



AIR FORCE ENGINEERING ENTERPRISE STRATEGIC PLAN 2014 - 2024





FOREWORD


To fulfill its mission, it is imperative the United States Air Force successfully execute joint warfighter operations across the air, space, and cyberspace domains. Our support of these operations requires developing, fielding, and sustaining weapon systems and equipment that provide tactical and strategic superiority to our warfighters across all three domains.

In the more than 60 years that have passed since the Air Force's founding, our engineers and scientists continue to lead the world in the development of those cutting-edge weapon systems vital to the security of our nation and its allies. The ability of the Air Force to deliver superior weapon systems to the warfighter strengthens our sacred trust with national leadership and with our fellow citizens. Air Force technological achievements are based upon the ingenuity of our engineering and scientific workforce, which repeatedly unites with the operational community, industry, and academia to deliver game-changing systems, and systems-of-systems, while achieving a balance between cost, schedule, and performance.

Amid ever-changing threats and today's fiscal realities, Air Force engineers and scientists continue to fulfill their duty to our nation and to the warfighter. Although our talents are strong, the sheer dynamics of the fast-changing global environment demand we harness the necessary tools and technologies to continue improving the way we execute our mission. With this strategic plan, a clear course is charted for the future of the Air Force Engineering Enterprise.

I approve this strategic plan as a guide for Air Force engineers and scientists and their leadership, as they continually push innovation to deliver affordable war-winning capabilities for future decades.


Deborah Lee James
Secretary of the Air Force


Mark A. Welsh III
General, USAF
Chief of Staff

EXECUTIVE SUMMARY

This Air Force Engineering Enterprise Strategic Plan is designed to address the demands of a fast-changing warfighting environment by delivering a strategic vision and governance structure for the entire Air Force Engineering Enterprise (EE).

The Air Force Engineering Enterprise is the network of interdependent engineers, scientists, and technical managers; processes; and supporting infrastructure providing U.S. Air Force mission capability by shaping requirements and providing technical leadership for research, development, test, manufacturing, deployment, sustainment, and disposal of Air Force systems and systems-of-systems.*

Since 1947, the Air Force has been a highly technical service, built on a foundation of engineering discipline and expertise, as well as a culture of innovation, competency, and integrity. As the options provided by technology have increased, the world's political climate has become much more complex. When combined with budgetary pressures, this climate demands greater vigilance by the Air Force. The new Air Force engineering vision and mission established in this plan provides a guiding star for the engineering enterprise response to these challenges.

Vision: To be a focused engineering enterprise with a culture of discipline and agility that enables warfighter's success.

Mission: Provide superior technical expertise to plan, acquire, and sustain dominant warfighting capability through an efficient, effective, and innovative engineering enterprise.

At the direction of the Secretary of the Air Force (SecAF), the engineering enterprise has established a strategic governance structure to attain this vision. Through this governance structure, the Air Force engineering senior leadership has identified four priorities for implementation across the enterprise:

Priority 1: Refine engineering enterprise governance, roles and responsibilities, and supporting policy

Priority 2: Enable high-quality engineering decisions and seamless communication

Priority 3: Improve engineering discipline through technical information management and standardization

Priority 4: Address engineering enterprise workforce issues, including core competencies, structure, development, and assignments

The vision, mission, and priorities outlined in this strategic plan, led by the strategic governance structure, provide a framework for what will be a relentless pursuit of engineering efficiency and excellence.

****The EE does not include installation or medical support activities.***

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1.0 STRATEGIC ENVIRONMENT

The capability of the United States to win wars hinges on its ability to sustain its technological edge over emerging, highly adaptable, asymmetric threats and to optimize services for joint operations. It must also possess the ability to authoritatively counter the host of nations pursuing the latest military capability, from roadside explosives to weapons of mass destruction.

This leads to a dramatic increase in system and system-of-systems complexity, creating an increasingly difficult and multifaceted engineering challenge. Additionally, our nation faces real fiscal challenges

that constrain the funding of future warfighting capabilities. Simultaneously, the Air Force is experiencing a loss of technical expertise in key areas as the workforce ages and fiscal realities hinder our ability to effectively recruit and retain engineers and scientists. The Air Force must continue its tradition of a solid and responsive engineering foundation by supporting a professional workforce that employs structured engineering practices with discipline and integrity to find affordable and innovative solutions to warfighting challenges.

“Only through the efforts of Airmen who have led the way in integrating military capabilities across air, space, and cyberspace—even as their numbers have become significantly smaller—has our nation maintained its airpower advantage.”

USAF Posture Statement 2013



2.0 OVERVIEW OF STRATEGIC PLANNING

The Air Force engineering leadership, consisting of the most senior engineering Air Force professionals, has developed an Air Force Engineering Enterprise strategic planning model and established a governance structure to address the challenges of our strategic environment. The strategic planning model defines how leadership will develop strategic direction down to actions and implementation. This includes a description of the required planning documentation as well as the frequency of relook/refresh for all engineering strategic planning activities. The Air Force EE governance structure provides leadership and guidance for the strategic planning process, as well as oversight and accountability of the implementation activities.

2.1 Strategic Planning Model

This strategic plan spans ten years and will be revisited every four years to ensure alignment with Air Force, Department of Defense (DoD), and national strategic objectives. The EE strategic planning model in Figure 1 illustrates the components of its strategic planning efforts.

The EE vision and mission serve as a guiding star

to the enterprise and provide a unified direction for strategic planning. Taking the vision and mission into account, as well as the current state of Air Force engineering, the engineering leadership identified priority areas for improvement that capture the heart of the enterprise's strategic-level focus. These EE priorities and associated goals are documented in this plan.

To implement the priorities, an operational-level EE Roadmap will describe the goals in greater detail and provide a high-level overview of the objectives required to meet those goals. The Roadmap, signed by the Assistant Secretary of the Air Force for Acquisition (SAF/AQ), will span four years and be revisited every two years to ensure alignment with the strategic plan. Priority goals will describe how the EE priorities, mission, and vision will be realized.

Finally, EE action plans will describe the objectives in further detail and provide near-term, actionable tactics for achieving those objectives. The action plans, signed by the Deputy Assistant Secretary of the Air Force for Science, Technology and Engineering (SAF/AQR), will span two years and be revisited annually to ensure alignment with the Roadmap. The detailed tasks defined in each action plan will be the basis for measuring progress towards accomplishing the objectives, goals, priorities, and ultimately the EE vision.



Figure 1 – Air Force Engineering Enterprise Strategic Planning Model

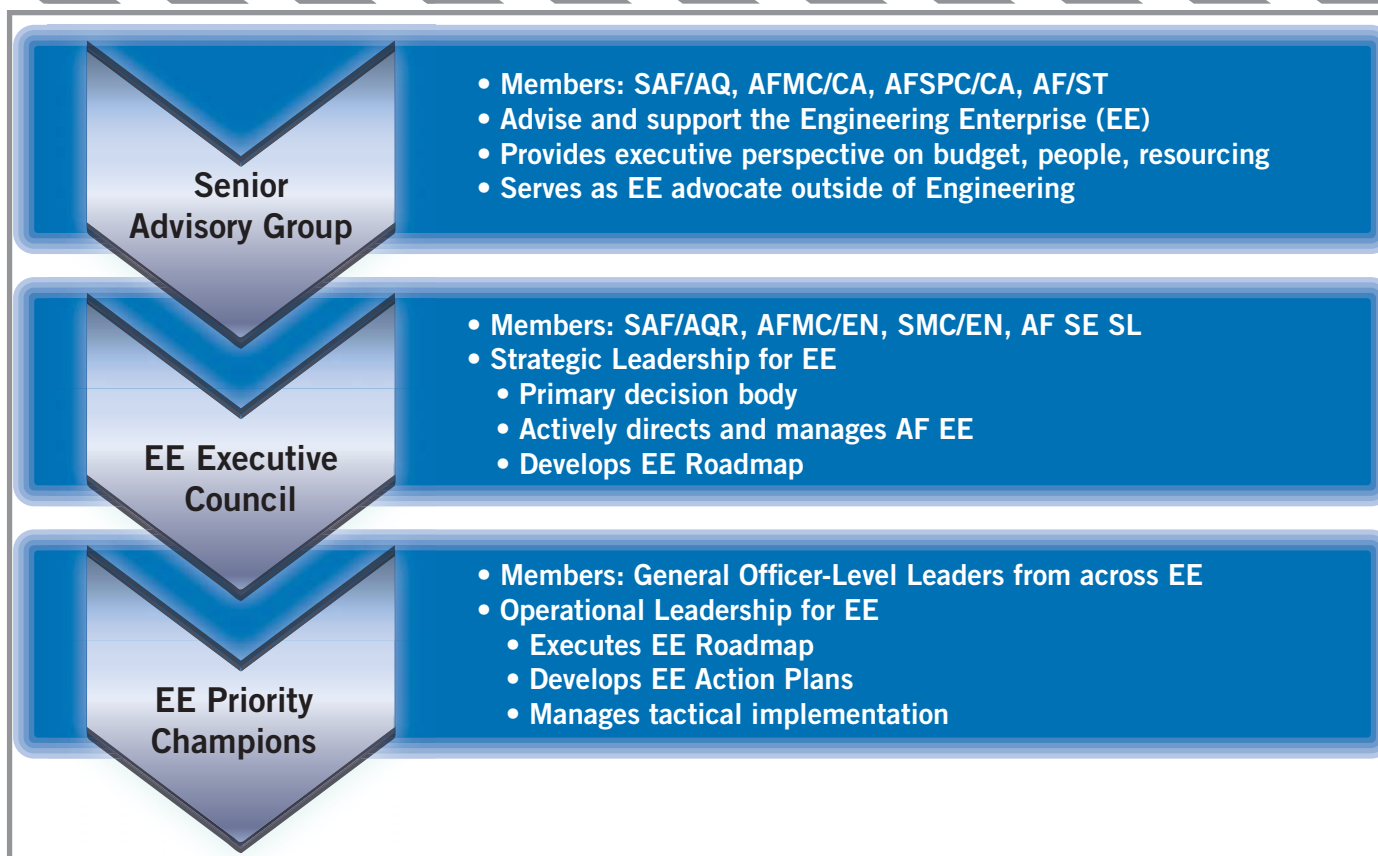


Figure 2 – AF Engineering Enterprise Governance Structure

2.2 Governance Structure

The Air Force EE governance structure provides leadership and guidance for the strategic planning process, as well as oversight of, and accountability for, the implementation activities. It is composed of senior Air Force advisory members and senior engineering leadership members who guide the actions necessary to achieve the priorities. There are three levels in this structure shown in Figure 2: 1) the Senior Advisory Group, 2) the EE Executive Council (EEEC), and 3) the EE Priority Champions.

The Senior Advisory Group, which is chaired by SAF/AQ and includes the Air Force Materiel Command Executive Director (AFMC/CA), the Air Force Space Command Executive Director (AFSPC/CA), and the Air Force Chief Scientist (AF/ST), advises and supports the EEEC. The Senior Advisory Group acts as a deliberative body that guides the Air Force engineering strategic approach and provides executive perspective on budget, people, and resourcing.

The Air Force EEEC, chaired by SAF/AQR, is the primary

EE decision body and is responsible for implementing a comprehensive and actionable strategic planning approach. The EEEC also includes the AFMC Director of Engineering and Technical Management (AFMC/EN) and the Space and Missile System Center Director of Engineering (SMC/EN) as well as the Air Force Systems Engineering Senior Leader (AF SE SL). The EEEC is chartered to establish the EE priorities and develop the EE Roadmap, to include the goals which are necessary to achieve the priorities. It conducts annual reviews to assess the progress, execution, and effectiveness of the action plans.

Each priority is led by a general officer-level Priority Champion, who is responsible for developing goals, establishing goal teams, and working with commanders and supervisors to lead the implementation process. Each Priority Champion develops an action plan, ensuring it contains feasible and executable tactics for achieving its goals. The Priority Champions also ensure the action plans are aligned with the Roadmap and the overall EE strategic plan.

This governance structure provides leadership and guidance for the strategic planning process, as well as oversight and accountability of the implementation activities.

3.0 AIR FORCE ENGINEERING ENTERPRISE STRATEGY

The unifying theme at the foundation of this strategy is that engineering efforts in the Air Force must fully support the effort to plan, build, and sustain effective, affordable systems in support of the joint warfighter. The EE must add value to the Air Force by providing sound technical judgment and expertise from a highly skilled workforce. The implementation of this strategy is crucial to achieving Acquisition Excellence as called out in the Air Force Strategic Plan, October 2008.

The EE encompasses a wide array of expertise, knowledge, tools, processes, standards, practices, facilities, and analytical capabilities. This enterprise impacts the entire range of systems employed by the Air Force, including all of our aircraft, satellites, launch vehicles, command and control systems, cyber systems, weather systems, air defense systems, air traffic control systems, force protection systems, armaments, nuclear weapons, intelligence, surveillance, and reconnaissance systems, as well as the test systems, ancillary systems, IT systems, and the ground and support equipment that accompany them. The facilities and environment in which the Air Force EE operates, and its statutes and regulations, require great depth and breadth of knowledge. This complexity requires personnel with skills in all of

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the technical, engineering, and scientific disciplines to include hardware; software; communications; environment, safety, and occupational health (ESOH); quality; and security.

Through disciplined implementation of the strategic planning model and governance structure defined in this plan, the engineering leadership has developed a new vision, mission, and supporting priorities to provide strategic focus and direction for the diverse engineering enterprise.



3.1 Vision

To be a focused engineering enterprise with a culture of discipline and agility that enables warfighter's success.



3.2 Mission

Provide superior technical expertise to plan, acquire, and sustain dominant warfighting capability through an efficient, effective, and innovative engineering enterprise.

3.3 Priorities

The Air Force EEEEC, with the support of the senior advisory group and the engineering enterprise, has identified these four priorities:

Priority 1: Refine engineering enterprise governance, roles and responsibilities, and supporting policy

Priority 2: Enable high-quality engineering decisions and seamless communication

Priority 3: Improve engineering discipline through technical information management and standardization

Priority 4: Address engineering enterprise workforce issues, including core competencies, structure, development, and assignments

The priorities focus the enterprise on achieving its stated vision. An explanation of each priority with the associated goals is provided in the following sections.

3.3.1 Refine Engineering Enterprise Governance, Roles and Responsibilities, and Supporting Policy

“Innovation is what we’re all about—we always have been.”

*General Mark A. Welsh
Chief of Staff of the Air Force*

The EE must refine its roles and responsibilities, and its approach to executing those responsibilities, in order to operate within the current environment of reduced budgets, reduced manpower, new organizational constructs, and increased Congressional expectation to provide engineering confidence in all weapon system engineering processes.

A crucial first step in effectively handling the challenges posed by this strategic environment is to properly align the EE and reassess the roles and responsibilities of its members to respond to the increasingly complex

issues related to weapons systems in any phase of the lifecycle. In addition, the large number of engineers and scientists supporting air, space, and cyberspace (including research, pre-program planning, lifecycle management, operations, and support) must be equipped to implement the EE activities and enable successful acquisition and sustainment of those weapons systems.

A key element of this priority is to establish and codify the process by which Air Force EE policies are created. Establishing such a process will afford the enterprise’s leadership the opportunity to determine the most efficient and least prescriptive method for implementing direction. It will also provide them the opportunity to comply with higher levels of direction using non-policy approaches. Overall, such a process will eliminate redundant or conflicting policy while reducing the internal workload of managing multiple levels of policy.

Goals:

- **Standardize roles and responsibilities of EE organizations and key positions.** This will include revitalizing the Air Force Technical Authority process



to provide programs with unbiased, analytical overview and support. A functioning Technical Authority increases the value of the engineering perspective, keeps technical programmatics on track, and adds to program success at all levels.

- **Focus and manage the EE portfolio of policy and process.** This will include creating an engineering policy formulation process and policy architecture that efficiently produces succinct, usable policy for the enterprise. Such policy will focus on the value-added insight required for increased program support.

3.3.2 Enable High-Quality Engineering Decisions and Seamless Communication

As the Air Force Chief Engineer, SAF/AQR provides timely and effective engineering insight to Air Force leadership, including the Service Acquisition Executive. While budgets are decreasing, the Air Force faces an increasing number of adversaries who are acquiring or developing the means to challenge it. Therefore, we must devote attention to comparing the benefits of increased operational effectiveness (that is, warfighter utility) with the costs of achieving new capabilities. Early systems engineering can help the Air Force optimize its investments and own the technical baseline to avoid pitfalls of latent cost, schedule, and performance issues. Most importantly,

“Faced with compounding fiscal challenges, we must make prudent choices to ensure the Air Force continues to preserve our nation’s airpower advantage.”

USAF Posture Statement 2013

care needs to be taken to evaluate enterprise solutions holistically, rather than continuing to promote stove-pipe approaches.

It is imperative that the EE infuse technical insight earlier into the requirements process by developing analytical tools capable of providing “trade space” analysis across a system’s lifecycle. The Air Force’s



current suite of analytic tools are narrowly focused and not well suited to large trade-space analysis. Also, these analytical approaches are sometimes deficient in regards to operator-in-the-loop, cyber, command and control, acquisition intelligence, and system-of-system interactions. A systematic approach to analysis will be established that integrates technologies and operations, rather than relying on narrowly-focused performance evaluations that do not sufficiently incorporate operational insights or enterprise optimization.

Additionally, the Air Force Engineering Enterprise needs to improve and expand upon its internal communications. The vast engineering enterprise spans research, development, test and evaluation, operations, and sustainment. However, these individual functions are often isolated from each other, both geographically and analytically. Various forums currently exist to enable cross-communication and information exchange to a limited degree, but they must be optimized. In addition, we must pursue and enforce the use of common tools and data where possible to aid in our collaboration initiatives.

The ability to collaborate across the enterprise will be a catalyst for significant improvements in all engineering processes. Tremendous efficiency is gained when concepts, data, models, alternatives, and technologies are readily exchanged across the engineering enterprise. Therefore, comprehensive enterprise communication is a key not only to innovation, but also to effectiveness in engineering efforts.

Goals:

- **Formalize role of engineering in the decision framework.** This will include developing and



implementing a plan to shape requirements and enhance the corporate decision-making process by providing insightful engineering information throughout the established review process.

- **Develop an analytical framework to support decisions.** This will include executing pilot projects to demonstrate the merits of an enterprise-level analytical framework and data-brokerage capability providing technical insights using the decision framework.

- **Establish a process for effectively communicating across the engineering enterprise.** This will include developing and employing a concept of operations to improve collaboration and exchange of information both horizontally and vertically across the enterprise.

3.3.3 Improve Engineering Discipline through Technical Information Management and Standardization

One of the keys to effective lifecycle management is the ability to make knowledge-driven decisions. The engineering enterprise is particularly dependent on a vast array of technical data and information to perform day-to-day functions and enhance its knowledge base. However, the Air Force currently lacks an enterprise approach for obtaining, maintaining, and using this vital technical information. It must better manage and govern technical data to ensure its engineering enterprise is effectively supporting the delivery of critical warfighting capabilities.

The engineering enterprise workforce must have the capability to access and protect the technical information that will help engineers and scientists execute their program responsibilities. This information can include specifications, best practices, process guides, technical reports and orders,

“We now have the opportunity to create a consistent process with common tools ...so if you move from base to base, or from program to program, you have some consistency in how we operate.”

Dr. David Walker
*Deputy Assistant Secretary of the Air Force for
Science, Technology, and Engineering*

drawings, parts lists, failure/performance data, and much more. Making quality engineering decisions also depends on having immediate access to these various forms of engineering data in a useful format. As Air Force systems become more complex, the tools and ability to search and assimilate these vast amounts of information into actionable decision material must also evolve. Our geographically diverse and dispersed engineering enterprise must also have the means to effectively collaborate. A common set of tools will enhance workforce portability from program to program, provide for consistent access to decision support tools, and better enable more disciplined use of technical information.

Specifications and standards are another essential component of the technical information used to ensure quality in development and sustainment operations. In this post-acquisition reform era, the Air Force must revitalize implementation of, and participation in, the Defense Standardization Program (DSP). The DSP is an important tool for enabling consistent application of best practices, implementation of interface standards, acquisition of parts that meet performance requirements, and creation of efficient engineering activities across the lifecycle. It should be noted that standards managed within the DoD Information Technology Standards Registry have already been mandated and are managed through a joint committee.

Goals:

- **Revitalize and formalize management and use of technical data.** This will include revitalizing and formalizing the management and use of Air Force technical data and information to improve the quality of engineering products and decisions.
- **Develop a management plan for an Air Force portfolio of specifications and standards.** This will include developing an implementation plan consistent with the DSP.
- **Create an Air Force engineering knowledge management capability.** This will include creating a web-enabled knowledge management capability that helps the engineering enterprise workforce to access and deposit information, while also fostering collaboration efforts.

3.3.4 Engineering Enterprise Workforce Issues - Core Competencies, Structure, Development, and Assignment

The Air Force is a technologically-driven service that prides itself on the ability of its engineering enterprise workforce to meet the ever-increasing challenges of the 21st Century. Indeed, a key to the Air Force's success is its technological superiority over any adversary. On the other hand, highly technical companies have their own challenges remaining competitive in their markets. In doing so, they will provide strong competition to the DoD in recruiting and retaining top engineering and scientist talent. Therefore, the Air Force must constantly invest in the development and retention of its EE workforce.

One of the most important issues facing the enterprise is addressing the core technical competencies

"Recruiting and developing high quality, innovative Airmen who leverage technology to rethink military operations to achieve strategic objectives will remain a fundamental tenet of the United States Air Force."

USAF Posture Statement 2013

needed for the workforce of the future. This will be accomplished by establishing a common taxonomy for workforce needs. The taxonomy will help build a common framework at the center, command, and Air Force levels for allocating engineers and scientists and determining future manpower needs. Once the framework is established, and engineers and scientists are aligned to technical disciplines and competencies, the Air Force must ensure the framework is sustained and balanced. To accomplish this, the Scientist and Engineer functional manager, SAF/AQR, will oversee this core competency management framework/process using the Scientist and Engineer Advisory Council (SEAC) as the governing body. The workforce activities of this council will additionally leverage the efforts of groups such as the Science, Technology, Engineering, and Mathematics Advisory Council (STEMAC) and the Air Force Science, Technology, Engineering, and Mathematics (STEM) Workforce Strategic Roadmap (Bright Horizons) to ensure there are no duplication of efforts among them. Tools and processes will be employed to develop, recruit, educate, and train an efficiently balanced workforce of program office, maintenance, supply chain, and support office engineers and scientists. For instance, a staffing deployment process would allow the development of specific career tracks for highly





skilled, experienced individuals as well as providing an agile workforce because engineers and scientists will be allowed to cross over into more than one technical discipline or core technical competency throughout their career. This will allow a more widely experienced and educated workforce to draw on for current and future Air Force needs.

Also, a process will be created to manage the technical careers of the engineering enterprise workforce and to identify resource requirements and sources to support career-broadening moves. An essential element of this process will be to construct an efficient way to connect a manpower need, for example in a program office, with the right technical competency, regardless of geographical location.

Finally, the EE will create a development path for promising individuals that ensures their development as leaders in the career field. The Air Force needs a core set of technical experts and leaders who

can provide the very best technical advice for the acquisition, test, deployment, and sustainment of the world's best air, space, and cyberspace systems.

Goals:

- ***Develop and manage an Air Force EE core competencies taxonomy (to include specialty engineering disciplines).*** This will include developing an Air Force EE competency taxonomy to 1) increase Air Force leadership insight into all engineering enterprise workforce strengths, weaknesses, and gaps; and 2) increase effectiveness of all EE workforce hiring, development, and succession planning efforts, including education, training, mentorship, and experience.

- ***Refine Center staff workforce development responsibilities and define structure for program offices.*** This will include standardizing workforce development core mission areas across AF Major Commands and Centers, standardizing critical position duty titles, and determining program-office manpower requirements based on the unique complexity and workload drivers for each program office.

- ***Focus workforce development and assignments to provide a highly qualified and capable workforce.*** This will include preserving Air Force core technical competencies by performing competency gap assessments and managing critical skill development, career assignments, education, training, and succession planning for engineers and scientists.



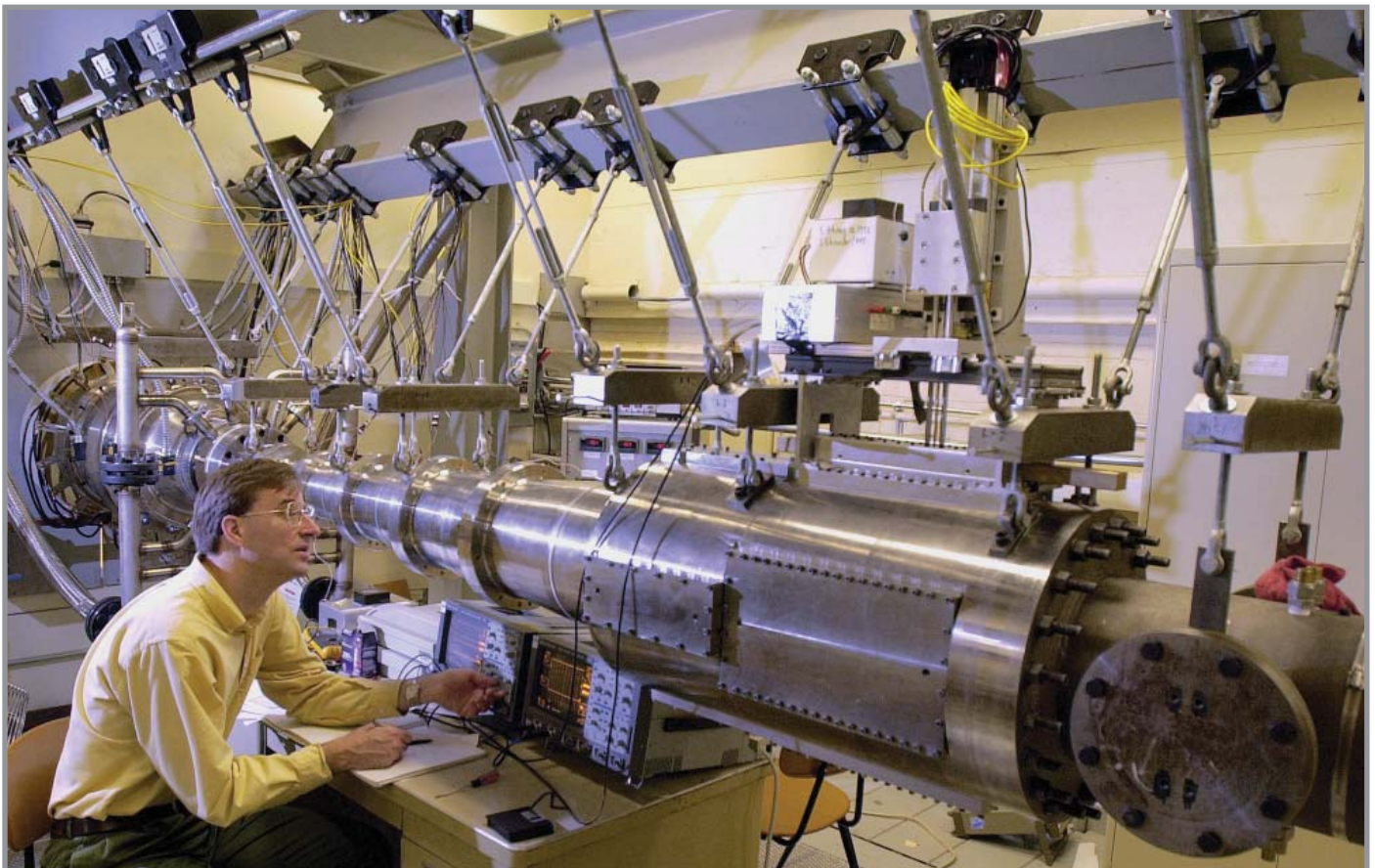
4.0 Way Ahead

The Air Force Engineering Enterprise is comprised of a tremendous team of professionals providing a solid foundation of integrity, discipline, and innovation. With a shared motivation to increase its ability to provide technical advice and information at critical points in the lifecycle of weapon systems, the EE will help ensure the Air Force remains the best in the world.

This strategic plan charts the way forward for the enterprise to reach its desired end state of establishing a governance structure with clearly defined roles and responsibilities supportive of the acquisition process and anchored by integrated and executable policy; providing sound technical judgment to program managers and expert technical advice to decision

makers; delivering standardized engineering tools, processes, and technical information management practices to create consistency across all engineering functions throughout the lifecycle; and fostering a highly qualified and capable engineering workforce of technical experts and leaders supported by a process that matures the very best into decision makers of the future.

The vision, mission, priorities, and goals outlined in this plan provide a framework for what will be a relentless pursuit of engineering efficiency and excellence. The next step in this journey is to develop and implement the Roadmap and action plans which will guide Air Force engineers and scientists to achieve the vision of the engineering enterprise.







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