APPLICATION OF ENGINEERING METHODS

Graduating cadets will recognize the engineering and technical challenges of the Air Force mission and the physical capabilities and limits within their assigned career fields and weapon systems. These officers need to not only be "operators," but to become problem solvers that use engineering principles to devise enhanced capabilities essential to achieving and maintaining Air Force dominance in air, space, and cyberspace. Proficiencies are organized into two broad categories:

- Fundamental Domain Knowledge (i.e., knowledge of basic engineering principles across a variety of physical domains relevant to Air Force missions in air, space, and cyberspace, and the infrastructure within which they operate).
- Problem-Solving Process (i.e., using a top-down, systematic problem-solving method, shown via italicized steps, to address the kind of ill-defined problems they will encounter across domains in their USAF careers).

USAFA GRADUATES WILL BE ABLE TO:

Fundamental Domain Knowledge

Proficiency 1: Describe and apply the principles governing the performance and capabilities of aerospace vehicles and cyber systems, and their possible effects.

Proficiency 2: Describe and apply principles governing the performance, capabilities, and defense of USAF's critical communication, sensing, control, and physical infrastructure.

Problem-Solving Process

Proficiency 3: Formulate a *problem definition* from an incongruous set of requirements and constraints.

Proficiency 4: Create a viable *design* using robust and accepted engineering principles that considers the entire product life cycle including CONOPS, operations, sustainment, and disposal.

Proficiency 5: Apply *decision-making* skills in time-critical situations to help lead to problem resolution and objectively determine a design solution from a set of design solutions which best meets a given set of requirements. (Includes Air Force CELO A2.7.2.1.1 listed under sub-competency A2.7.2: Decision Making).

Proficiency 6: Develop physical and/or virtual *prototypes* using engineering tools which are tested to evaluate candidate designs, then apply the results back into the design process to develop improved design solutions, inform the decision making process, and improve the final product.

Proficiency 7: *Evaluate* test results and determine if a solution meets given requirements and draw conclusions.

Proficiency 8: After solving a problem, cadets will *reflect* to comprehend systematic problem solving processes and the relationship to continuous process improvement. (Includes Air Force CELO A2.7.2.1.2 listed under sub-competency A2.7.2: Decision Making).