education Center (ASTREC) is an Industry/University Cooperative Research Center (IUCRC) program seed-funded by the National Science Foundation and driven jointly by NC State University and Florida State University. The objectives of the ASTREC are in line with the on-going transformation of the space industry to provide more affordable costs and more responsive schedules. The Center will perform multidisciplinary research in the areas of small satellite technologies with a "design-build-fly" approach to create rapid and economic transitions from low technology readiness to actual flight test.

Recommendation:

Include as a strategic plan state support to provide additional funding for the development of a small satellite systems center. Optional, design that bill to bring in collaboration with, and support, from NCA&T and Eastern Carolina University State support would include:

1. Cost associated with administrative support and set-up.
2. Seed funding for developing a small satellite whose mission is important to North Carolina. (Seed funding only, primary funding to come from other agencies.)
3. Funding for graduate students to gain skills in the area of satellites.
4. Funds to develop a K-12 outreach program.

Responsible Agencies for this recommendation:

North Carolina State University

Costs: REDACTED

Implementation Plan:

Determine appropriate satellite mission

Design-Build-Fly

Data monitoring

Develop K-12 outreach program through Design-Build of small satellite.

Technology Policy Recommendation T-7

Title: North Carolina Division of Aviation ADS-B Center of Excellence

Executive Summary:

The North Carolina Division of Aviation (DOA) has established the importance of statewide coverage of ADS-B (Automated Dependent Surveillance-Broadcast) for air traffic control applications. The FAA has targeted this new technology for national coverage by 2020, with the infrastructure in place by 2010 to support this control. The advantages of this new technology, and it's implications for safety in aviation is well summarized on the following FAA web page:

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/surveillance_broadcast/

The Division of Aviation has put together three technology oriented demonstration projects. These demonstrations show how ADS-B can work with UAV/UAS systems for air traffic control, as well as help monitor aircraft deployment for military command centers and communicate with forest fighting planes from a command scout plane.

ITRE and the Vice Chancellor for Research at NCSU have signaled their interest in preparing the necessary documents to be processed through NCSU to the UNC Board of Governors for formal establishment of the center. Furthermore, NCSU has placed the funding of this Next Generation Center as one of its top priorities for this coming federal fiscal year, and this center has also received favorable responses from the FAA and other groups, such as the Joint Planning and Development Office, in Washington, D.C.

Recommendation:

Support the Department of Aviation in establishing a partnership with NCSU-ITRE to implement ADS-B and other technologies and applications within North Carolina through the establishment of a new center. This new center will provide technical support to the DOA on this technology, utilizing faculty expertise within appropriate departments to help develop this technology for full implementation across all aircraft platforms.

Responsible Agencies for this recommendation :

NC Department of Commerce

Costs:

REDACTED

Implementation Plan: Policy and Implementation

Policy Recommendation P-1

Title: Governing Body for Implementation of Strategic Plan for NC Aviation and Aerospace Economic Development

Executive Summary:

While the state's aerospace industry is healthy and growing, there are indications that some factors could become limits of growth. Those factors include, but are not limited to, supply of skilled workforce.

We believe that our Steering Committee recommendations will address these factors, which also include technology leadership and the image of our state to reflect our efforts in technology leadership.

However, the process of developing this strategy did also disclose that while we can address these areas, we should take a more aggressive role in the ongoing development of the aviation and aerospace industry in the state. Aerospace does have the potential to be one of the state's fastest growing industries, and adequate focus on this industry should be a constant effort, not a one-time or periodic endeavor.

Our meetings with aviation and aerospace industry leaders through this strategic planning process brought forward one preeminent opinion, which is that the state should put increasing emphasis on the aerospace economic sector in the coming years.

By example, North Carolina chose to make biotechnology a leading priority for economic development more than ten years ago. With a minimal investment at that time, this industry has matured to become a critical part of the state's economic landscape. A similar effort should be made for aerospace.

Recommendation:

A single governing body, funded and supported by the state, should be established to have oversight of aerospace strategic plans, to be similar in scope and mission to the North Carolina Biotechnology Center.

This organization, which could be named the North Carolina Aerospace Resource Center, would have specific responsibility for oversight and, in some cases, management of the strategic plans in this document.

The NC Aerospace Resource Center would function as a resource and support organization to the state Department of Commerce and they would have oversight responsibility for an on-going strategic planning process in the state.

Responsible Agencies for this recommendation:

An organization with this mission and scope must be established by the office of the Governor of North Carolina, and supported by Legislative initiative. It should be established as a 501 (c) 3 non-profit entity.

Costs:

A full-time staff of three management and one administrative support person will be required. If additional responsibilities are given to this organization, as in the implementation of specific strategic plans, then addition funding and personnel should be transferred to this organization from those projects.

This organization will also have the responsibility to direct funding to identify public and private agencies to implement strategic plans.

Implementation Plan Recommendations:

Prepare and deliver a formal recommendation to senior administration, including the Governor and Lieutenant Governor.

Brief key members of the state Legislature, including the Speaker and President Pro Tem.

Draft and ensure implementation of a bill to provide the establishment of the North Carolina Aerospace Resource Center.

Each of the strategic plans identified will need to be expanded into a detailed project plan with detailed budget, project timeline, objectives, and responsible parties. This should be done prior to introducing a funding bill since the exact costs may be slightly higher or lower than the estimates given in this document.

Appendix A. Implementation budget; REDACTED

Appendix B. Steering Committee Members REDACTED