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## Graduate School of Engineering & Management Five-Year Strategic Plan: 2018-2023

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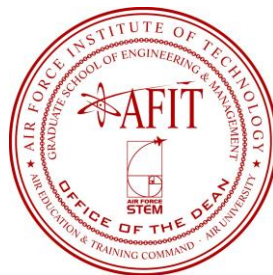
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# GRADUATE SCHOOL OF ENGINEERING & MANAGEMENT FIVE-YEAR STRATEGIC PLAN

**2018-2023**



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# DEAN'S MESSAGE

## Dean's Message

Dear Colleagues,

I am delighted to release this latest edition of the Strategic Plan of the Graduate School of Engineering and Management at the Air Force Institute of Technology (AFIT/EN). I always profess that “a plan is the map of the wise.” The purpose of this strategic plan is to serve as our guide as we collectively map out our activities and actions in the pursuit of our mission. We have a unique platform of operation because of the three complementary cultures within which we operate; namely, the federal government culture, the academic culture, and the military culture. No other academic institution has the luxury of such diverse span of influence and operating opportunities. AFIT is a military organization with a chartered academic mission. Our actions and activities are predicated on possibilities within the military chain of command. However, this strategic plan leverages all privileges of working in three cultures simultaneously. The basic theme of our strategy is teamwork from a systems point of view. Together, we accomplish a lot by strategically capitalizing on what each individual brings to the table in terms of process design, evaluation, justification, and integration. As you flip through the pages of this strategic plan, please understand that it is a live document, subject to continual review and refresh. We will remain adaptive, reflective, and responsive as new opportunities develop in our collective pursuit of excellence. Contrary to the conventional Strength, Weaknesses, Opportunities, and Threats (SWOT) analysis, we plan in accordance with our own in-house Strength, Challenges, Opportunities, and Threats (SCOT) analysis, which views weaknesses as opportunities to excel. Thus, our plans are aligned with the prevailing list of priorities (and opportunities) presented by the US Air Force and the US Department of Defense (DoD), while recognizing the empowering environments of the Federal Government and Academia. I invite all readers to join us in this fruitful pursuit of institutional excellence.

Together, we stand; In unison, we excel.

With Best Regards to All,



**ADEDEJI B. BADIRU (SES), Ph.D., P.E., PMP, FIIE**

Dean

Graduate School of Engineering and Management  
Air Force Institute of Technology

## Strategic Environment

### BACKGROUND

The Air Force Institute of Technology (AFIT) has provided advanced education to the Air Force and other military and government organizations for over 99 years. The Institute, having evolved under multiple names, has provided advanced educational support to our Air Force and sister services for many decades and has granted over 20,000 AFIT graduate degrees (as of March 2017) in programs of high military and defense relevance.

AFIT has achieved significant growth in national recognition and sponsored research support despite many challenges over the past several years. The near closure in 1996 that was quickly reversed created an insecure environment for the faculty and staff. This was followed by a decade of subsequent threats by the Base Realignment and Closure Commission and unstable resources. During this same period, the Air Force science and engineering career fields continued to decline, reaching an all-time low in 2001. However, in 2002, Secretary of the Air Force James G. Roche introduced the Vector Blue initiative in an attempt to improve the technical workforce of the Air Force. Vector Blue expanded AFIT's resources and capacity, but it never received complete implementation due to Program Budget Decision 720, sequestration, and subsequent force shaping of the Air Force. In spite of these past difficulties and instabilities, AFIT has continued to expand into new areas and provide more services into others. The Center for Space Research and Assurance was established to focus AFIT's research presence in Space. The Center for Cyberspace Research continues to perform collaborative research that solves real-world communications and security issues facing our nation and national defense with the DoD, Department of Homeland Security, and other Air Force organizations. A further enhancement to AFIT's capabilities is the new Concept Laser M2 3D Metal Printer system that enables AFIT to fabricate metal aerospace parts for various research investigations.

The congressionally-mandated study conducted by the National Research Council (NRC) in 2014 presented favorable conclusions and recommendations about the mission, value, and future of AFIT/EN. Among many other recommendations in the report is the call for the DoD to do a better job at educating its civilian workforce in the Science, Technology, Engineering and Mathematics (STEM) fields, which may present new collaboration opportunities.

Today, AFIT/EN provides valuable capabilities for conducting critical defense-related research and education to support the AF mission. We are well prepared to address Air Force's dire need to build an inventory of STEM talent from a shrinking pool of available personnel, both civilian and military. This strategic plan presents our roadmap for moving AFIT/EN forward toward eminence as a leading defense research and educational institution.

AFIT/EN is distinct from other institutions of advanced learning in that we are at the center of a blend of three cultures: military, academic, and federal civil service. These are three different, but complementary cultures, which are symbiotically essential for executing AFIT/EN's mission to produce outstanding technical leaders for the AF and DoD.

# STRATEGIC ENVIRONMENT

## AFIT MISSION

The enabling environment for AFIT/EN is embodied in the mission statements and strategic priorities of our chain of command:

AFIT Mission Statement (2014): *Advance air, space, and cyberspace power for the Nation, its partners, and our armed forces by providing relevant defense-focused technical graduate and continuing education, research, and consultation.*

## AFIT VISION

AFIT Vision Statement (2014): *Be an internationally-recognized and respected leader for defense-focused technical graduate and continuing education, and related research and consultation.*

## AFIT KEY OUTPUTS

Key Output 1: Highly-Qualified Graduates

Key Output 2: World-Class Research

Key Output 3: Defense-Focused Technical Consulting Services

## AFIT PRIORITIES

1. Support the Air Force Vision by providing high-quality academic and continuing education programs that enable the Air Force to sustain its competitive advantage "...maintain(ing) the most technically proficient, best-educated, and best-trained air force in the world..."
2. Support faculty, staff, and students and their families
3. Attract and develop outstanding faculty, staff, and students
4. Develop and maintain strategic partnerships
5. Attain, sustain, and improve education support infrastructure
6. Increase and sustain stakeholder awareness of AFIT's value proposition



**In operation since 1919, granting degrees since 1955**

# MISSION, VISION, AND CORE VALUES

## Mission, Vision, and Core Values

### AFIT/EN BACKGROUND

The Graduate School of Engineering and Management (AFIT/EN) has continued to deliver high quality programs over the years. In the Fall of 2007, the leadership of AFIT/EN initiated an annual strategic planning process. The School has made significant progress in several teaching and research areas, including new graduate certificate and degree programs, new distance learning options, and increased research in areas of special importance to the AF and the DoD. AFIT/EN has many strengths, unique capabilities, and opportunities and it is always primed to move forward to the next level in achieving prominence as a research-based defense-focused academic enterprise.

The military culture and discipline are beneficially ingrained into our work processes. This unique fact is leveraged to improve work process efficiency and effectiveness. Even among our civilian workforce, a large percentage has prior military service, which positively influences the dedication to duty that they demonstrate on the job. As of January 2017, 41 out of 77 AFIT/EN civilian faculty have prior military service. The current faculty distribution is summarized below:

- 149 faculty
  - 78 civilians and 71 military
  - 42 Professors, 21 Associate Professors, 75 Assistant Professors, 9 Research Assistant Professors, 2 Instructors

Thus, 110 out of our current 149 faculty members have military service connectivity. This sets us apart from other academic institutions.

The student body at AFIT/EN is predominantly military officers. As such, the diversity of the students is reflected in the diversity of the Air Force in general. Furthermore, the enrollment at AFIT is not locally controlled but controlled by the Air Force Personnel Center who ultimately establishes quotas for the number of students in each program within AFIT/EN. Due to this, student enrollment in each program can vary year to year which has an impact on not just teaching, but research, and infrastructure processes.

### AFIT/EN MISSION

*The mission of the AFIT Graduate School of Engineering and Management is to produce outstanding technical leaders in the DoD by providing superior graduate education built on defense-focused research.*

The School's mission reflects its focus on preparing students with the skills required to maintain the world's best Air Force, with the recognition of research as a critical element in quality graduate education. The concept for achieving mission effectiveness is through the synergy of defense-focused advanced student learning, research, and technology transfer programs for improving Air Force and joint operational capabilities. We develop technical leaders who have the skills to solve current and emerging challenges in the defense of the United States and our allies, and our research enables the DoD to maintain its technological dominance.



# MISSION, VISION, AND CORE VALUES

AFIT/EN is an academic institution devoted to the Air Force and other defense focused organizations. AFIT/EN must recognize its broader educational role in national defense. The institution has enormous capabilities that extend beyond the Air Force to the other U.S. armed forces, allied armed services, and any federal agency involved with technical defense issues. Capitalizing on the Graduate School's strengths and expertise to educate students belonging to these other organizations and successfully supporting their research needs, will place AFIT and the Graduate School in a strong position as a quality graduate institution of choice.

## AFIT/EN VISION

*The vision of the AFIT Graduate School of Engineering and Management is to be internationally recognized as the school of choice in engineering and applied science for defense-focused and research-based graduate education.*

AFIT/EN's unique blend of military and civilian faculty provides both technical depth and operational relevance for the curricula and research programs. The diversity of the military, non-military, and international students provides further enrichment to the learning environment as well. The proximity and partnering relationship with Air Force Research Laboratory allow faculty and students access to some of the most superb laboratories and equipment facilities in the world. These important qualities are value-added assets that complement AFIT/EN's capabilities and success in achieving eminence.

We embrace and practice the philosophy of **"teaching what we research and researching what we teach."** Superior teaching occurs only when topics are research-informed. It is recognized that defense research is a fundamental pathway to the advancement of national priorities. AFIT is a valuable vehicle for cost-effective accomplishment of defense-related research, as reported by the 2014 National Research Council (NRC) report (NRC, 2014).

## CORE VALUES

As an Air Force organization, AFIT/EN is guided by Air Force Core Values: *Integrity first, service before self, and excellence in all we do.*

*Integrity first* includes:

- Pursuit of academic integrity and strict adherence to those principles
- Prudent stewardship of our infrastructure and resources

*Service before self* includes:

- Promotion of Wingmanship
- Service to the academic community

*Excellence in all we do* includes:

- Sustainment of Excellence in our research, teaching, and service engagement
- March toward eminence of the institution and faculty



# STRATEGIC FOCUS AREAS

## Strategic Focus Areas

To achieve its vision, it is necessary for the administration, faculty, students, and staff of the Graduate School to recognize the importance of AFIT/EN and focus on the following areas:

1. Teaching Excellence
2. Research Advancement
3. Service Engagement
4. Infrastructure Improvement

These strategic areas are fundamental in building and strengthening our reputation in the defense community and the professions, creating a stable environment at AFIT, and promoting a culture that stimulates academic excellence. Through focused attention to each area, we will cultivate a faculty of renowned scholars, develop a cadre of well-trained professional staff, and deliver well-educated technical leaders to serve the Air Force and the DoD.

This strategic plan describes the path we have identified for advancing AFIT/EN. We evolved a new approach to the traditional Strengths, Weaknesses, Opportunities, and Threats analysis with a recalibration of “Weaknesses” as “Challenges.” Thus, the current plan uses SCOT analysis to drive our improvement plans. There are three basic areas that are fundamental for achieving success: increase our national visibility, change our existing culture at AFIT, and strengthen our faculty. These imperatives are integrated into our four strategic areas: Teaching Excellence, Research Advancement, Service Engagement, and Infrastructure Improvement.

This process originated with two independent efforts. First, an offsite was held where the Dean, Associate Deans, and the Department Heads convened to lay out an initial SCOT analysis. Concurrently, questions were asked to the students, faculty, and staff regarding the four strategic areas to discover where they saw strengths and challenges and where they felt opportunities were and what the threats were. Over a hundred surveys were collected and compiled. Subsequently, four teams were assembled, one to address each strategic area. These teams were given the initial SCOT analysis and the compilation of the survey and asked to refine and identify areas that could be addressed and improved. The objectives and goals for these areas, along with the SCOT analysis, and implementation and metrics from the efforts of these teams are presented in the remainder of this document.

This process was enhanced with the conclusion of the biennial climate survey that was out briefed in November 2017. Some common themes that were brought out in that survey were the impact of reduction in resources and effect on efficiency, production, morale, and unit cohesion. Specific items included manpower shortages, increased additional duties, and the impact that deployments of our military faculty have on everyone and the overall mission. Another key area identified was in the infrastructure and facilities areas. Items discussed included physical condition and appearance of AFIT, space allocation, and technology adoption & integration. These items were absorbed into this plan as well and metrics were developed.

## Teaching Excellence

### OBJECTIVE STATEMENT

To develop a highly qualified and diverse faculty that: 1) educates students to think critically in technical graduate programs; 2) provides innovative and inter-disciplinary instruction; 3) creates leaders in defense-focused technical areas; and 4) prepares students to face challenges in a global arena.

### SCOT ANALYSIS

#### Strengths (Internal)

- Culture as a strength (Air Force Core Values shared by students, faculty, staff)
- Interdisciplinary research centers
- A reinvigorated Faculty Development program and the creation of a virtual Center for Excellence in Teaching and Learning.
- Support from Extension Services department
- Engaged AFIT/AFRL Library staff

#### Challenges (Internal)

- Motivation: Promotion and tenure ambiguously tied to teaching performance
- Sparse faculty commitment to continuous teaching improvement
- Faculty hiring and retention —cumbersome *USAJobs* process and AFPC assignment process reduces candidate pool
- Difficulty in developing inter-disciplinary programs – manning tied to departments
- Classroom scheduling to handle hard de-conflicts for interdisciplinary degree programs

#### Opportunities (External)

- Air Force fully funds in-resident students
- Increased enrollment through additional civilian and contractor students and through distance learning.
- Alumni are potential sponsors and/or guest speakers

#### Threats (External)

- Broader AF does not require Advanced Academic Degrees for career advancement until O-6/Col boards—leads to fewer student billets
- Severe shortage of clearance-eligible Ph.D.'s from underrepresented populations who (a) desire academic careers and (b) are willing to tolerate inconveniences associated with federal government hiring and employment
- Faculty retirements and deployments
- Policies constrain student enrollment (i.e. student eligibility and ability to accept tuition)

# TEACHING EXCELLENCE

- Inadequate information technology support (i.e. SC)
- No direct funding for distance learning

## GOALS

1. Produce quality defense-focused student thesis/dissertations
2. Produce students able to think critically and dedicated to lifelong learning
3. Hire and retain qualified and diverse faculty population
4. Support interdisciplinary programs and research
5. Foster a culture of teaching excellence based on innovation and continuous improvement
6. Protect classroom space from excessive encroachment from other uses

## DISCUSSION

Evaluating and motivating teaching excellence generated the most discussion and debate. In brief, teaching excellence is subjective and difficult to quantify. Most notably, as noted in the SCOT, the promotion & tenure (P&T) decision ambiguously weighs teaching ability, without providing a rubric for evaluation.

Attaching teaching to P&T is a strong extrinsic motivator. AFIT is currently undergoing a Quality Improvement Program (QIP), which has collected teaching excellence rubrics that included student evaluations, multiple summative teaching reviews, and teaching portfolios. While the Online Evaluation System measures student feedback, the data gathered is insufficient on its own the sole evaluation measure, due to poor sample sizes, typical extreme biases, and inconsistency between departments. Most critically, student evaluations are perceived as “popularity contests.” Thus, student evaluations can be included, but only in context of other evaluation methods. The QIP commonly found summative reviews by peers and department. AFIT should consider a schedule for these that are supportable by manning—for instance, reviews may only be required after the submission of the P&T package. Prior attempts to conduct annual reviews for appraisals failed partially due to the lack of time and inconsistency with P&T evaluation criteria. Teaching portfolios are products produced for the P&T package. They should include syllabi, assignments, rubrics, and most importantly, evidence of providing feedback to students. Each department should have the flexibility to determine their own evaluation that can be summarized to a quantifiable Teaching Excellence mark.

While P&T is a strong extrinsic motivator, AFIT should also foster ways to cultivate intrinsic motivation, especially when military professors typically do not submit tenure packages, and Full professors no longer submit P&T packages. These tools should be voluntary—making training attendance mandatory or “strongly encouraged” hampers their acceptance. Each department should have process in place to request formative evaluations, which are voluntary to ensure the focus is on improvement rather than disciplinary.

Changes in procedure must be coordinated and consistent across EN Operating Instruction (ENOI) and Faculty Council Standing Rules to avoid confusion. Furthermore, there should be a lead time (e.g. minimum 2-year) after approval of changes to ensure those preparing for the P&T have adequate time to meet the changing requirements. In addition, the new criteria should not take effect until each department identifies

# TEACHING EXCELLENCE

exemplar individuals and products (such as the teaching portfolio) as models of teaching excellence for others to emulate.

## IMPLEMENTATION AND METRICS

Metrics tracked annually unless otherwise stated.

### 1. Defense-focused

- a. Metric 1: 70% (threshold)/ 85% (objective) of student thesis and dissertations are sponsored by the DoD and defense-related government agencies (e.g. NSA, DOE, DHS) [OPR: ENR]
- b. Metric 2: 90% (threshold) / 95% (objective) Faculty eligible for security clearance [OPR: XRR]

These metrics make the assumption that the thesis product is a culmination of the coursework and research process, and thus reflective of teaching excellence. AFIT can host foreign professors via the Engineer and Scientist Exchange Program so not every faculty member may be eligible for security clearance, but a high objective is set so that AFIT is ready to conduct classified research and work with partners requiring security clearance.

### 2. Students capable of critical thinking

Our first need in this area is to establish what our current rates are on the following three criteria. We currently grade our thesis but there are some differences in the terminology of these criteria across departments. Also, currently this data is not centrally collected for appropriate analysis. The goal for the first two years of the plan is to collect this data and then look to improve on these levels in the subsequent years.

- a. Metric 1: B grade (threshold) or higher on research analysis on thesis grading sheet [OPR: EN]
- b. Metric 2: B grade (threshold) or higher on research methodology on thesis grading sheet [OPR: EN]
- c. Metric 3: B grade (threshold) or higher on Initiative/Creativity on thesis grading sheet [OPR: EN]

All departments have a rubric to evaluate thesis grades, though there are slight variations between departments. Ideally, the grade sheets can be modified so that the rubrics can be consistent across departments.

### 3. Diverse & qualified faculty

- a. Metric 1: Qualified<sup>1</sup>
  - i. 90% (threshold)/100% (objective) PhD or Professor of Practice [OPR: EN]
  - ii. 70% (threshold) approved P&T packages have 7 (B grade) or higher on Teaching Excellence [OPR: Faculty Council]
- b. Metric 2: Diversity

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<sup>1</sup> Evaluated during milestones such as hiring process, or P&T process

# TEACHING EXCELLENCE

- i. 50%/50% (objective) of military/civilian faculty with the ratio not exceeding 60%/40% or
- ii. 40%/60% (threshold) [OPR: EN]
- iii. 50% (threshold) / 40% (objective) faculty with AFIT PhD degrees [OPR: EN]
- iv. Minimum minority faculty representation [OPR: MSC]
  - For military faculty, this should mirror the overall Air Force career demographics
  - For civilians 15% (objective) mirroring comparable civilian school demographics
- v. 90% (threshold) / 100% (objective) of search committee participation in Equity Advisor brief on best practices and implicit bias.

## 4. Interdisciplinary

For this goal, the first step must be to determine the current make up of our interdisciplinary nature. Inherently, our students' cross disciplines since all degrees require a math component. So from one respect we already achieve a 100%. What is to be encouraged moving forward is additional coursework from other departments to improve breath for our students. Again, certain degrees already offer sequences in other departments or encourage particular classes to be taken by their students. What is not currently documented is just what these levels are. The metric would then be to offer additional opportunities for students to cross disciplines. For the third metric, again our doctoral students already have a mandate to have an out of department representative. So by doctoral council policies cross disciplines are obtained. However, our master's students are not required to have non-department members. There are benefits for this to occur where appropriate and this should be encouraged. Again, these actual numbers are not currently tracked. The first year or two of this plan should collect this historical data and then make an assertion towards a reasonable level moving forward.

- a. Metric 1: Encourage students take courses across multiple departments, beyond the requisite MATH or STAT requirement for the degree program [OPR: ENE]
- b. Metric 2: Offer additional degree programs with multiple department options or electives [OPR: ENW]
- c. Metric 3: Promote master's student to have multi-department committee members on their thesis [OPR: ENR]

## 5. Innovation

As a teaching faculty AFIT must continue to understand the state of the art in teaching innovation. The faculty development program at AFIT has been revitalized and is in touch with current teaching practices and techniques. These are shared to the faculty in the form of different seminars throughout the year. These opportunities for the faculty are in place. What is needed is more encouragement for the faculty to attend and subsequently make use of these new techniques for educating our students. Furthermore, a virtual Center for Excellence in Teaching and Learning has been stood up. More resources are still needed to make this an effective Center for our faculty.

- a. Metric 1: Increase the number of opportunities for faculty development offered throughout the year
- b. Metric 2: Increase the number of faculty attending at least one of the faculty development events per year through stronger encouragement at the department level, as a part of department leadership expectations

# TEACHING EXCELLENCE



## Research Advancement

### OBJECTIVE STATEMENT

To enhance national security through defense-focused, operationally-relevant, interdisciplinary, sponsored research programs that are faculty led and student driven and contribute to the academy through dissemination in highly-respected, scholarly publications.

### SCOT ANALYSIS

#### Strengths (Internal)

- Current research base and equipment
- High caliber students
- Low incremental requirements
- Credentialed faculty with deep understanding of DoD systems from experience

#### Challenges (Internal)

- Available lab space
- Insufficient technicians and staff to maintain laboratories
- Insufficient staff to handle high-volume purchasing
- Government processes to barriers to collaborating outside of the DoD
- Institutional barriers between departments impede interdisciplinary research

#### Opportunities (External)

- Co-location with a myriad of other DoD organizations at Wright-Patterson AFB
- Graduates become part of the customer base, creating career-long ties
- Ability to do classified research provides unique funding opportunities

#### Threats (External)

- Opacity of current security approvals for publication review
- Deployments/student flow affects ability to keep research commitments
- Difficulty in hiring
- Reduced number of AF requirements/personnel attending

### GOALS

1. Uphold and sustain defense focused graduate research
2. Broadly engage DoD, industry, and academic partners on the potential and impact of AFIT's research



# RESEARCH ADVANCEMENT

3. Refine research related business processes and policies to reduce administrative burden and enable innovation
4. Expand and improve AFIT's ability to perform cutting-edge DoD focused research

## DISCUSSION

The goals presented as part of the EN strategic plan for research advancement cover four distinct but equally important ideas which are fundamental to advancing research at AFIT. The first goal to advance research reinforces the current capabilities in AFIT research, namely to "Uphold and sustain defense focused graduate research." AFIT accomplishes outstanding research on a daily basis. The current output of high quality research must not be sacrificed in order to implement our new ideas. While subsequent goals are focused on expansion and specific improvement areas, our first priority ensures AFIT upholds its current level of research excellence.

The second goal to advance research is to "Broadly engage DoD, industry, and academic partners on the potential and impact of AFIT's research." Our ability to conduct *marketing* and *communication* succinctly summarizes this goal. As discussed previously, AFIT routinely conducts groundbreaking research for the DoD. Continued success (Goal 1) and growth of AFIT (Goal 4) requires us to broadly market AFIT's capabilities across the DoD, industry, and academic partners. All members of AFIT, from the institution's senior leaders down to individual students who will graduate and become AFIT partners for life share responsibility to achieve this goal. Despite AFIT's vast pool of talent, value, output, and experience, the institution does not have the name recognition it warrants. To maximize our value and impact to the defense of the nation, we must market and communicate our abilities.

The third goal to advance research "Refine[s] research related business processes and policies to reduce administrative burden and enable innovation." This goal seeks to improve identified difficulties and challenges, as well as removing threats, to AFIT achieving its mission. Goal three heavily draws from faculty and student feedback. Though admittedly complex problems, we endeavor to find simple solutions. The problems and their effects are significant, however, and must be identified as a first step toward developing viable solutions.

The final goal to advance research is to "Expand and improve AFIT's ability to perform cutting-edge DoD focused research." This goal leverages the successes of achieving elements of the first three goals. Goal 1 aims to sustain and uphold current research. Goal 2 sets out to market AFIT's capabilities across the DoD and Goal 3 aims to solve internal challenges. These goals all work towards enabling AFIT to go above and beyond what we currently achieve and advancing both our ability to conduct research as well as the impact of the research itself.

## IMPLEMENTATION AND METRICS

Metrics tracked annually unless otherwise stated.

1. Uphold and sustain defense focused graduate research

# RESEARCH ADVANCEMENT

- a. Metric 1: EN should initiate yearly contact with 100% major command workforce development offices [OPR: EN]

The Air Force sends students as justified by Advanced Academic Degree-coded positions within units across the Service. AFIT must continually advise units and advocate for more positions that enable technical leadership to grow within the officer ranks. AFIT Senior Leaders can interface with Major Command workforce development personnel to proactively identify these needs, while faculty educate sponsors, alumni, and colleagues of the need. This activity will allow the same number or more students to attend AFIT for advanced degrees.

- b. Metric 2: Build upon current external research funding to address emerging DoD needs [OPR: ENR]
  - i. Increase external research funding by 6% each year
  - ii. Bring in 4 new sponsors each year

Though EN brings in on average over \$20M annually for the past 8 years (record \$27.4M in FY17!), we want to increase this sponsorship through new opportunities and new fields of study to continue the research portfolio relevance. One challenge to continually bringing in more revenue is that this will spawn additional space requests and other resources to support more research.

- c. Metric 3: Contribute to the academy through dissemination in highly-respected, scholarly publications [OPR: ENR]
  - i. Publish a minimum of 300 refereed publication authorships each year
  - ii. Publish at least 1.5 journal articles a year on average for the faculty

Refereed publication authorships is based on either a full length peer-reviewed conference paper or a journal article. The research performed at AFIT, though defense-focused, can reach broad technical audiences and should be archived in professional journals and in peer-reviewed conference proceedings to the extent that is publically releasable. AFIT can also lead academia as the premier facility for editing classified scholarly publications.

- d. Metric 4: Restore Building 644 to its commissioning standards [OPR: MS/Commandant]

Any academic institution that is focused on research must maintain state-of-art laboratories and research facilities. As the core enrollment process (Air Force quota) continues to shrink, the maintenance of excellent research facilities becomes more important for attracting defense contractors to utilize AFIT for their graduate education requirements.

- d. Metric 5: Retain and recruit expert faculty [OPR: EN]
  - i. Intensify efforts to increase the pool of qualified applicants beyond the typical number of less than 10.

# RESEARCH ADVANCEMENT

- ii. Develop methods to better assess faculty departures to identify problem areas for retaining faculty by End of Fiscal Year (EOFY) 2018

AFIT successfully transitions excellent military faculty into civilian positions. These faculty members tend to be subject matter experts in important DoD focus areas. However, this pool is not the only source of individuals that we should be recruiting from. AFIT has recognized that we tend to hire from within and as of August 2016 new policies have been written and the ENOI on faculty recruiting has been updated. New search committee training is in place and the current faculty are learning how to broaden their pools and reach a more diverse set of candidates. Implementation of the policies is underway and over the next few years AFIT needs to track the results of this new policy.

Further, it is proposed that a more formal exit interview process be implemented to understand why existing faculty leave AFIT. There are many reasons why people leave and departures are not always a negative as often this enables collaboration with the faculty members' new institution. What is needed, though, is a better appreciation of the driving causes and then address those where appropriate.

## 2. Broadly engage DoD, industry, and academic partners on the potential and impact of AFIT's research

- a. Metric 1: AFIT leadership conducts at least 1 meeting a year with departments and research centers focused on broadening their understanding of research being conducted at AFIT and discussing the marketing of center research to external partners and sponsors [OPR: Dean]

AFIT leadership must stay engaged with faculty to have a comprehensive understanding of applied and basic research being conducted at AFIT. This understanding will help facilitate AFIT leadership's roles as an external advocate for AFIT. Special focus should be paid to partners and sponsors who have limited or no relationship with AFIT.

- b. Metric 2: AFIT faculty communicate mission in teaching, research, and service [OPR: Faculty]

- i. AFIT faculty assist ENR in compiling list of sponsors/partners who are relevant to a given area of research but are not yet engaged by EOFY 2018
- ii. Establish cooperative travel funds in order to establish new customer relationships by EOFY 2018
- iii. AFIT publications should acknowledge 100% of all sponsors that desire to be recognized
- iv. Improve the staffing and operation of Thesis Processing Center to facilitate getting theses into Defense Technical Information Center in a timely manner.

Just as AFIT leadership must stay engaged with faculty to have an understanding of research being conducted at AFIT. AFIT faculty must participate in the marketing and effective communication of their research as well. Faculty should continue to maintain the external inter-relationships and collaborations that establish AFIT as a leader in the academic community.

# RESEARCH ADVANCEMENT

## c. Metric 4: Engaging alumni for a lifetime AFIT relationship [OPR: Chancellor/Provost]

- i. Reenergize the Alumni and Supervisor Survey to reach out to AFIT grads at the 5 and 10 year point post-graduation for operational feedback

This survey has not been sent out the last few years and should be reinstated. The alumni provide a valuable resource. Their feedback would be invaluable on many areas from understanding what parts of their degree were the most beneficial moving forward and where changes could have helped them. These individuals are also often in positions that could aid our research program. Reaching out to them can open doors for many collaborations.

- ii. Establish a day where graduates can return to AFIT. This would be an advertising opportunity for AFIT both where alumni are engaged for operational feedback and the current students can showcase their research and facilities.

It is proposed to do an initial day as part of the 100<sup>th</sup> anniversary of AFIT celebration. A dedicated day can be set aside to bring alumni back to campus for a series of lectures and tours and interaction.

- iii. AFIT alumni office should expand upon the current database of AFIT graduates

Currently the alumni office tracks over 20,000 graduates. However, they only have contact information for just over 50% of them and of those individuals, they only know the current position title of about 50% of those graduates. An effort to improve these numbers should be implemented.

- iv. AFIT alumni office should also obtain and track previous military faculty contact information and current positions/assignments

Considerable opportunity exists to further our engagement with graduates for life- long learning and collaborative research activities. AFIT is unique in that its military faculty transition away from AFIT but remain engaged in relevant research areas throughout the Air Force and thus are a valuable resource for current faculty. They already understand our processes and capabilities and should be eager to support the next group of students. As part of our 100<sup>th</sup> Anniversary there is an effort to make contact with this group as well and track this information as well.

## 3. Refine research related business processes and policies to reduce administrative burden and enable innovation

### a. Metric 1: Define appropriately-timed PA approval process [OPR: AFIT Security]

- i. Papers and posters processed in 10 days or less
- ii. Theses/Dissertations processed within 30 days or less
- iii. Full complement of security staff in place by EOFY18

# RESEARCH ADVANCEMENT

Public approval processes are vital in order to avoid spillage of government data and technical rights. As the interface between faculty and students seeking to publish papers, theses/dissertations and other technical material the process must be clearly defined, understood, and timely to respond to both long-lead publications and short-turn consultation requests. The support staff that performs these actions will be appropriately resourced and trained.

b. Metric 2: Refine purchase approval processes [OPR: EN Department Heads]

i. Goal: Government Purchase Card requests processed in 3 business days or less and no more than 5 business days

ii. All departments maintain 1 purchaser

As AFIT executes \$30M of congressional funding and research sponsorship, administrative process for activities like purchasing equipment or other material must be streamlined for efficiency, while ensuring that FAR requirements are met. We endeavor to reduce as much overhead as possible from faculty through highly-trained administrative staff and minimal bureaucratic intervention.

4. Expand and improve AFIT's ability to perform cutting-edge DoD focused research

a. Metric 1: Establish and advertise alternative methods to enroll non-AF military students [OPR: ENE]

i. Yearly review of enrollment methods with academic departments

ii. Clearly define and advertise through AFIT website, social media, and all partner schools/sponsors alternative methods for student enrollment

The AF military student quota remains the bulk of the student body. They do not represent the need for defense-focused advanced degrees within the civilian workforce, both within and outside the government. Government civilians, defense industry partners, and partner academic institutions should be encouraged to participate in our graduate and certificate programs to the maximum extent possible. By defining the mechanisms through which these students can be admitted, we will greatly increase our ability to educate the workforce that will solve DoD's technical problems.

b. Increase collaboration with academic and industry partners

i. Reduce time for The Cooperative Research and Development Agreement (CRADA) approvals by 25%

ii. Streamline the coordination process for the AFIT CRADA approval process

One of the primary limiting factors to AFIT collaborating with industry and academic partners is that AFIT is a government agency and industry and academia receive government funding that is not necessarily meant to flow back to the government. CRADA process has allowed AFIT some success in working with academia and industry to collaborate and form consortia as if it were a civilian

# RESEARCH ADVANCEMENT

university. These agreements take considerable time to establish due to legal process including data rights and fiscal execution. While the time to execute these agreements is often outside of AFIT/EN's control, shortening this time is necessary for faculty to be able to perform research with outside organizations.

c. Improve military faculty engagement

- i. Max out military faculty which are currently authorized a sequential tour
- ii. Increase military faculty authorized by a sequential tour by 10%

42% of the AFIT/EN faculty are military officers with 4 year assignments. The school's current promotion and tenure expectations typically require 6 years of strong research productivity for promotion to Associate Professor with tenure. Recently AFIT received authority for up to 15% of the military faculty to receive a second sequential tour, if the candidate is making strong progress towards academic promotion. Further engagement of military faculty in the research enterprise might be enabled through stronger mentoring, extending our relationship with military alumni faculty throughout their careers, and integrating new military faculty into established research groups.

d. Build new research facilities and improve the utilization of existing facility

- i. Yearly update to faculty on status of efforts to expand AFIT research facilities
- ii. Yearly report from faculty on limitations or work-stoppages caused by limitations of current facilities

Current AFIT research facilities limit the expansion of new research programs, particularly for experimental projects. Furthermore, we use several older, poorly supported laboratory buildings outside the main campus, for nuclear engineering and optics (among others). We are currently adapting to these constraints by converting teaching and administrative space to research activities, but no additional room is now available. A new research laboratory has been designed to relocate the labs to the main campus, resolve safety limitations, and provide expansion opportunities. The priority of this military construction project within AETC is currently low and will require strong advocacy to become a reality. Meanwhile, the Graduate School will intensify efforts to provide and/or increase work-area cubicles for students to advance their research.

# SERVICE ENGAGEMENT

## Service Engagement

### OBJECTIVE STATEMENT

To enable faculty and students to engage in activities that promote and support the success of school programs, personnel, and the greater AFIT community through maintaining an active presence in professional associations, academia, and the Department of Defense.

### SCOT ANALYSIS

#### Strengths (Internal)

- Enthusiasm and engagement of faculty
- Ample opportunities
- “Service before Self” culture
- Incentive for service in military OPRs

#### Challenges (Internal)

- Lack of time
- Restrictions on participation in faculty governance based on academic rank/tenure
- Low priority for service in promotion and tenure evaluations
- Imbalance between military and civilians performing internal service activities
- Data rights for tracking metrics

#### Opportunities (External)

- Partnerships with academic, professional, and industrial organizations
- Co-location with many AFRL and local researchers
- Local professional organizations

#### Threats (External)

- Military faculty turnover



# SERVICE ENGAGEMENT

## GOALS

1. Broaden AFIT's consulting, short courses, and research portfolio to reflect the needs of DoD customers and their research interests and their problems
2. Improve AFIT's visibility and contribution to professional organizations, their publications, and their conferences
3. Extend AFIT's reach into the base and local community

## DISCUSSION

Service is an institutional core product providing our customers, community, and professional organizations with valuable assistance. With quality service, customers send research dollars, students, and projects to AFIT. The goals presented here are intended to advance AFIT's service engagement to ultimately grow as a research institution.

To maximize service, both students and faculty are encouraged to participate in valuable service to increase AFIT's prestige and recognition with alumni, customers, and industry partners. Service has many different forms and vehicles for faculty to participate and assist the community. AFIT students, faculty, and staff participate in many service activities including professional societies and activities like Engineers Week at AFIT to community service such as coaching youth sports, cub scouts and church groups. To baseline and encourage our contributions, service at AFIT is focused on three equally important areas:

1. Service to the DoD
2. Service to AFIT
3. Service to academia, the profession, and the community

Therefore, the identified goals and areas encourage faculty to engage in service, advance the institution, and build the relationship necessary to make AFIT the premier DoD graduate school.

## IMPLEMENTATION AND METRICS

The goals given for Service Engagement are intended to track faculty participation and monitor AFIT's service contributions. One of the issues is that this information has to be freely given on a volunteer basis by the individual faculty members annually after the faculty activity reports are completed and is not able to be directly captured. Therefore the overall service of the faculty may be underestimated.

1. Defense focused service
  - a. Metric 1: 75% participation of military and civilian faculty in DoD service or pro-bono consultation outside of AFIT
  - b. Metric 2: 40% participation of staff in DoD service or pro-bono consultation outside of AFIT

# SERVICE ENGAGEMENT

This metric aims to increase AFIT's research portfolio and service to DoD customers. Faculty and staff are encouraged to engage DoD organizations outside AFIT and the Air Force to help them find solutions. Many pro-bono solutions can generate funded research projects and therefore all faculty and staff are strongly encouraged to assist DoD agencies when able.

## 2. Academic and professional focused service

- a. Metric: 95% participation rate of faculty in service to their respective professional organizations

This metric aims to improve AFIT's visibility and contribution to professional organizations, publications and their conferences. Professional organizations provide opportunities for networking, collaboration, and partnerships. Participation and contribution can take many forms from chairing a conference session to reviewing articles for publication, and many other opportunities.

## 3. Wright-Patterson AFB and local community focused service

- a. Metric: 75% participation of faculty, staff, and students in base and local community research, teaching, and outreach projects

The Wright-Patterson AFB and the greater Dayton Ohio area is a research rich environment and AFIT has the opportunity to foster collaboration and facilitate research, teaching, and service excellence to the base and community. By facilitating research, teaching, and service locally we build the relationships necessary to grow AFIT's research opportunities, recognition, and prestige.

## 4. AFIT focused service

- a. Metric: 100% participation of faculty in service to AFIT, EN, or their respective departments

This metric forms the foundation of AFIT's service program. Faculty members are needed to serve on local committees, governing boards, and panels. This service to AFIT enables AFIT to complete its goals and core mission.

# INFRASTRUCTURE IMPROVEMENT

## Infrastructure Improvement

### OBJECTIVE STATEMENT

To support our educational mission and enable innovation by ensuring properly maintained facilities, adequate support staff, effective processes, and sufficient technical, personnel, and physical resources.

### SCOT ANALYSIS

#### Strengths (Internal)

- Personnel are resourceful, committed, and high-quality
- Have a baseline set of facilities, equipment, staff, and processes
- Have identified required staff positions
- Library well equipped, well managed, and responsive to faculty and student needs
- Have high-quality research equipment
- Facilities are on-base
- Student culture (adopted recycling bins, Tidy Fridays)

#### Challenges (Internal)

- Limited financial resources
- Limited educational tech staffing
- Difficulty in recruiting, hiring, and retaining staff personnel
- Many vacant positions
- Limited facility space
- Inadequate size of computer lab classrooms
- Inadequate infrastructure deterrent for faculty recruitment and retention
- Lack of cleanliness creates stressful environment
- Facilities are on-base
- Outdated/poorly functioning classroom technology
- Insufficient funding for Distance Learning
- Contracting regulations to make large purchases

#### Opportunities (External)

- Access to on-base high-quality research equipment and facilities

#### Threats (External)

- Ability to adapt to new student information system and new LMS
- Limited staffing for external support orgs (SC, XR, FacMan, Mailroom)
- Fiscal environment

# INFRASTRUCTURE IMPROVEMENT

- Lack of decisiveness/ speed of decision making
- Cumbersome processes

## GOALS

For the purposes of this section, infrastructure has been defined as the physical assets (buildings, classrooms, laboratories, etc.) and services (IT networks, Facility Management, etc.) in place to support the academic mission of AFIT. The following are goals that will help to ensure AFITs infrastructure has a positive impact on the AFIT mission.

1. Ensure infrastructure is aligned to support and enhance AFIT mission
2. Develop and encourage a culture of “Pride of Ownership”
3. Increase and improve communication tools to aid continual infrastructure improvement
4. Advocate for AFIT as a base and Air Force wide asset

## DISCUSSION

Infrastructure improvement efforts at AFIT are coordinated through the Facilities Utilization Board (FUB). Many requests are made through the building managers but this process should be less transparent with more input from the users. In regards to the first goal that “Ensure infrastructure is aligned to support and enhance AFIT mission,” the AFIT infrastructure should be supportive of the AFIT mission at all times. This requires minimal downtime due to infrastructure failures. While it is understood infrastructure requires periodic maintenance, unscheduled outages have a tremendous negative impact on the ability of AFIT faculty, staff and students to complete the educational mission due to the far ranging ripple effects of infrastructure failures. For example, when the water system went out in building 640, the eye-wash stations in one lab were inoperative, thus causing the entire lab to close due to safety issues. In addition to high-uptime rates, all infrastructure upgrades should be tied to an identifiable enhancement to the AFIT/EN mission. While this is not perceived to be a huge problem, if an infrastructure update is occurring, it should be tied directly to some mission requirement. Finally, there should be a greater emphasis on the transparency with regard to allocation, procurement, and maintenance of infrastructure assets. There is much anecdotal evidence that once an infrastructure item is identified as needing repair, there is little communication regarding status or timeline for the repair. Similarly, there is little explanation for how AFIT/EN infrastructure is allocated to each department, research center, etc. Enhancing transparency into those processes would go a long way toward identifying under-utilized infrastructure as well as improving scheduling of operations dependent upon AFIT infrastructure availability.

For the second goal “Develop and encourage a culture of “Pride of Ownership.” AFIT needs to foster a sense of “pride-in-ownership” for its infrastructure assets. All faculty, staff and students should view AFIT property as if it belonged to them. If something is broken, fix it or report it. If something is dirty, clean it up. This should be a culture change for AFIT as a whole.

The third goal desires to “Increase and improve communication tools to aid continual infrastructure improvement.” Currently there is a lack of understanding and/or knowledge of how to report infrastructure

# INFRASTRUCTURE IMPROVEMENT

problems among AFIT faculty, staff and students. As a result, it is easy to take a “someone else must have taken care of it” approach to infrastructure problems. The root of this issue is a lack of communication about how to submit trouble tickets and then view status of the ticket while being worked. Communication would foster a sense of involvement as well as ownership listed in Goal 2.

The fourth goal focusses on “Advocate for AFIT as a base and Air Force wide asset.” AFIT truly is an Air Force asset. While we produce world-class graduate students and DoD relevant research, we also are the caretakers of valuable military infrastructure. Whether it is hosting DoD-level conferences in Kenney Hall or conducting critical cyber research in the Cyber Center of Excellence labs, the infrastructure in place at AFIT should be viewed as a valuable Air Force commodity. AFIT should actively emphasize and market our infrastructure to the Air Force at large. As part of the active marketing, AFIT should also make sure an AFIT infrastructure development plan is created, updated and pushed to the base and Air Force level decision makers, thus ensuring adequate funding/attention to long-term infrastructure requirements.

## IMPLEMENTATION AND METRICS

For each goal a series of objectives have been developed and definable metrics to determine progress.

1. Ensure infrastructure is aligned to support and enhance AFIT mission.
  - a. Metric 1: Zero time lost as a result of infrastructure availability issues.
  - b. Metric 2: 100% Uptime rate for network resources during operating hours.
  - c. Metric 3: 24 hour or less response time from AFIT FACMAN (Facility Manager).
2. Develop and encourage a culture of “Pride of Ownership.”
  - a. Metric 1: 100% of reported issues addressed within 72 working hours and 80% (threshold)/95% (objective) resolved within 2 weeks
  - b. Metric 2: 85% (threshold) / 95% (objective) Faculty/Staff/Student participation in Tidy Friday
  - c. Metric 3: 85% (threshold) / 95% (objective) 100% adoption of recycling containers
  - d. Metric 4: Zero trash overflow issues not cleared by next business day
  - e. Metric 5: Having designated student cubicles to promote “pride of ownership”
3. Increase and improve communication tools to aid continual infrastructure improvement.
  - a. Metric 1: 100% visibility of infrastructure issue reports visible to AFIT population.
  - b. Metric 2: 85% (threshold) / 95% (objective) of AFIT population aware of how to report infrastructure issues.
4. Advocate for AFIT as a Base and Air Force-wide asset.
  - a. Metric 1: Growth or maintenance of utilization of AFIT facilities and assets by outside entities.
  - b. Metric 2: Growth or maintenance of external collaboration with outside AF and DoD entities.

# 2018 AFIT/EN STRATEGIC PLAN TEAM

## 2018 AFIT/EN Strategic Plan Team

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## In Pursuit of Eminence

*With VISION, we can achieve EXCELLENCE;*

*With excellence, we can achieve EMINENCE.*

