

Part II: Word Document

Item A. Institutional Mission

Background and History

Established by the Virginia General Assembly in 1839, the Virginia Military Institute is a four-year state-supported college whose student body is organized as a military corps under the command of the Superintendent and is constituted as the guard of the Institute. As a wholly undergraduate military college, VMI meets society's need for educated citizens and leaders and contributes significantly to the diversity of the Commonwealth's system of state-supported and independent institutions of higher education.

VMI has shaped leaders, heroes, and individuals whose daily lives reflect the integrity, fairness, and appreciation for the value of work that are instilled here. Its alumni include a Nobel Prize winner, eleven Rhodes Scholars, seven Medal of Honor recipients, a Pulitzer Prize Winner, a Supreme Court Justice, 39 college presidents and 266 generals and flag officers. VMI is associated with such distinguished soldiers as "Stonewall" Jackson and George C. Marshall as well as more than thirty thousand former cadets who have excelled in either civilian or military life.

Mission

The Virginia Military Institute believes that the measure of a college lies in the quality and performance of its graduates and their contributions to society. Therefore, it is the mission of the Virginia Military Institute to produce educated, honorable men and women, prepared for the varied work of civil life, imbued with love of learning, confident in the functions and attitudes of leadership, possessing a high sense of public service, advocates of the American Democracy and free enterprise system, and ready as citizen-soldiers to defend their country in time of national peril.

To accomplish this result, the Virginia Military Institute shall provide to qualified young men and women undergraduate education of highest quality – embracing engineering, science, and the arts – conducted in, and facilitated by, the unique VMI system of military discipline.

Cadet life at VMI is defined by the Institute's Honor Code. Cadets live by the Honor Code and are responsible for all aspects of its governance. They are also charged with maintaining the military structures and protocols of life in Barracks. Since all cadets reside on Post throughout their four years at VMI, Barracks is the focal point of cadet life and an important laboratory for building and exercising leadership and teamwork skills.

The combination of VMI's rigorous academic program with its disciplined military organization and system distinguish the Institute from most institutions of higher education in the United States. Our comprehensive institutional mission is to educate the cadet intellectually, physically, morally and ethically through challenging and integrated curricular and co-curricular experiences. The Virginia Military Institute maintains a clear educational focus and a well-established niche in the higher education marketplace. We aspire to become neither a large institution nor a research institution.

We believe that this institution offers cadets not only an excellent academic education but also many additional benefits: a disciplined approach to overcoming obstacles, an understanding of the principles of leadership and of working in an organizational setting, and the experience of living in an environment that greatly values personal integrity, ethical inquiry and physical well-being. Because of these many benefits, the VMI graduate is an educated and honorable citizen-soldier.

Vision 2039 – Major Strategic Directions

General J.H. Binford Peay, III, United States Army (Retired), VMI Class of 1962, was appointed the Fourteenth Superintendent of the Virginia Military Institute on 1 July 2003. Following receipt of strategic guidance from the Board of Visitors, Commonwealth of Virginia, and the Institute's accreditation agencies, the Superintendent appointed focus groups comprised of staff, faculty, cadets, alumni, parents, and other friends of the Institute to study, discuss, and make recommendations in four program areas: Academics, Military, Athletics, and Physical and Cultural Environment. The four focus groups made several hundred individual recommendations.

With the assistance of his senior staff, the Superintendent analyzed the focus group recommendations, blending them with his strategic guidance and his personal assessment to produce *Vision 2039*, a document whose name was chosen to celebrate the coming bi-centennial anniversary of the founding of the Institute. *Vision 2039* was promulgated as a means to focus effort and resources, to define a desired end state, and to express the Superintendent's plans and intentions to all Institute stakeholders. The theme of "Commonality, Synchronization, and Integration" prevails throughout the document. *Vision 2039* builds upon the rich traditions and history of VMI, concentrates on effectively executing today, and moves VMI forward to the future.

The Fourteen Simplified Descriptors of *Vision 2039*:

- I. A Military Institute and a Military Environment---Delivering a unique education.
- II. Academic Reputation – The Premier Undergraduate College in America.
- III. Renowned Honor System – #1 in the Nation.
- IV. Partnerships with the Best USA Graduate Schools.
- V. Balance of Arts, Sciences, and Engineering with greater than 50% in hard science and engineering.
- VI. Corps of 1500 that is diverse and includes at least 10% Female Cadets.

- VII. Greater than 55% Virginia Cadets.
- VIII. Service to the Nation with 70% Corps Commissioning (with growth in Guard and Reserve) – “Citizen Soldier”.
- IX. Every Cadet an Athlete – Winning Sports Teams – The VMI way.
- X. Leadership Development System – Program unsurpassed.
- XI. Physical Plant – Historic, beautiful, modern, and technologically enhanced.
- XII. Organizationally streamlined, efficient and communicative.
- XIII. Proud, Disciplined, Civil Cadets----and Graduates.
- XIV. One Cohesive Team – Alumni, Agencies, BOV, the Institute, Parents and Friends.

Vision 2039 was enthusiastically received by the VMI community and stakeholders, with strong endorsement from the Governor, the VMI Board of Visitors, and VMI’s three Alumni Agencies. The Fourteen Simplified Descriptors of *Vision 2039*, along with over 100 implementing strategies, have been integrated into a comprehensive strategic planning document for the Institute.

Summary

VMI seeks to enroll young men and women of exceptional talent, curiosity, and character in an academic community in which innovative teaching and active learning are complemented by an intensive military regimen. The VMI experience builds personal and intellectual discipline as well as a resolute sense of duty to others, preparing cadets for the responsibilities of citizenship and leadership in the increasingly interconnected world of the twenty-first century. VMI aims to shape educated and honorable citizen-soldiers whose lives are marked by integrity, fairness, and a dedication to the value of work. Because they are products of such a purposeful college experience, VMI graduates have distinguished themselves in their communities and in nearly every profession, including the military, for more than 168 years.

VMI does not plan to make any changes to its institutional mission during the next six-year period through FY 2022.

Item B. Strategies

Part I of VMI's Academic and Financial Plan includes a total of thirty-three (33) strategies and/or funding initiatives which have been assigned a priority. Twenty-four (24) of these are strategies that are listed by short title in the Academic and Financial Plan and are described in more detail in the following pages.

Each strategy includes a short title, the priority number assigned, and summarizes progress to date for those strategies identified in the 2013/2014 Six Year Plan. It also notes how additional General Fund support, savings, and reallocations were used to further the strategies.

#1: Increase T&R Faculty Salaries

An important factor in maintaining VMI's reputation for academic excellence, and in meeting the Vision 2039 objective of becoming a "Premier Undergraduate College in America," is a vibrant, active, and enthusiastic faculty. As VMI seeks to recruit and retain the best faculty – Ph.D. level men and women who are excellent teachers, productive scholars, active in their professions, and engaged in the lives of cadets – it is imperative that the Institute offer competitive salaries.

In recent years, VMI has had difficulty in filling vacant faculty positions with the top applicants, which led the Dean in Spring 2012 to charge the Faculty Compensation Committee (FCC) with evaluating the adequacy of the VMI faculty compensation model for determining faculty salaries. The FCC was also charged with comparing VMI salaries to other Virginia colleges and universities, to professional discipline indices, and to selected peer groups. The FCC found that, when compared to the 14 Virginia public colleges and universities, VMI's average faculty salary ranked 11th. When compared to the 23 SCHEV peer group schools for which information was available, VMI's average faculty salary ranked 23rd.

Based on these results, the FCC recommended adopting salary data from a peer group of 119 institutions similar to VMI from the College and University Professional Association for Human Resources (CUPA-HR) salary survey. The CUPA-HR data was applied using the VMI salary algorithm to provide target faculty salaries at the 60th percentile of the discipline and rank database of the 119 institution CUPA-HR peer group with target salaries adjusted by time in rank. This would raise the projected starting salaries for new faculty in all disciplines as well as raise target salaries for current faculty at all levels. At the time, many salaries were below the 10th percentile and none approached the 50th percentile of the combined sample. The Superintendent provided feedback on the 119 institution VMI CUPA-HR peer group submitted by the FCC, and he asked that they further refine this peer group and provide the Board of Visitors with a final report.

2015 Update:

The VMI CUPA-HR peer group was further refined based on feedback received from the Superintendent, and a final peer group of 64 institutions was selected. This peer group was presented to the Board of Visitors in January 2014. The target salaries determined using the VMI CUPA-HR peer group were used as the basis for targeted salary adjustments in FY 2014 (\$50K in E&G funds and \$450K in private funds) and FY 2015 (\$100K in E&G funds). VMI is now pursuing a strategy of using privately funded faculty chairs to reallocate E&G funds formerly used to fund the chairholder's faculty position to be used to provide targeted faculty salary adjustments. The first of these chairs is anticipated to be in place in FY 2017 and will provide approximately \$135,000 for salary adjustments.

#4: “Right-Sizing”

With the addition of the third barracks at the start of the 2009-10 AY, the Corps of Cadets increased from approximately 1,200 to 1,500. However, there was no increase to the size of the faculty to accommodate the increased number of students. As a result, the Institute increased its use of adjunct faculty. The "Right-Size" Initiative will add 14 new full-time faculty positions by FY 2018 to support a Corps of 1,500. By reducing the reliance on adjunct faculty, VMI will improve the quality of instruction, and increase the number of mentoring/undergraduate research opportunities available to cadets. The cost of these positions will be covered through a combination of new funding, reallocation of resources (adjunct faculty funds and “turnover” savings from replacing retiring faculty) and private funds. All privately funded positions will eventually be “bought back” (i.e. converted to E&G), including seven full-time faculty positions currently funded by private grants. Through FY 2014, VMI added five of the 14 positions. Three of these positions are privately funded, and two positions initially funded with private funds have been converted to the E&G budget. The cost of converting these two positions, as well as the conversion of the Sponsored Programs Administrator position, to the E&G Budget was \$217,000. All 14 new positions will be added as of FY 2018.

2015 Update:

VMI remains on track with the plan to have all 14 new positions added as of FY 2018. In FY 2015, VMI added two new positions – one privately funded and one E&G funded position at a cost of \$76,000. In FY 2016, VMI will add three new faculty positions – one privately funded and two E&G funded positions at a cost of \$161,000 at which time 10 of the 14 positions originally identified by the “Right-Size” initiative will be in place. However, since the need for an additional 14 positions was determined in order to support a Corps of 1,500, the size of the Corps has continued to grow and currently numbers close to 1,700 cadets. As a result, a new “Right-Size” study is being conducted to determine if additional faculty will be required. Unlike the original study, which used adjunct demand to determine where new full-time faculty positions would be required, the new study will also look at faculty workloads across all departments. The VMI Applied Mathematics Department has developed a model that will be used to compare departmental workloads, so that we may identify where faculty positions may be moved from one department to another as faculty retire in order to meet enrollment demand in lieu of adding new faculty positions. This study will be completed by the fall of 2015.

2016 Update:

As of FY 2017, 13 of the 14 new positions identified in the original “Right-Size” initiative are in place, and VMI remains on track with the plan to have the 14th and final position added as of FY 2018. However, since the need for an additional 14 positions was determined in order to support a Corps of 1,500, the size of the Corps has continued to grow and currently numbers approximately 1,700 cadets. As a result, a new “Right-Size II” study was completed in fall 2015 to determine if additional faculty are required to support this continued growth. Unlike the original study, which used adjunct demand

to determine where new full-time faculty positions would be required, the new study examined faculty teaching loads across all departments. The VMI Applied Mathematics Department analyzed three years (12-13 AY to 14-15 AY) of teaching load information to develop a model that can be used to:

- identify teaching load imbalances between departments;
- model the possible impacts of faculty hires/position shifts as well as changes in student enrollment;
- examine the results of these changes.

While the focus of Right-Size Study II was on faculty teaching load, we also evaluated the number of Core Curriculum courses being taught by adjuncts as opposed to full-time faculty. Therefore, the addition of some term faculty (i.e., predominantly teaching, non-tenure track positions) will help achieve the secondary goal of reducing the reliance on adjunct faculty, and exposing freshmen to full-time faculty in their Core Curriculum courses. Based on the results of this study, an additional nine full-time faculty positions (two tenure track and seven term positions) are required to support a Corps of Cadets of 1,700 in addition to the 14 positions identified in the original Right-Size initiative.

#5: Math that Matters: Contextualizing Mathematics in a Computational World

In order to prepare today's graduates to succeed in a world where rapidly changing technology is transforming how we relate to and function within our environment, the Institute considers it a priority to ensure that all cadets become literate in the language of math, and computational technology and its application in solving real-world problems. Most STEM majors at VMI are exposed to programming and mathematical problem-solving through the course work in their curriculum, but approximately 50-60 percent of cadets could benefit significantly from additional course work in these areas. Therefore, this initiative focuses on improving the common core math requirement by developing a new, two-course math sequence that will include technology-driven mathematical topics and basic computational skills.

This innovative curriculum will emphasize the contextualization of mathematics within a cadet's discipline by incorporating contemporary pedagogical methods (e.g. problem-based learning) and modern problem-solving tools into one powerful educational package. This new pedagogical paradigm will better prepare VMI graduates to: (a) think critically and solve complex problems within their disciplines that require significant computational, data analytic, and critical thinking skills, (b) better understand the nuances of how technology informs and impacts interactions with our environment, and (c) better negotiate the technological-mathematical terrain that pervades the modern world.

Stated simply, the idea is to have students, particularly non-STEM majors, engage with math in ways that are meaningful and useful for solving domain-specific problems through the use of computers. Active problem-based projects will be designed and used to apply mathematical skills to realistic math problems including statistics and modeling. In addition, basic computational thinking skills will be developed using software, like Excel, in order to teach cadets to solve the problems and understand the capacity and the limitations of both the model and technology. These projects will be developed through collaborations between the Applied Mathematics Department and other departments whose cadets will be required to take this new math core sequence.

VMI will undergo reaffirmation of accreditation by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) in 2017. The concept of quality enhancement is at the heart of the SACSCOC philosophy of accreditation, and each institution that seeks reaffirmation of accreditation is required to develop a Quality Enhancement Plan (QEP). The QEP will be submitted for review in September 2016. It will undergo the approval process through June 2017.

#6: Financial Aid

Background

VMI projects an enrollment for Fall 2015 of 1715 cadets consisting of approximately 1018 in-state cadets (59 percent) and approximately 697 out-of-state cadets (41 percent). At a minimum 44 percent of in-state cadets and 63 percent of out-of-state cadets are projected to demonstrate need. VMI expects to award over \$22 million in grants and scholarships in the 2015-16 AY to include Federal, State, ROTC, and institutional aid. Private and institutional aid accounts for over \$12 million and ROTC scholarships for about \$9 million (about 23 percent of cadets are expected to qualify for ROTC scholarships).

The percentage of in-state cadets and out-of-state cadets qualifying for need-based aid continues to increase annually especially since the economic recession of 2008. The percentage of “needy” in-state and out-of-state cadets was about 36% and 50%, respectively, in the 2008-09 AY and has grown to 44% and 63%, respectively, in the 2014-15 AY.

Policies and Commitment

VMI strives to meet 100% of the demonstrated need of in-state cadets with grants and loans. VMI also maintains a “need-blind” admissions policy ensuring that no qualified applicant is denied admission based on his or her ability to pay. See Part II Item C of VMI’s Six-Year Plan for a description of its Financial Aid Plan to include addressing the impact of tuition and fee increases on low-income and middle-income cadets and their families.

VMI’s Vision 2039 includes a goal of commissioning 70 percent of graduates into the Armed Forces so VMI continues to emphasize and support cadet efforts to participate in ROTC scholarship and other military-based aid programs.

2015 Update:

Financial aid resources provided to “needy” in-state cadets included \$870,928 of State General Funds in the 2014-15 AY; the total for the 2015-16 AY will be \$970,928.

Of the 245 in-state cadets who graduated in 2014 (1 July 2013 to 30 June 2014) 125 or 51% graduated with Federal loans. Their average debt was \$20,563.

#8: VMI's Center for Undergraduate Research (V-CUR)

The VMI Center for Undergraduate Research (V-CUR) was established to more fully integrate student scholarly inquiry into the VMI experience. The program was originally founded on the premise that the most meaningful academic experiences of college students come through one-on-one interactions with faculty mentors outside the traditional classroom environment. Through the growth of V-CUR, cadets presenting research at regional and national venues, VMI's co-hosting of national and regional undergraduate research conferences, and publications about V-CUR in the Council on Undergraduate Research Quarterly, have made a significant contribution toward the Vision 2039 goal of improving VMI's academic reputation as a premier undergraduate college in America.

V-CUR provides grants for student summer research projects. The Center is privately funded at about \$180,000 annually. VMI faculty are engaged in externally funded research with approximately \$350,000 of funding received annually in support of these projects. As a result of these projects, the VMI faculty make approximately 100 scholarly presentations at conferences in the U.S. and abroad each year.

2015 Update:

V-CUR continues to receive \$180,000 annually in private funding support, which is expected to continue for the foreseeable future. The majority of this funding supports the Summer Undergraduate Research Institute (SURI), which supports approximately 60-70 cadets engaged in undergraduate research with a faculty mentor each summer. VMI faculty remain engaged in both internally and externally funded research.

#9: Math Education and Resource Center (MERC)

The Math Education and Resource Center (MERC) was created to specifically address cadets' poor performance in mathematics with a particular emphasis on incoming freshmen. As VMI increases its efforts to reach its goal of 50 percent (Class of 2011 was approximately 37 percent to 48 percent STEM majors depending on the criteria governing which majors should be considered as STEM) of all graduates coming from STEM majors, it is essential that students who are poorly prepared in mathematics as they leave the public secondary schools receive instruction and coaching to find success in college-level mathematics, especially math required for technical disciplines.

The MERC is directed by a full-time mathematics faculty member who also teaches two sections of mathematics courses. The director is well versed in mathematics pedagogy, possessing a background in Mathematics Education. The director has the ability to assist the department in introducing more historical dialogue into the mathematics curriculum. The MERC employs both professional and cadet tutors who work with cadets one-on-one to develop mathematics skills, to understand strategies useful in solving mathematics problems, to guide efforts in completing course assignments, and to prepare for tests and final exams.

With the support of a private funding grant of \$666,000 covering a five-year period, the MERC began offering services through the Open Mathematics Laboratory (OML) in Spring 2011 and was fully implemented by Fall 2012. As a result of the rapidly increasing demand by cadets for the OML's services during the first year and a half of operations, the OML was moved to a new space in the Preston Library four-times larger than its original space for the start of the 2012-13 AY. An operating budget was established for the MERC, and a full-time tutor supervisor position was established, both supported by E&G funds. State funding may be required to replace the private funding grant when the end of the term approaches.

2015 Update:

The response to the OML continues to be overwhelming – positive with respect to cadet perception, and voluminous with respect to cadet utilization. A survey of users of the OML conducted in Spring 2015 reported an exceptionally high level of satisfaction with the services and support provided by the OML. As a result of this high level of satisfaction, cadet utilization has remained high with approximately 400-450 cadets making approximately 3,000 to 3,500 visits to the OML each academic year. The OML also provides approximately 1,000 hours of tutoring services during the VMI summer programs. Additionally, in June 2014, a comprehensive statistical study was completed, the results of which clearly demonstrated the effectiveness of OML on cadet academic performance. For example, in the 2013-14 AY, the scores for the top 30 cadets (by number of OML visits) in critical math courses went up by almost an entire letter grade from midterm to final course grades. This is significantly better than the overall Cadet Corps average change in their mathematics course grades over the same time period.

#11: In-State Student Enrollment

Background

Since 2003, the number of in-state cadets in the Corps has increased from 653 to 971 in FY 2013 or 49 percent. This increase was accomplished by expanding the size of the Corps from 1,299 to 1,664 or 28 percent and enrolling a greater percentage of in-state cadets. In-state cadet enrollment grew from 50 percent of the Corps to over 58 percent. The percentage of in-state cadets in the Corps has averaged about 58 percent during this period.

Plans and Commitments

VMI projects 1,002 in-state cadets in FY 2016 or about 60 percent of the Corps. The number of in-state cadets is projected to increase to 1,023 in FY 2017 and 1,038 in FY 2018 as VMI seeks to maintain an average Corps size of approximately 1,625. The percentage of in-state cadets in the Corps is projected to approximate 61 to 62 percent for the six years from FY 2017 to FY 2022. These projections reflect recent difficulties in attracting the Vision 2039 target of out-of-state cadets of 45%. The State's shortfall in funding 67% of the cost of education of in-state students coupled with an increasing percentage of in-state cadets has contributed to increases in in-state tuition because of the loss of the differential tuition paid by out-of-state cadets.

Strategies

VMI plans to continue to achieve its in-state enrollment projections using proven strategies and methods to include extensive participation in college recruiting programs, direct mailings to high school students who appear to have the academic and personal traits to be successful at VMI, Alumni Association sponsored recruiting programs (approximately 30 annually) in Virginia, six annual Open House Programs that reach 700 prospective cadets, hosting JROTC and other school groups each year, and conducting hundreds of personal interviews with Admissions staff. Two key financial aid strategies that target in-state cadets are the policy to meet 100 percent of demonstrated need through grants and loans, and the Simultaneous Membership Program with the Virginia Army National Guard.

2015 Update:

The number of in-state cadets in the Corps increased to 994 in FY 2014 and was 989 in FY 2015, over 58% of the total Corps. This was a two-year increase of 18 in-state cadets or 1.9% over FY 2013 and reflects continued growth in the total Corps to 1,700 in FY 2015. This two-year increase in in-state cadets is 68 greater than our 2013 SCHEV enrollment projections for in-state cadets of 921 by FY 2015. It reflects progress made in our strategies (see above) indicated in our 2013/2014 Six-Year Plan.

#13: Technology Enhanced Instruction

VMI's integrated academic and military life program requires cadets to live on campus and to meet specific accountability requirements throughout the day. Accountability requires that cadets attend all of their classes. To accommodate the military demands of the VMI experience, classes are scheduled between the hours of 8 a.m. and 4 p.m. – the academic day. Consequently, enrollment in VMI courses reflects actual attendance and all classes are taught during the prescribed academic day. This model is inherent to VMI's mission and it does not facilitate independent distance learning.

Classrooms and Labs

VMI maintains 88 Smart classrooms and maintains e-instructional resources in nearly all other classrooms. These facilities are fully supported by VMI's IT Department, which also maintains seven general purpose computer laboratories to provide cadet access to specialty software applications. The engineering departments employ computer aided design (CAD) and other design and manipulation software applications for instruction and research. The Mechanical Engineering Department uses a computational fluid dynamics laboratory, and all VMI science and engineering instructional and research laboratories are equipped with state-of-the-art technology, including capabilities that are not readily available elsewhere in Virginia. The capabilities in many of these laboratories were acquired by NSF, DOD, DOE, private industry, and foundation funding.

VMI Statement on Faculty Expectations

Faculty are encouraged and expected to use appropriate technology in the development of their courses as stated in the VMI Statement on Faculty Expectations. Approximately 50 percent of the Institute's courses use the course management software, *Canvas*, including VMI's capstone courses, *Civilization & Cultures*, required for all cadets. In addition, course instructors are encouraged to develop websites to accompany their courses and many distribute and collect information through drives on the VMI network and through electronic reserves in Preston Library. For many courses, but specifically for all *Civilizations & Cultures* courses, *ePortfolio* is a required, integral component that is used for both teaching and reflective learning fostered by the use of technology.

Discipline-Specific Technology

Academic departments have integrated technology specific to their disciplines. For instance, the natural sciences, math, and engineering departments all maintain state-of-the-art instructional and/or research facilities (many that are not common to undergraduate institutions). There are numerous examples of the use of technology, including an open source textbook available in electronic form and used in the core sequence of Calculus; the Mathematics Education and Resource Center use of the SMART board E70 (which is like a giant iPad) for tutoring and workshops; and the use of circuit-modeling computer aided design by the Electrical and Computer Engineering program in approximately 40 percent of its courses. The Mechanical Engineering and

Electrical and Computer Engineering programs have used labs with computer-numerically-controlled (CNC) subtractive rapid prototype capabilities for over a decade and continue to acquire specialized instructional technology equipment. Mechanical Engineering employs a vast array of computational tools including Solid Modeling software, Finite Element Analysis and Computational Fluid Dynamics for instructional use and research. In addition, the department maintains 3D printing facilities, a computer numerically controlled plasma cutting machine and machine tools that enable physical prototypes of computer generated designs to be created.

Information Technology Support

VMI's IT Department provides technical support for student-owned computers with a Help Desk in Barracks. The VMI Post has 100% WIFI coverage and cadets also have access to wired data ports in many academic buildings, including Preston Library, and in their rooms in Barracks. VMI provides up to 1,000 Mbps of Internet bandwidth to meet the demand of its 1,700 cadets.

2015 Update:

VMI replaced *Angel* with *Canvas* as the course management system in the summer of 2014. Approximately 50 percent of the courses taught at the Institute employ this course management system.

VMI continues to be an active participant in RANA (Rockbridge Area Network Authority). RANA was created with a \$7 million Federal grant and augmented with \$2.5 million from Washington and Lee University. RANA's mission it to provide the infrastructure that will allow low cost broadband Internet access throughout Rockbridge County. VMI has connected to RANA resulting in better performance at a lower cost.

#15: “New Directions” Grant Program

Committed to excellence in teaching and scholarly endeavors, the VMI faculty actively pursues funding to support innovations. However, the competition for external grant monies has become fierce as granting agencies are overloaded with funding requests, and proposals describing new research or pedagogical directions are often not funded without significant preliminary data. Strong, well-developed proposals sent to national funding agencies are routinely declined on the first attempt. As a result, the implementation of ideas that would enhance the academic program is delayed by a year or more, and critical momentum is lost.

In light of the current difficulties in obtaining external funding, the New Directions in Teaching and Research grants program was launched in FY 2012 through a private funding source. This program fills a critical need for monies to enable faculty to implement new ideas and, when appropriate, to gather data to strengthen proposals for external support.

The program promotes innovation and collaboration in teaching and research, and funds are awarded annually through a competitive proposal review process with individual awards ranging from \$10,000 to a single award of \$100,000. Successful proposals include the potential for continuing longer-term funding through alternative private sources, but may ultimately result in requests for state funding where projects directly serve the Commonwealth's interests.

2015 Update:

Since the inception of the “New Directions” program in 2011, ten awards have been made totaling \$449,000. These funds have been used to purchase equipment to be used in new areas of research, and to support new academic initiatives, such as the First Year Initiative program (described in the Learning Services Program narrative), creating an electronic calculus textbook; developing a new Exercise Science Minor; and establishing an international environmental biological research collaboration with the Federal University of the Amazon.

#16: Engineering Graduate Program Research Agreements

VMI has developed some and is pursuing other agreements with Virginia Commonwealth University (VCU) and Virginia Tech engineering departments. These agreements will share laboratory facilities and provide internship and research opportunities for undergraduate and graduate students.

An agreement with the VCU College of Engineering established a summer research program involving VMI rising seniors coordinated with collaborative research between VCU and VMI faculty. Initially limited to the Mechanical Engineering Department at each institution, the VMI Physics & Astronomy and the VMI Chemistry Department have also participated in various aspects of this agreement.

An agreement with Virginia Tech involves the Institute's environmental engineering programs. VMI graduates who attend Virginia Tech for graduate school in environmental engineering use the VMI Environmental Engineering Laboratory to pursue their graduate research work under the direction of a VMI faculty member as their graduate advisor.

2015 Update:

The current collaborative research programs with the VCU College of Engineering and Virginia Tech are ongoing and active. Additionally, the VMI Department of Mechanical Engineering is collaborating with the Department of Aerospace and Ocean Engineering and the Hume Center at Virginia Tech on collaborative research proposals. The plan is to obtain external funding to support undergraduate research at VMI and provide a path to graduate studies in Aerospace Engineering at Virginia Tech. The VMI Department of Physics & Astronomy and the VCU Department of Physics are also exploring an agreement similar to the existing agreement between VMI and the VCU College of Engineering.

Additionally, VMI continues to enhance the research capabilities of the science and engineering department labs by investing in state-of-the-art equipment. Almost \$400,000 in State Equipment Trust Funding (ETF) has been allocated for equipment purchases in the science and engineering departments in the past three years. "New Directions" grants (described earlier) totaling \$309,000 have been awarded to the following departments: Mechanical Engineering, Civil and Environmental Engineering, Physics and Astronomy, and Biology. These "New Directions" grants provide the departments with new equipment/facilities to support new research capabilities, and research collaborations.

#17: Articulation Agreements

VMI has developed articulation agreements with 14 Virginia universities to create incentives for cadets to graduate and pursue advanced professional and graduate degrees and certificates, and the Institute is pursuing additional agreements with other Virginia universities. This program is directed at attracting qualified students and improving retention and allows students the opportunity to plan their academic progress from community college to four-year college to graduate school.

2015 Update:

At the conclusion of the 2014-15 AY, all 14 MOUs with Virginia universities remain in effect. While preliminary discussions have begun on a 15th MOU, the emphasis of the Committee on Graduate Relationships (charged with overseeing these MOUs) for the past two years has been on utilization of these MOUs to the benefit of VMI cadets and alumni. While there are no reporting requirements for those who benefit from the MOUs, the Committee reported that 27 cadets expressed interest in utilizing these MOUs during the 2014-15 AY.

#18: Increasing STEM Majors

The VMI Core Curriculum, which defines coursework required of all VMI students, includes a two-semester sequence in a laboratory science (eight credit-hours in Biology, Chemistry, or Physics) and a two semester sequence in mathematics (six credit-hours), regardless of the major. As a result, every VMI graduate has a basic background in science and mathematics with a general attrition from other majors into the science and mathematics disciplines. Revisions to curricula in several majors have been implemented since the 2011-12 AY to respond to cadet interests with the intent of attracting additional majors and improving retention. The Biology Department established a concentration in Ecology, Conservation, and Organismal Sciences (ECOS) for cadets who wish to explore field-based and organismal disciplines of biology, including plant and animal biology, conservation, and ecology. The Computer Science program was transformed into a Computer and Information Sciences program designed to produce graduates prepared for careers influenced strongly by a firm understanding of the role of technology and its place in military, for-profit and not-for-profit career environments. In addition to curricular changes, the 2012-13 AY, an Enrollment Management Committee was established to develop policies and procedures to address the unequal distribution across majors at VMI in order to achieve a better balance of STEM and non-STEM majors.

2015 Update:

Beginning in the fall of 2014 (Class of 2018), the Psychology Department eliminated the B.A. degree in Psychology and will now offer only a B.S. degree. The new Psychology curriculum with a strong foundation in science and research methods has firmly established the VMI Psychology program as a STEM major. Additionally, other curricular and enrollment management changes implemented since the 2012-13 AY are beginning to show positive results towards VMI reaching its goal of 50 percent STEM majors, as total enrollment in STEM majors in Fall 2014 comprised 49 percent to 55 percent of the Corps of Cadets depending on the criteria governing which majors should be considered as STEM. Some notable increases in program enrollment that can be traced directly to curricular changes include Biology, which saw its total enrollment increase from 119 in Fall 2011 to 166 in Fall 2014 – a 40 percent increase, and Computer and Information Sciences, which saw its total enrollment increase from 34 in Fall 2011 to 70 in Fall 2014 – a 106 percent increase.

#19: Learning Services Program

VMI expanded its Learning Services program to address student performance at all levels. Learning services had been provided to all cadets seeking assistance, but the scope of these services and their reach was limited by staffing.

Learning Services focuses attention on cadets in both general and specific ways. General learning services programs involve skills and strategies that are characteristics of successful college students. These include services that enable cadets to read-to-learn, take useful class and study notes, efficiently manage their time, prepare for tests and exams to optimize success, and apply effective test-taking strategies. Specific learning services involve close engagement between cadets and learning services staff to augment course instruction and cadet-faculty interaction through activities such as small group study sessions, weekly academic success programs, monthly workshops, and individual consultations.

A Director of Learning Services was hired at the start of the 2011-12 AY, and she has developed a network of programs and services designed to facilitate cadets' academic success throughout their cadetship. These programs help cadets develop essential skills, such as time management, effective study skills, and how to work with faculty. Helping first year cadets make the transition from high school to college-level academic work was of particular emphasis in these programs, and led to the development of a program called the "First Year Initiative," which was initially piloted during Fall 2012 through a \$23,000 "New Directions" grant (described earlier), and has been subsequently supported by an annual budget of \$2,000 from E&G funds so that the pilot program may continue.

A private funding grant of \$750,000 covering a period of five years starting in 2012 supported expansion of the Learning Services program and an increased staff. The program has expanded services to assist all cadets in achieving higher levels of academic success. The program provides particular support to cadets enrolled in high-need majors, such as science and engineering, and in traditionally difficult courses such as the core curriculum world history sequence and introductory language courses. As the program matures and the end of the private funding term approaches, state funding may be required for the program to continue.

2015 Update:

Learning Services has continued to add new programs and expand existing ones. Continuing the focus to proactively support the performance of first year cadets, workshops are conducted in Summer Transition Program classrooms and on Registration Day both in the fall and spring semesters. These workshops address the challenges of being academically successful at VMI to include time management, effective study skills, working with faculty, and keeping the focus on academics during the "Rat Line." Also, a program called "Operation Excel" was developed specifically to provide first year, ROTC scholarship cadets with planning and study skills needed to successfully complete their first year at VMI. The "First Year Initiative" pilot has also continued and will be

completed in Fall 2015. The Group Study Sessions (GSS) program, which involves cadet facilitators assisting fellow cadets under the mentorship of faculty, supported an average of 20 courses each semester. At the request of cadets and faculty, GSS has been expanded to include 100, 200, and 300-level courses.

State budget cuts during the 2014-15 AY prevented the filling of a vacant Administrative & Professional position in Learning Services. As a result, the number of cadets served decreased from 975 cadets in the 2013-14 AY to 742 cadets in the 2014-15 AY, and the number of interactions decreased from 9941 to 4053 during the same period. This loss of staffing emphasized the importance of assessment in Learning Services, and new tools were added to an existing system of surveys, interviews, and focus groups so that Learning Services may continue to use program assessment to make informed decisions on the most effective ways to serve academic success at VMI.

#20: Sponsored Programs Administrator

VMI established a privately funded Sponsored Programs Administrator position in 2003 to assist faculty in competing for extramural grants to support research and academic initiatives. The impact this position had on providing resources for the academic program is evidenced by the fact that the average amount of extramural funds expended per year since the establishment of this position increased from \$169,002 over fiscal years 1999-2003 to \$465,910 over fiscal years 2004-2010 – a 176% increase. This position was slated for conversion to E&G funding starting in FY 2014, the cost of which is included in the incremental funding associated with new faculty positions outlined in the “Right-Sizing” Initiative (described earlier).

2015 Update:

Sponsored Programs activity continues as the privately-funded administrator position was successfully converted to E&G funding in FY 2014. Seventeen new sponsored programs proposals were submitted in FY 2014. Eleven were funded, providing over \$250,000 in new support. Also two FY 2013 proposals were granted renewals in FY 2014, for over \$137,000 of continued support. To date in FY 2015, 11 new proposals have been submitted seeking a total of over \$660,573. Seven have been awarded funding for over \$99,000 in support, and two with a value of over \$278,000 are pending. Total sponsored programs spending remains approximately \$400,000 annually.

#21: Biology Department Staffing

The Biology Department faculty has doubled (from four to eight) in recent years to support the teaching of the Biology sequence of the Core Curriculum science requirement. This increase in faculty has occurred with no corresponding increase in the number of support staff. The Biology Department Administrative Assistant is currently a 10-month employee, making Biology the only academic department without full-time, 12-month administrative support, and there is only one laboratory research technician to support approximately 11 core biology labs each semester, 12 upper division lab-based courses each academic year, and faculty/undergraduate research during the academic year and summer months. VMI converted the administrative assistant position to a 12-month position in FY 2013 and a full-time laboratory research technician position was added in FY 2014.

2015 Update:

All required actions in support of this strategy have been completed, and it will be removed from the Six-Year Plan going forward.

#22: Year-Round Facility Use

VMI Post

The VMI Post is a relatively small campus and includes the following:

- Barracks and Mess Hall that provide housing and food service for approximately 1,700 VMI cadets. All cadets are required to live in the Barracks and eat in the Mess Hall. The Barracks includes a barber shop, tailor shop, book store, military store, post office, commercial-scale laundry, armory, and café.
- Eight academic buildings including Preston Library. The academic buildings provide faculty and administrative support offices, instructional and research laboratories, classrooms, student study areas, and spaces for other academic support functions.
- Administrative offices located in the main administrative building and a few smaller structures such as converted residences.
- Athletic program venues and offices.
- A conference center.
- A physical plant.

Academic Program

The VMI academic program schedule includes the following:

- Two regular semesters, each lasting 15 weeks – 14 weeks of instruction and one week of final exams. All cadets must enroll full time for each semester and must complete at least 24 credit-hours of academic work each academic year. During the regular semesters, class enrollment is limited to VMI cadets and, by special agreement, Washington & Lee University students. VMI's ROTC programs also enroll students from Mary Baldwin College, Southern Virginia University, and Washington & Lee University.
- Two summer semesters each lasting five weeks. Summer sessions are open enrollment and serve the educational interests of Rockbridge County and surrounding area residents. Approximately 70 different courses are typically offered during the summer semesters. Over the past five years, total summer semester enrollment has averaged near 600.
- A summer transition semester for incoming freshmen of four weeks. Approximately 50 percent of the incoming freshman class of about 500 participate in the Summer Transition Program (STP) and take one course in biology, English, history, mathematics, or chemistry. All summer transition students are required to live in Barracks and eat in the Mess Hall.

Academic and Extracurricular Program Demands

Incoming freshmen participate in initial military training exercises two weeks prior to the beginning of the fall semester and the cadre of upper-class cadets who conduct the

training return from summer break one week earlier. For these cadets, this extends the fall semester to 18 weeks. During the summer, VMI also hosts numerous academic and athletic camps (resident and day camps), conferences and symposia, the Summer Undergraduate Research Institute, the College Orientation Workshop for at-risk youth, and other programs. Faculty use the winter, spring, and Thanksgiving breaks as uninterrupted periods for focused scholarly work and research. Consequently, VMI facilities are in constant year-round use.

Nearly one-third of VMI cadets are NCAA athletes and another one-third participate in organized club sports. VMI also hosts ROTC programs for all branches of the U.S. Armed Forces and all VMI cadets are required to participate in ROTC during their four years at VMI. The ROTC programs impose additional physical training requirements on cadets. This interest in and emphasis on athletics and physical fitness creates a heavy demand on practice and competition venues.

Cadet Life

The unique nature of cadet life ensures high use of VMI facilities. Cadets are required to attend all classes, march in formation to breakfast and dinner, and participate in physical and military training activities. Consequently, classrooms are full, all beds in Barracks are occupied, the Mess Hall is fully utilized, and nearly all other facilities operate at or near full capacity. Academic buildings experience significant use in the evenings as cadet study and undergraduate research space. Facilities use is expected to remain substantial, with some increasing burden, into the foreseeable future.

2015 Update:

Year-round use of VMI facilities remains substantial. Facility use during the regular academic year remains unchanged as the demands of the academic program, extracurricular programs and cadet life have remained unchanged. VMI continues to offer a summer program and STP, and enrollments remain high. Other summer programs, such as athletic camps (resident and day camps), conferences and symposia, the Summer Undergraduate Research Institute, and the College Orientation Workshop for at-risk youth, remain active.

#23: Economic Opportunity Initiatives

Background

VMI meets society's need for educated citizens and leaders and produces graduates capable of maximizing their economic opportunities for top jobs and earning power. VMI's mission and vision emphasizes goals for its graduates to be productive and undertake careers in high-demand, high income fields such as engineering and science:

The Virginia Military Institute believes that the measure of a college lies in the quality and performance of its graduates and their contributions to society. Therefore, it is the mission of the Virginia Military Institute to produce educated, honorable men and women, prepared for the varied work of civil life, imbued with love of learning, confident in the functions and attitudes of leadership, possessing a high sense of public service, advocates of the American Democracy and free enterprise system, and ready as citizen-soldiers to defend their country in time of national peril.

To accomplish this result, the Virginia Military Institute shall provide to qualified young men and women undergraduate education of highest quality – embracing engineering, science, and the arts – conducted in, and facilitated by, the unique VMI system of military discipline.

Two important components of VMI's Vision 2039 call for greater than 50 percent of graduates to be STEM majors and for VMI to develop 25 partnerships with the best graduate schools in the country.

VMI believes that it offers cadets not only an excellent academic education, but also many additional benefits: a disciplined approach to overcoming obstacles, an understanding of the principles of leadership and of working in an organizational setting, and the experience of living in an environment that greatly values personal integrity, ethical inquiry and physical well-being. Because of these many benefits, the VMI graduate is an educated, honorable citizen-soldier, and one who is fully capable of taking advantage of economic opportunities for top jobs and earning power in the 21st Century consistent with the Virginia Higher Education Opportunity Act of 2011 and the Statewide Strategic Plan.

Programs and Initiatives

VMI has undertaken the following programs and initiatives to encourage and support cadets who elect to major in STEM:

1. Recently renovated its Engineering facilities (Nichols Engineering Hall)
2. Recently renovated its Math, Computer Sciences, and Physics facilities (Mallory Hall)
3. Recently renovated its Chemistry and Biology facilities (Maury-Brooke Hall)
4. Established a new Math Resources Center to help improve cadets' math skills

5. Operates and maintains the VMI Center for Undergraduate Research
6. Operates and maintains the Engineering Lab Center
7. Increased the number of full-time STEM faculty
8. Revised the curricula for STEM programs to add flexibility
9. Hired an additional Science (Biology) Lab Technician
10. Operates and maintains an effective Career Services program that helps graduates find “top jobs”

2015 Update:

VMI’s performance and recognitions include the following:

1. Engineering Programs continue to rank in the Top 25 among undergraduate schools.
2. Ranked fourth among all National Public Liberal Arts Colleges in the nation trailing only the three federal service academies by *U.S. News and World Report*.
3. Only about three percent of the graduates for the 2013-14 AY were still seeking employment as of 31 October 2014.
4. About 50% percent of cadets entering post-graduate programs of study entered competitive programs ranked by *U.S. News and World Report*.
5. Among cadets who reported accepted employment offers, 68 percent reported salaries above national salary data means for their respective majors.

#24: Simultaneous Membership Program (SMP)

One exciting military aid program is VMI's growing Simultaneous Membership Program (SMP) with the Virginia Army National Guard (VaNG) and the United States Army Reserve. The SMP is a volunteer officer training program that allows Army National Guard and Reserve enlisted members to participate in the Advanced ROTC Program. The intent of the SMP is to increase officer accessions into the Reserve Components (RC) by increasing ROTC enrollment from enlisted RC members who are attending college. Upon completion of Basic Training, Advanced Individual Training, and while obtaining their college degree, RC soldiers can join the Advanced ROTC Program and earn a commission as an officer in the U.S. Army or State National Guard. In addition, contracted non-scholarship cadets and Reserve Forces Duty scholarship cadets can join a RC unit and the SMP. Advanced Course ROTC SMP students are paid for their Guard/Reserve training, can receive Federal and State Tuition Assistance benefits to help pay for college and receive the ROTC allowance for each of their two years in the Advanced Course. Upon completing the ROTC program, the officer has an eight-year obligation to be served in the Reserve Forces, on Active Duty, or a combination of the two. This program provides a valuable scholarship opportunity to VMI cadets.

VMI has commissioned five to eight officers a year into the National Guard, providing a reliable commissioning source. The VaNG is able to fill vacancies and maintain a reliable source for future officers while providing financial benefit and assistance to the cadet and the cadet's parents, with an option to pay for college. Army ROTC benefits from an early commitment from the cadet to contract into the officer program, while both VaNG and Army ROTC benefit from the military structure and training provided through the Institute. In the end, college becomes more affordable, cadets commit to serve early, the training regimen of the VaNG, VMI, and ROTC are all complementary, and officers emerge who will serve both the State and the country.

2015 Update:

VMI has commissioned 19 officers in FY 2014 (13 to Active Duty and 6 to the National Guard) and 24 in FY 2015 (19 to Active Duty and 6 to National Guard), from the SMP Program. Approximately 75 cadets are currently expected to participate in the SMP in FY 2016.

#25: Shared Resources

In addition to the Engineering Graduate Program Research Agreements previously described, VMI is involved in several resource-sharing programs with other colleges and universities in the region.

Collaborative Programs with Washington and Lee University

Washington & Lee University (WLU) and VMI campuses share a common boundary. This close physical proximity enables the institutions to collaborate in several meaningful ways. For example, VMI has established a student chapter of Engineers Without Borders (EWB) which prompted WLU to establish an EWB club. Through a formal agreement, the VMI chapter and WLU club have completely integrated their activities. VMI and WLU also maintain an agreement to allow their students to enroll in courses at both institutions, which is particularly attractive to WLU students seeking engineering courses.

Shepherd Higher Education Poverty Consortium

VMI joined WLU, Berea College, Furman University, Middlebury College, Lynchburg College, University of Notre Dame, University of Arkansas Little Rock, and the College of Wooster in forming a national consortium to develop a curriculum and internship experiences that allow students to understand issues related to poverty in the United States. As partners forming the Shepherd Higher Education Poverty Consortium, these institutions promote civic engagement and research that improves local communities. VMI and WLU each offer classes consistent with the goals of the consortium with enrollment open to students from both institutions.

ROTC Programs

VMI's offers ROTC programs for all four branches of the U.S. Armed Forces. Mary Baldwin College, Southern Virginia University, and WLU students interested in participating in an ROTC program do so by enrolling in the service branch of their choice at VMI. The ROTC programs are important to these students in that they provide substantial scholarship opportunities to help them meet tuition and other educational expenses. VMI waives tuition for non-VMI students who enroll in a VMI-sponsored ROTC program. About 50 non-VMI students typically enroll in VMI ROTC programs each year.

Open Enrollment Summer Semesters

The two VMI summer semesters are open enrollment and serve the educational interests of Rockbridge County and surrounding area residents as well as cadets. Approximately 70 different courses are typically offered during the summer semesters. Total enrollment is approximately 600, of which about four percent are not VMI students.

Transfer Credit

VMI accepts International Baccalaureate, Advanced Placement and Cambridge Examination credits and transfer credit from other accredited colleges and universities. The Institute also allows cadets who are within 10 credits of completing their VMI degree requirements to do so at other institutions. These policies serve the needs of cadets, allowing them to seek a wider range of course offerings by effectively expanding VMI's academic resources.

VMI Preston Library Programs

VMI's Preston Library collaborates at the local, regional, state, and national levels in multiple ways. It maintains formal, reciprocal borrowing agreements with Washington & Lee University, Southern Virginia University, and the Rockbridge Regional Library. At the state level, since 1994, Preston Library has participated in VIVA, the Virtual Library of Virginia. Through this participation, the Library is able to obtain access to large scholarly collections and resources due to beneficial consortial purchasing agreements. Preston Library adheres to the VIVA Interlibrary Loan Guidelines that require cooperation with other VIVA institutions to share VMI collections using express mail (books) and electronic document delivery (articles). At the regional and national level, Preston Library is a member of Lyris and OCLC, which provide online cataloging and Interlibrary Loan services as well as consortial pricing for some online databases. The Library also participates as a selective depository library in the Library Programs Service of the Government Printing Office.

2015 Update:

All aspects of this strategy remain in effect. Membership in the Shepherd Higher Education Poverty Consortium has grown since its inception, and the Consortium now includes the following members in addition to the original membership: Baylor University, Bucknell University, Center College, The Cleveland Clinic Lerner College, Elon University, Hendrix College, John Carroll University, Marymount University, and Millsaps College.

#26: STEM Scholars

VMI received a five-year grant of \$571,729 from the National Science Foundation (NSF) to develop a STEM Scholars program to encourage and mentor financially needy cadets majoring in the STEM disciplines. The funds provided by NSF enable VMI to provide financial and academic support to about 22 cadets annually. The grant expires at the end of FY 2014. Admissions criteria include declaration of a major and prospective students who declare majors in STEM disciplines are given preference for acceptance.

2015 Update:

The NSF funding for this program ended at the end of FY 2014. During the term of this grant, a total of \$579,729 in funding was received from NSF, of which \$505,000 was used to award STEM scholarships to 57 cadets. The remaining grant funds were used in support of STEM-related academic support activities conducted by the Learning Services Program, the Math Education and Resource Center, and STEM departments. No salary support was provided to faculty and staff involved in the administration of the STEM Scholars program. This program was discontinued at the end of the 2013-14 AY due to lack of funding support.

#27: Increased Degree Completion for Virginia Residents

Cadets who matriculate and then leave the Institute are allowed to reapply for admission within two years, with liberal exceptions for cadets who deploy to meet military commitments. For qualifying transfer students who are willing to conform to the rigors of VMI life, VMI does accept transfer credit from other colleges and universities and from community colleges. VMI also accepts International Baccalaureate, Advanced Placement and Cambridge Examination credits. Two-Year Transfer students must complete a minimum of four semesters in residence at VMI. To provide scholarship opportunities for all students, including transfer students, VMI's ROTC programs offer three-, two-, and one-year academic scholarships and other incentives for students seeking a commission in the U.S. Armed Forces. VMI offers two summer semesters and multiple study abroad opportunities that are open enrollment and serve the educational interests of Rockbridge County and surrounding area residents, as well as cadets. Approximately 70 different courses are typically offered during the summer semesters. Total enrollment of all summer programs is approximately 600, of which about four percent are not VMI cadets.

2015 Update:

All aspects of this strategy remain in effect.

#28: Military Commissioning

Background

VMI possesses a proud tradition of educating citizen-soldiers, ready to defend the country in time of national peril. Toward this end, the Institute encourages all qualified cadets to pursue commissions in the Active Duty, National Guard, and other Reserve components of the U.S. Armed Forces. In addition, curriculum requirements for graduation include four years of ROTC instruction, regardless of a cadet's intention to seek a commission. This instruction provides valuable leadership training and positions the cadet to seek a commission should his or her plans change.

Financial Aid Component

As part of its efforts to assist cadets with financial aid opportunities and increase the number accepting commissions, VMI encourages cadets to seek military financial assistance. In addition to those who matriculate with a four-year ROTC scholarship, VMI assists cadets with seeking three-year, two-year, and one-year scholarships. The number of cadets who are commissioned at graduation is significantly influenced by the number of ROTC scholarships awarded. Over the past five years, over 80 percent of cadets accepting commissions received ROTC scholarships.

Another form of assistance is the Simultaneous Membership Program (SMP) offered through the Virginia National Guard. This is a volunteer officer training program that allows Army National Guard and Army Reserve enlisted members to participate in the Advanced ROTC Program while attending college. Advanced Course ROTC SMP students are paid for their Guard/Reserve Training and receive the ROTC allowance for each of their two years in the Advanced Course.

Commitment to Maintenance of Effort

VMI is committed to maintaining a high commissioning percentage as a part of its Vision 2039 Master Plan. Since the inception of the Master Plan, the percentage of graduates accepting commissions has risen markedly from less than 40 percent in 2003 to approximately 50 percent for the 2015 graduating class. Its goal as outlined in Vision 2039 is to reach 70 percent commissioning with growth in the Guard and Reserves.

The Commonwealth benefits significantly from individuals who accept commissions, complete their service obligations, and return to the state to pursue employment in the profession of their choice. These young officers return to become productive members of the state's workforce with a level of maturity and leadership acumen unsurpassed by their peers. The cadets benefit in that many receive scholarship assistance while in college and all are gainfully employed upon graduation. Likewise, their time in the service offers them invaluable training that is attractive to potential employers.

2015 Update:

As noted above, the commissioning percentage for the class of 2015 was approximately 50%. The commissioning percentage for the class of 2014 reflected a decline to approximately 42%; however, the commissioning percentage for the class of 2016 is projected to be in line with other recent classes in approaching 50%. The five-year average for the classes of 2011 through 2015 is projected to be approximately 47%. VMI continues to strive toward the Vision 2039 goal of 70% commissioning, while realizing that numerous factors, including limitations imposed by the Armed Forces branches, greatly impact these numbers.

#29: STEM Conference Series

VMI's Center for Leadership and Ethics (CLE) developed a four-year series of annual conferences to address STEM education issues. The first conference was held in Fall 2012. The CLE conference series is a public-private partnership.

The mission of the VMI STEM conference series is to gather leaders in STEM education across stakeholder boundaries to discuss strategies, priorities, and resources that will support student success, understanding, and accomplishment in science, technology, engineering, and mathematics. The 2012 conference focused on “Mathematics as the Gateway to STEM Success” since one of the fundamental reasons students fall short in STEM classes and careers is they lack an understanding of and interest in mathematics. Over 580 individuals registered for this conference, the vast majority being K-12 administrators and teachers and high school students.

With lessons learned from the first conference, the 2013 conference, “Science with the Future in Mind,” limited attendance to teachers and administrators, drawing over 280 participants and featured workshops such as Unlocking the Mysteries of the Human Brain; the Science of Scent; Collisions, Catalysts, & Activated Complexes; and many others. Author Steve Spangler was a featured speaker.

2015 Update:

Engineering was the principal emphasis of the 2014 STEM conference, with participation focused on teachers and administrators in grades 3 – 8, and emphasis placed on hands-on workshops with easily replicable lesson plans. Speakers included robotics expert and *Mythbusters* television host Grant Imahara and biomedical engineer Nicole Hastings. Titled “Engineering Ingenuity: Math and Science Concepts in Action,” the conference drew nearly 300 educators from across the Commonwealth.

Imahara’s address was designed to help elementary and middle school teachers make science and engineering more appealing to students in the classroom. He encouraged packaging science in fun ways to keep the interests of students.

Hastings explained that most of the students majoring in STEM fields in college made the decision to do so in high school or earlier. Noting the anticipated increase in STEM jobs by the year 2020, Hastings encouraged educators to plan programming that inspires students’ interest in the STEM fields.

Workshops offered during the two-day conference included Exploring Chaos through Games, Concrete for Kids, Building Truss Bridges, and Harnessing the Wind. This is a typical response received in the post-conference survey: "Compared to other teacher workshops I have attended, I consider this one tops. The price was right, my level of learning was high, there was not a repeat of material from other educational conferences, and the sessions and workshops were varied enough to hold my interest throughout the entire sessions."

Plans are underway for VMI's final STEM conference in 2015 on 6-7 October. Its theme is "Hands-on STEM: Technology and Integrated Project Based Learning," emphasizing the "T" for technology in STEM education, while continuing to offer programming covering math, science and engineering. Featured is a "Technology Petting Zoo," offering teachers hands-on demonstrations of the latest hardware and software in use in schools. A confirmed plenary speaker is Arthur Benjamin, the Smallwood Family Professor of Mathematics at Harvey Mudd College. He was recently selected by *Princeton Review* as one of The Best 300 Professors in America. He is also a professional magician and one of the world's fastest mental calculators. Dr. Benjamin has given three TED (Technology, Entertainment and Design) talks which have been viewed over 10 million times. He is the author of several books, and four DVD courses from The Great Courses series.

2016 Update:

A fifth annual STEM conference will be conducted in October 2016 entitled "Math: The Roots of STEM." This conference will serve teachers of students in grades 3-8 and their administrators. Though the theme focuses on Math, the conference will offer many workshops covering the other STEM disciplines: Science, Technology, and Engineering.

#30: Efficiency Reforms

Energy Savings

VMI continues to strive to keep both energy use and energy costs down through a variety of measures. Examples include upgrades to lighting and lighting controls in multiple facilities making them more energy efficient, installation of sub-metering capabilities across Post to allow for more accurate monitoring of energy use and to assist in identifying inefficient facilities and systems, and the use of that sub-metering system in various academic endeavors in order to increase energy awareness in the VMI community. VMI models and pre-buys most of its natural gas in advance, avoiding winter price spikes and curtailment penalties. VMI recently established a central HVAC operations center which allows for central monitoring and control of building temperatures and facilitates the use of automated energy reduction measures when facilities are not being used.

Managing Vacancies

VMI's policy is to require the Superintendent's approval to fill any vacant position to ensure that the position continues to be essential to VMI's mission and operation. Justification is provided in writing as part of the process before any vacant position is filled.

VASCUPP Cooperative Contracts

As a member of the Virginia Association of College and University Purchasing Professionals (VASCUPP), VMI contributes to and enjoys access to hundreds of cooperative contracts which provide volume pricing for goods and services. This volume pricing is much more favorable than VMI could procure with stand-alone contracts. In addition, the ability to use these cooperative contracts eliminates the need to administratively procure and manage many contracts allowing the VMI Procurement Services Office to function with limited staffing. If VMI did not have access to these contracts, there would be an immediate need for one or possibly two additional procurement professional positions at an estimated annual cost of \$60,000 to \$120,000.

VMI is a member of the newly formed Higher Education Procurement Cooperative (HEPC). Its purpose is to aggregate and leverage procurement requirements and resources resulting in a greater financial advantage from cooperative procurement. Current member institutions include George Mason, Old Dominion, University of Virginia, Virginia Tech, Virginia Commonwealth, College of William & Mary, James Madison, Radford, Virginia Military Institute, UVa Wise, Longwood, Mary Washington, and the Virginia Community College System. The HEPC focus is directed to commonly used goods and services unique to higher education and builds upon the strong foundation put in place through the Virginia Association of Schools, Colleges and University Procurement Professionals (VASCUPP). The HEPC believes that collaborative procurement will result in price reductions leading to increased savings by

combining annual spend and resource allocation, ultimately producing economies that reduce the resources (time, people, effort) required by a single institution.

Rockbridge County Fiber Optic Grant

VMI partnered with Washington and Lee University (WLU) and the County of Rockbridge on a new federal grant-funded fiber optic upgrade initiative to serve many county residents, businesses, and schools, and provide a backup disaster recovery data center for VMI. The data recovery center is being constructed on WLU property adjacent to VMI and will allow the Institute to implement a backup data center with minimal investment.

Capital Projects

Two capital projects included in the Institute's Six Year Capital Plan will continue to improve energy efficiency on Post. The Corps Physical Training Facilities project includes renovations to Cocke and Cormack Halls that will greatly improve the energy efficiency of these two facilities. The Post Utility Infrastructure Improvements project, authorized for detailed planning during the 2016 General Assembly Session, also includes energy efficiencies in the use of electricity, gas and water.

Managed Printer/Copier Contract

VMI instituted a Post-wide printer initiative that has standardized printer and copier equipment under one vendor and provides enhanced service at a lower cost than the previous non-standardized environment. Rather than purchase and maintain approximately 600 machines, the contract vendor provides and maintains the machines and VMI pays a fee for each copy/print. Service response time has been improved with a dedicated on-Post vendor technician. The service also includes a FAX server that eliminated the need for legacy fax machines and reduced the number of dedicated fax phone lines from 40+ to two. Cost savings are as much as 60% over what was previously spent to purchase and maintain VMI-owned copiers, printers and, fax equipment.

2015 Update:

VMI continues to participate in the Commonwealth's Demand Response Program, reducing electrical demand during peak usage times by cycling off air conditioning and reducing lighting in certain buildings. In exchange, VMI earns revenues for its participation in the program. This program not only assists the electrical supplier in avoiding potential brown-out conditions, but also reduces VMI energy consumption and provides a small revenue stream which is invested back into energy savings improvements across Post. VMI also recently re-evaluated its Facility Use Agreements for various venues, ensuring realistic operating costs are reflected in the fees charged.

The Rockbridge County Fiber Optic Grant project is complete with high speed connections to the Stonewall Jackson Museum, the Physical Plant Hinty Hall facility, and

the Nichols Engineering Hall server data center. VMI granted Dominion Power an easement to install utility lines across VMI property to a new data center being constructed as part of this project. In addition to allowing VMI to obtain high speed Internet services at a lower cost, the new data center will provide an opportunity for VMI to use the center as a disaster recovery facility at a much lower cost than would otherwise be possible.

ITEM C. Financial Aid

VMI's Financial Aid Plan to help mitigate the impact of tuition and fee increases on low-income and middle-income students and their families, including the projected mix of grants and loans, is described in the following pages.

**VIRGINIA MILITARY INSTITUTE
FINANCIAL AID PLAN**

Award Package Guidelines

Virginia Military Institute 2014-15 AY “packaging guidelines” funds 70% to 80% of the demonstrated need for non-Virginia cadets (moving towards funding 70% of the need) and 100% of the need for Virginia cadets. For both groups loans are used to meet need and the maximum amount of subsidized loan is used for year in college (\$3500 1st year, \$4500 2nd year, and \$5500 thereafter up to aggregate limit for dependent students of \$31,000 of which \$23,000 may be subsidized or need-based). Packaging guidelines are reviewed annually to ensure consistency in financial aid awards, to review compliance with policies and procedures, and to mitigate if possible tuition and fee increases.

Low-Income and of Middle-Income

VMI uses SCHEV guidelines which for 2014 define low-income families as a family of four with total family income of \$54,860 or less and middle-income as those with family income of \$54,861 to \$109,720. The low-income threshold represents less than 200% of the Virginia poverty level for a family of four while middle-income represents 200% up to 400% of the poverty level for a family of four. High-income families are defined as those with total family income greater than \$109,720 for a family of four which is 400% greater than the Virginia poverty level.

Low-income	Total family income less than \$54,860
Middle-income	Total family income between \$54,861 and \$109,720
High-Income	Total family income greater than \$109,720

For the 2014-15 AY, 639 of the 999 Virginia cadets enrolled applied for financial aid with 106 (10.6% of 999) reporting total family income of \$54,860 or less and defined as low-income; another 235 (23.5% of 999) reported total family income of \$54,861 to \$109,720 and defined as middle-income; the remaining 298 who applied for aid reported total family income above \$109,720. Assuming those who did not apply for aid had total family incomes above \$109,720 would result in 658 cadets (65.8% of 999) with total family incomes above \$109,720.

For the 2014-15 AY, 443 Virginia cadets demonstrated financial need or 44% of the Virginia cadets enrolled. Of the 106 low-income cadets all but 2 qualified for need-based financial aid. Of the remaining Virginia cadets 220 of the 235 middle-income and 119 of the 298 high-income cadets who applied for financial aid qualified for need-based aid.

Steps to Mitigate Impact of Tuition and Fee Increases

VMI takes many steps to mitigate the impact of tuition and fee increases on low and middle income cadets. In addition to Federal and State need-based aid programs, VMI provides significant institutional resources to fund need-based scholarship aid for Virginia cadets. *VMI institutional aid funds the majority of need-based scholarship aid provided to all cadets.* VMI continues to use a significant portion of its restricted and unrestricted endowment to provide assistance to cadets who without such aid may not be able to attend the Institute.

Need-based grant and scholarship dollars were distributed as follows:

<u>Source</u>	<u>Low-income</u>	<u>Middle-income</u>	<u>High-income</u>
Federal	88.7%	11.3%	0
State	25.4%	65.1%	9.5%
VMI	39.3%	52.3%	8.4%

Total need-based institutional funds exceed Federal and state funds combined, with over 90% of institutional aid awarded to cadets from low-income and middle-income families.

Use of Loans

Of the 106 Virginia cadets defined as “low-income” 63 or 59.4% used a Federal subsidized loan with average loan \$4,029 for those who borrowed.

Of the 235 Virginia cadets defined as “middle-income” 161 or 68.5% used a Federal subsidized loan with average loan \$4,179 for those who borrowed.

The 298 Virginia cadets defined as “high-income” and who applied for financial aid 72 or 24.1% used a Federal subsidized loan with average loan \$4,053 for those who borrowed. Many in the “high-income” category would not be eligible for the subsidized or need-based loan.

Those Virginia cadets defined as “low-income” rely less on loans (with zero PLUS loans) than the other two groups as VMI is able to provide significant grant/scholarship aid to reduce loans.

<u>Loan Type</u>	<u>Low-income</u>	<u>Middle-income</u>	<u>High-income</u>
Subsidized	\$253,850	\$672,747	\$ 291,833
Unsubsidized	\$ 56,370	394,945	950,469
PLUS	<u>0</u>	<u>265,838</u>	<u>531,382</u>
Total	\$310,220	\$1,333,530	\$1,773,684

Use of Tuition Revenue for Financial Aid

VMI uses a portion of its tuition revenue to fund need-based financial aid. In 2014-2015, tuition revenue used for need-based aid totaled \$984,913 for in-state cadets and \$2,325,146 for out-of-state cadets for a total of \$3,310,059. The aid for in-state cadets represented 12.4% of the gross tuition revenue from in-state cadets; the aid for out-of-state cadets represented 10.9% of the gross tuition from out-of-state cadets. The total aid awarded represented 11.3% of total tuition revenue.

Tuition revenue used for in-state cadets is much less than for out-of-state cadets due primarily to the following factors:

1. The State provides need-based aid for in-state cadets (\$870,928 in FY 2015)
2. VMI has significant private endowments that provide scholarships to needy in-state cadets
3. About 44% of in-state cadets qualify for need-based aid versus 63% of out-of-state cadets
4. Out-of-state cadet tuition is almost 4 times greater than in-state tuition (\$29,554 versus \$7,498 for FY 2015); out-of-state tuition revenue comprised 72% of the total E&G tuition revenue in FY 2015 although out-of-state cadets comprised only 42% of the total Corps

Out-of-state cadet tuition in FY 2015 represented about 161% of the total cost of education, significantly exceeding the State minimum requirement of 100%. In-state tuition represented only about 41% of the total cost of education. Tuition revenue from out-of-state cadets has helped to mitigate the shortfall in State general funds in meeting its goal of funding 67% of the cost of education for in-state cadets. Out-of-state tuition revenue is significantly helping to minimize in-state tuition increases that would otherwise be necessary to make up this shortfall in State general funds.

To attract and retain out-of-state cadets, it is important that VMI provide sufficient financial aid to help meet their demonstrated need. VMI strives to meet 70% of this need and the use of tuition revenue is essential.

Item D. Evaluation of Previous Six-Year Plan

VMI has made significant progress in all of the strategies identified in its 2013/2014 Six-Year Plan. The specific progress made in each of the strategies is described in “Item B. Strategies” under the 2015 Update portion of the narrative. This includes an explanation of how additional General Fund support, savings, and reallocations were used to further the strategies.

ITEM E. Capital Outlay

VMI's Corps Physical Training Facilities (CPTF) capital project authorized for construction funding by the 2013 General Assembly consists of two phases and is expected to be completed and placed in service effective FY 2017. The estimated operations and maintenance costs (O&M) for this new project will have a significant impact on cadet tuition and fees. Provision for this new cost is reflected in the Academic and Financial Plan.

VMI submitted its Six-Year Capital Outlay Requests for the three biennia from FY 2017 to FY 2022 to the State in June 2015. It includes projects totaling \$88 million in 2016-2018, \$52 million in 2018-2020, and \$84 million in 2020-2022 for a total of about \$224 million.

Approximately \$192 million of the \$224 million requested or 86% is for State General Funds pertaining mostly to renovations of existing E&G facilities and Post Infrastructure improvements. Only about \$20 million of the \$224 million or 9% represents new construction for which an increase in cadet tuition would be necessary to help fund operations and maintenance. For these projects, the increase in cadet tuition and fees would not be significant.

ITEM F. Restructuring

- i. List any items that need clarification under your existing authority and any additional concerns or issues.

There are no items that need clarification and no concerns or issues.

- ii. List areas, issues, or specific items of additional authority that would be requested through legislation and/or renegotiated management agreements.

The following would be requested: Travel and Lodging Exceptions; Small Purchase Credit Card Exceptions; Authority to Invest Education and General and Nongeneral Funds; and Additional Accounts Receivable and Disbursement Authorities.

ITEM G. Enrollment Projections

SCHEV Biennial Enrollment Projections 2015

VMI's enrollment projections reflect the following considerations:

1. VMI is a wholly-undergraduate institution that accepts only full-time students who must live in the Barracks and eat in the Mess Hall.
2. Guided by its Vision 2039 Strategic Plan, VMI maintains enrollment targets of 55 percent Virginians and 45 percent non-Virginians with an average enrollment for the year of about 1625 cadets. These targets reflect VMI's unique mission, diversity of the Corps, Barracks and Mess Hall capacity (about 1,600 for each facility), and important financial considerations.
3. In the 12 years since 2003, VMI has expanded the size of the Corps from 1,299 to 1,700 or 31% with growth in in-state cadets from 653 to 989 or 51%. The percentage of in-state cadets in the Corps grew from 50.3% in FY 2003 to a high of 60% in FY 2009. It is currently 58.2% in FY 2015.

The growth in the percentage of in-state cadets since 2003 reflects several factors to include implementation of VMI's Vision 2039 target of 55% Virginians, improvement in the in-state admission yields (the percentage of in-state cadets accepted for admissions and who enrolled grew from about 67% to 70%), improved retention, and economic factors. These factors resulted in a greater proportion of in-state cadets than targeted.

4. VMI's enrollment projections for FY 2016 to FY 2022 reflect a gradual increase in the percentage of in-state cadets to approximately 62%. This exceeds VMI's Vision 2039 target of 55% in-state enrollment primarily due to increasing difficulty in attracting out-of-state cadets and an increasing number of qualified in-state applicants.
5. VMI continues to be committed to enrolling all qualified in-state applicants and to meeting 100% of the demonstrated financial need of in-state cadets through grants and loans to help ensure access and affordability.

Note: Approximately 44% of VMI's in-state cadets qualify for need-based aid. For FY 2014, 125 or 51% of the 245 in-state cadets who graduated had loans; the average loan was \$20,563.

6. The continuing sluggish economy has contributed to the State's inability to meet its target of funding 67% of the cost of education of in-state students. This underfunding for VMI approximates \$4.1 million in FY 2015 and is a major factor why VMI must increase tuition and fees in the years ahead.

7. VMI's out-of-state cadets pay almost four times the tuition rate that in-state cadets pay in FY 2015 (\$29,554 versus \$7,498). Tuition as a percentage of the average cost of education is about 161% for an out-of-state cadet and 41% for an in-state cadet. The enrollment of out-of-state cadets helps to mitigate in-state tuition increases and generally helps to keep in-state tuition affordable. Out-of-state cadets are projected to comprise 40.4% of the Corps in FY 2016, but they bring in 72% of total tuition revenue for the Educational and General Program.
8. VMI is one of only six Senior Military Colleges serving the nation. Consequently, it attracts a significant number of ROTC Scholarship students who do not receive appointments to the federal service academies. ROTC scholarship recipients comprise approximately 23% of the Corps in FY 2015 with about 48% of these recipients from out-of-state. These recipients are drawn from a national pool of applicants and VMI needs to maintain flexibility in its in-state/out-of-state mix to accommodate these ROTC scholarship recipients.
9. Enrolling qualified out-of-state students contributes to the mission and diversity of VMI. The General Assembly has recognized the national role of the Institute and granted it an exemption from limits on out-of-state enrollments. Given the traditional role VMI plays in providing service to the national security, it is imperative that VMI maintain this national perspective.
10. VMI maintains an aggressive goal of over 50 percent of the Corps majoring in STEM programs. Currently, the percentage of STEM majors is 49 percent and the Institute needs to maintain ultimate flexibility in order to formulate the appropriate academic profile for incoming classes. Increasing STEM graduates is one of the priorities of the HEOA. As ranked by U.S. News and World Reports, VMI's engineering programs have been among the top programs in the nation on a consistent basis.
11. VMI maintains an ambitious goal of 150-200 in female cadet enrollment. Reaching this goal without compromising the academic profile also requires flexibility in the in-state/out-of-state mix.
12. VMI is committed to supporting as many of the goals of the HEOA as possible and the Statewide Strategic Plan, consistent with its mission and conditions. We will continue to review and monitor our enrollment projections in the years ahead and make adjustments as appropriate.