

## Competency-based Definition of Work and Performance for Command and Control

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## **Abstract**

The Air and Space Operations Center (AOC) is the operational Command and Control center in which the Commander, Air Force Forces (COMAFFOR) has centralized the functions of planning, direction, and control over assigned and attached Air Force resources. If the COMAFFOR is also designated as the Joint Force Air Component Commander (JFACC), these functions will be performed for all aerospace resources from the Air Force and other Services and nations made available for planning and tasking within the guidance provided by the Joint Force Commander.

The core manning of an AOC consists of approximately 252 personnel from over 30 Air Force enlisted and officer career fields. The majority of these personnel do not receive training on their duties and systems within the AOC prior to their assignment. They are expected to meld career field knowledge and skills, professional military education, and AOC unique training to perform their part of the planning, direction and control of Air Force resources. The Air Force has recently declared the AOC a weapon system with the attendant focus on training and certifying AOC operators.

The Air Force Research Laboratory, Warfighter Training Research Division, under the sponsorship of ACC/DOY and AC2ISRC/DOT have begun an effort to define AOC training and rehearsal requirements using an approach based on Mission Essential Competencies (MEC). This effort provides the most complex attempt to date to apply the MEC process across multiple teams and individuals. This paper will discuss the application of the process to two AOC divisions, Combat Plans and Combat Operations, and provide an interim report on the results and lessons learned.

### **Air and Space Operations Center**

The AOC is the senior element of the Theater Air Control System (TACS). It provides operational level command and control of air and space forces as the focal point for planning, directing, and assessing air and space operations. Although the Air Force provides the core manpower capability for the AOC, other service component commands contributing air and space forces provide personnel in accordance with the magnitude of their force contribution. During any contingency, the Air Force builds the AOC using three primary Unit Type Codes (UTC) and other capabilities incorporated in various enabling UTCs. The discussions in this paper will focus on the core 7FVX1 UTC.

An AOC is typically organized into five divisions and multiple specialty teams. The divisions include Strategy; Combat Plans; Combat Operations; Intelligence, Surveillance, and Reconnaissance; and Mobility. Specialty Teams include Communications, Information Warfare, Space Operations, Special Operations, and Judge Advocate. Core manning, as provided in the 7FVX1 UTC, is the responsibility of a Numbered Air Force with an Air Operations Group (AOG) assigned. Based on the requirements of the particular contingency, the Numbered Air Force commander will direct the formation of an AOC using the organic AOG augmented by various augmentation UTCs and enabling UTCs.

The 7FVX1 UTC is designed to provide the personnel and equipment for initial response, defined as supporting up to two weeks of full spectrum, 24/7 AOC capability. When deployed, this UTC will be augmented with the mobility component from the Air Mobility Command and other enabling UTCs. The officer contingent of the UTC is currently made up of 37 pilots, 22 navigators, 10 air battle managers, 7 space operators, 2 airfield operators, 34 intelligence officers, 1 weather officer, 2 operations support officers, 2 logisticians, 10 communications/computer officers, 1 PSYOPs officer, 1 judge advocate, 1 operations assessor, 1 electrical engineer, and 1 special investigator. The enlisted contingent is made up of journeymen and craftsmen from a variety of career fields including 2 air traffic control, 2 command post, 11 aircraft control and warning, 45 intelligence, 9 ground radio and electronic communications, 1 munitions, 7 information management, 21 communications-computer systems, 2 audio/visual, and 1 security forces. None of these personnel are trained in AOC operations in their basic career field training.

AOC operators need to be mission ready in their specialty areas and are expected to use their knowledge and experience to provide subject matter expertise to the planning and operations functions. Additionally, since the AOC is the interface between the operational art of war and tactical execution, operators are expected to be versed in professional knowledge gained from professional military education and reading. Joint and aerospace doctrines are also required knowledge areas for AOC operators.

Finally, the AN/USQ-163-1 Falconer system, the formal designation of the AOC weapon system, consists of over 40 systems and applications which are used by the various operators. Training on these systems, and some of the required knowledge, is currently provided by the Command and Control Warrior School (C2WS) at Hurlburt AFB FL. The C2WS courses are being transitioned into a Formal Training Unit (FTU) course, which will be the standard preliminary requirement for all personnel assigned to an AOC position. The FTU is designed to certify AOC operators for initial qualification status and represents the first step in developing a robust AOC operational training pipeline.

One of the greatest challenges for consistent, effective and efficient AOC operations has been the frequent influx and outflow of personnel. By the time AOC operators get comfortable working in the AOC, they are returning home and handing their job off to others, who are often as ill-prepared for the jobs as they were when they started months earlier. Formal training, now made possible by the weapon system designation, will be an essential element in reducing the transitional slow-downs inevitable when personnel enter and exit the AOC arena. The challenge is to develop training that can be targeted at an individual's specific training needs, and provide that training in a manner which will raise the proficiency level of the individual rapidly. In this way, AOC personnel can contribute effectively to the mission more quickly during their compressed assignment cycle.

### **Mission Essential Competencies for the AOC**

In developing an approach to AOC training we considered a highly successful effort, in which we are involved, focusing on aircrew training. Air Combat Command (ACC) wanted to take a competency-based approach to training needs analysis to help optimize

the Ready Aircrew Program (RAP) through the use of advanced simulation. Combat mission readiness has traditionally been defined in RAP in terms of the number of hours and training missions individual pilots have completed. However, recently ACC/DRAT realized it needed to operationalize readiness in terms of the performance required of aircrews under combat conditions, and in specific mission contexts. With the current emphasis, ACC conceived the Mission Essential Competencies (MECs) as context-specific, maximal performance standards. AFRL/HEA, cooperatively with their commercial partners, the Group for Organizational Effectiveness and ACC/DRAT, developed the MEC methodology and defined the associated outcomes for understanding performance requirements for aircrew operations.

MECs are a collection of statements written at different levels of abstraction. At the highest level are the MECs proper – such as the statement from the air-to-air (F-15) MECs: *“Intercepts and targets factor groups.”* Statements indicating a starting point, purpose, and end point clarify and define the original statement. The Starting Point occurs when intercepting and targeting starts at the commit. Geometry and contact ranges may cause the two parts of this phase to blend together. Very short commits may not have an intercept portion and flights may have to go directly to targeting. As with detection, targeting may be a repetitive action if multiple entities and waves are involved. The Purpose is to arrive with a positional advantage, a position to employ ordnance, and to deconflict shots. The End Point is when engagement criteria are met in terms of weapons parameters, ROE, and target identification.

At the next level are Supporting Competencies. These are both more general than the MECs proper, and reflect areas of competence needed in carrying out the MECs. For example, SCs identified as important for air-to-air include

- Adaptability: adapts to changes in the mission environment (e.g., adjusts timeline and/or gameplan, reacts to threat maneuvers and tactics, and adapts to other changes in the environment)
- Communication: clear, concise, and correct transfer of information

The most specific level of granularity can be found within knowledge and skills. Knowledge is defined as *information or facts that can be accessed quickly under stress*. For our purposes, a skill is defined as *a compiled sequence of actions that can be carried out free of error under stress*. Examples of knowledge and skills for air-to-air include

- ROE: knows rules theatre Rules of Engagement, areas of non-combatants and political situation
- Anticipates problems: predicts what will happen based on all relevant data and anticipates problems before they occur.

The MEC process is a unique work analysis in that it links the knowledge and skills required to do a job, and the application of those knowledge and skills to perform duties within the realistic context of a work environment. In short, MECs fill the gap between knowledge and skills and actual job experience.

This paper describes the extension of the MEC concept from aircrew tactical employment to the operational art of command and control and discusses the methodology used to define MECs for AOC operators.

One of the first challenges to defining MECs for AOC operations is that of scope. The sheer variety of AFSCs and operator backgrounds presented a problem in parceling the AOC into manageable pieces suitable for defining meaningful MECs. Our approach, which involves an applied research and development focus, ensures that useable data and proof-of-concept methods are provided as quickly as possible. Our work to date has been conducted through separate workshops to accommodate the unique divisions within the AOC.

MEC workshops are coordinated with sponsorship from ACC/DOY and AFC2ISRC/DO. The workshops include participants who are SMEs, as identified by the operational community. Interim results and more specific details for the first two divisions, Combat Operations and Combat Plans Divisions are outlined in the following sections. Please note that the information provided below is preliminary only.

### **Mission Essential Competencies for the Combat Plans Division**

Two MEC workshops have been conducted for the Combat Plans Division of the AOC. This section of the presentation describes the process and outcomes of these two workshops. Because the MEC development process for this Division is not completed, **the information below is preliminary and should not be considered other than a draft.** Although our experience is that the draft products obtained by the end of the second workshop are fairly stable, they are still subject to change; in addition, the MEC process necessarily takes a slightly different form in the AOC than in previous, aircraft, platforms. The nature and reasons for this difference will be discussed later.

**First workshop process and outcomes.** Like all MEC workshops, the first workshop was a facilitated, SME-centered session. SMEs attended who were very familiar with the work processes, manning, and products of the AOC Plans division. The workshop proceeded, after introductions and description of objectives, by eliciting from the SMEs a) the structure, makeup, and outcomes of the teams in Plans, b) the knowledge and skills required for each of the major positions identified. Also identified was an initial list of supporting competencies.

The SME input was then collated and edited. This yielded a draft of the knowledge and skills and the supporting competencies. Also, the draft MECs were generated, via the same process of induction used for previous MEC initiatives. For the AOC, then, the first workshop proceeded in much the same way as first MEC workshops for aircraft platforms such as F15, AWACS, and Joint Stars.

**Second workshop process and outcomes.** The second workshop was attended by some of the SMEs as in the first workshop, augmented by SMEs who had not attended the first workshop (this is typical for the MEC process). In this workshop, the draft MECs,

supporting competencies, and knowledge and skills were presented to the SMEs for critiquing, editing, and revision. As is typical, the wording of the MECs changed somewhat at this stage. The draft supporting competencies were also revised. The knowledge and skills were revised, and mapped onto relevant positions in the Plans Division. These results, which, as mentioned, are only preliminary, are presented below.

### **Mission Essential Competencies for AOC Combat Plans Division (DRAFT)**

**Interpret Commander's Guidance and Intent:** Translate Commander's guidance and intent into operational plans, using effects-based analysis and incorporating an understanding of capabilities, limitations, mission purposes, and risks.

**Gather, Process, and Analyze Information:** Collect information from planning documents (e.g., JFC Guidance, OPLAN, JAOP, AOD, ROE, SPINS, ACP, ADP), operational units (e.g. sortie availability), other AOC divisions/teams; process information by evaluating reliability, currency, and relevance; sort and prioritize information to prepare for analysis; and analyze information. Identify information shortfalls and request additional information from appropriate sources. Share information with appropriate planners.

**Identify and Nominate Targets:** Refine the draft Joint Integrated Prioritized Target List which includes inputs from participating components and detailed targeting data (e.g., DMPIs). If required, set cut line on JIPTL to reflect current capabilities. Obtain approval from JFC or designated representative.

**Develop Air Attack Plan:** Allocate available kinetic and non-kinetic weapons to targets using JIPTL, apportionment guidance, information on weapons and weapon systems capabilities and limitations, and information on component unit current capabilities and constraints, and current information on weather and intelligence. Include C2, ISR, and other support assets.

**Establish and Maintain Command and Control:** Establish and maintain command and control by establishing communication and airspace/air defense control requirements and procedures through coordination with appropriate agencies.

**Produce and Distribute Products:** Assemble products (e.g., ATO, ACO, SPINS, RSTA Annex, TACOPDAT, OPTASK LINK) by compiling input from planning teams and according to appropriate formats; distribute products using most efficient means available.

It can be seen that these competency statements meet the original definition of MECs: "A Mission Essential Competency (MEC) is a higher-order individual, team, and inter-team competency that a fully prepared pilot, crew or flight requires for successful mission completion under adverse conditions and in a non-permissive environment." The one emendation would be to add the word "team" to "pilot, crew or flight."

Of further interest is the fact that there are two MECs (“Interpret Commander’s Guidance and Intent,” and “Gather, Process, and Analyze Information”) that overarch the teams of the AOC Combat Plans division. The other four MECs map onto particular teams (“Identify and Nominate Targets” – GAT, “Develop Air Attack Plan” – MAAP, “Establish and Maintain Command and Control” – C2, “Produce and Distribute Products” – ATO Production) while the competencies they discuss are not limited to any one team. Indeed there are specialty area positions that do not fall exactly within the purview of any one team, yet reflect these competencies constellated in various ways.

A sample of the supporting competencies (there are 12 in all) for the Combat Plans Division include:

**Collaboration/Coordination:** Ability to actively share and transfer information between all appropriate parties to enhance and support mission planning and execution

**Interpersonal Communication:** Ability to communicate in clear, concise, and timely manner

**Negotiation:** Ability to identify and balance needs and requirements of various parties and obtains consensus on solution.

**Quality Control:** Ability to assess accuracy, completeness, and timeliness of various processes and products

**Projection:** Ability to conceptualize future actions and events based on relevant factors.

As can be seen from this sample, SMEs identified as important for Plans competencies that support teamwork and production.

Finally, this first second workshop permitted the SMEs to a) revise the wording of the knowledge and skills (including deleting whole statements, or adding new ones), and b) indicate, for each major position in the Plans division, the level of knowledge or skill required for effective performance (not applicable, basic, intermediate, advanced).

The following table shows an example of the outcome of this process:

### Sample Knowledge and Skills for AOC Combat Plans Division (DRAFT)

	CCP	GAT				MAAP				ATO Production				C2 Planning					
Knowledge or Skill	CCP	Chief	Planner	IW	ISR Element	Chief	Planner	IW Planner	ISR Planner	Chief	SPINS Officer	NCOIC	Tech	Chief	Air Defense Planner	C2 Architecture Planner/Air Support Planner	Airspace Planner	Air Support Planner	Comm/Freq Planner
Able to convert targets and threat situation to plan of action	I	A	A	A	A	A	A	A	A	B	B	B	_	B	B	_	_	_	_
Understands the offensive and defensive capabilities, limitations, and effects of weapons systems	I	I	I	A	A	A	A	A	A	B	_	B	_	B	A	B	B	B	B
Understands package development process & procedures	I	B	B	B	B	A	A	A	A	B	_	_	_	_	_	_	_	_	_
Knows and understands current guidance (e.g., ROE, SPINS).	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Able to lead team (e.g., communication, delegation, performance monitoring)	A	A	_	_	_	A	_	_	_	A	_	A	_	A	A*	A*	A*	A*	A*
Able to ensure quality of MAAP	A	_	_	_	_	A	I	I	I	_	_	_	_	_	_	_	_	_	_
Able to DEVELOP BRIEFING AND brief effectively (ops)	A	A	I	A	A	A	I	A	A	I	_	_	_	A	A*	A*	A*	A*	A*
Understands combat PLANS processes, functions	A	A	I	I	I	A	I	I	I	A	I	I	B	A	A*	A*	A*	A*	A*

Key: What level of knowledge or skill is required for effective performance of the job?

B=Basic

I=Intermediate

A=Advanced

\_ =Not Applicable

As can be seen, the SMEs were able to identify, for major positions, the level of knowledge or skill required for effective job performance. This kind of scaling will facilitate training needs analyses that indicate training gaps.

Finally, it should be noted that at time of writing, the work required by the second workshop for Plans was not fully complete. Specifically, the knowledge and skills need further SME refinement, as does a list of developmental experiences that the SMEs were able to generate.

The next step, after completion of all second workshop products, will be to develop training needs analysis questionnaires for distribution to a wide AOC MEC audience.

## **Mission Essential Competencies for the Combat Operations Division**

### **Interim Results**

Two MEC workshops have been conducted with the Combat Operations Division of the AOC. The structure of these meetings and associated outcomes were similar to that of Combat Plans (see First workshop process and outcomes and Second workshop process and outcomes above). One notable difference was the increased time necessary to map knowledge and skills to specific positions for Combat Operations due to the larger number of teams and positions within teams. All other aspects of the MEC process conducted thus far have generalized very well between AOC divisions. Below you will find an edited draft version of MECs, supporting competencies, and knowledge and skills for Combat Operations. Again, **the results below are preliminary and should not be considered as anything other than a draft.**

### **Mission Essential Competencies for AOC Combat Operations Division (DRAFT)**

**Monitor the Battlespace:** Maintain situational awareness of the battle plans and associated documents, TACS system, logistics, communications, weather, base/wing status, and friendly/adversary air, space, ground and naval force status and activity.

**Monitor Battle Plan Execution:** Confirm taskings are carried out and that the JFACC objectives, in support of JFC's intent, are achieved. Ensure that tasked aircraft are packaged appropriately for maximum mission effectiveness and force protection.

**Assess and Integrate Information:** Constantly assess and integrate information to identify potential ramifications to current operations.

**Dynamic Execution:** Based on the ramifications of current information, make decisions regarding changes in plans, taskings, and execution. Work closely with units and component and allied liaisons for a coordinated application of capabilities and assets.

**Disseminate, Communicate, Publish Changes:** Make formal changes to the appropriate battle plans, associated documents, and execution and use the proper communication channels to disseminate those changes to internal and external elements in a timely manner.

**Execution Feedback:** Provide information for execution management, operational assessment, and to improve planning process.

The MECs for Combat Operations also meet the original definition of MECs in that they are each a "higher-order individual, team, and inter-team competency that a fully prepared pilot, crew or flight requires for successful mission completion under adverse conditions and in a non-permissive environment." While the MECs for Combat Plans contained two overarching MECs with the other four MECs mapping onto particular teams within Plans, this was not the case for Ops. For Combat Operations, all seven MECs appear to be higher level and to apply across the teams (offensive, defensive, integrated ISR, and specialty/support). This is not to say that each MEC applies equally across teams or positions, only that in a generally sense these MECs apply across teams. One particular challenge in deriving MECs for Combat Operations was trying to capture higher order skills needed for a dynamic and circular process and to report them in a linear fashion. You'll note that the SMEs required the use of language such as "constantly" as a way to emphasize this dynamic and circular process.

A sample of DRAFT supporting competencies (there are 12 in all) for the Combat Operations Division include:

**Decisiveness:** Ability and willingness to make timely decisions based on available information.

**Adaptability:** Identify and adjust to changes in the environment.

**Multi-tasking:** Ability to effectively perform multiple responsibilities simultaneously.

**Interpersonal Communication:** Ability to communicate in clear, concise, and timely manner.

**Situational Awareness:** Ability to assimilate information to develop and maintain a perception of current operations scaled to individual responsibilities.

The SMEs representing Combat Operations identified competencies emphasizing the need for maintenance and awareness of a dynamic, fast-paced, and changing environment and the need to be able to function well within that environment.

## Sample Knowledge and Skills for AOC Combat Operations Division (DRAFT)

	CCO	Offensive Operations					Defensive Operations						Integrated ISR					Speciality and Support									
Knowledge or Skill	CCO	SODO	SODO Tech	ODO (several)	TST Chief	ATO Change Tech	SADO	DDO	SADO Tech	TMDO	TMDT	ICO/ ICT/ TDC	SIDO	Analyst	TST Analyst	Collecti on/ISR Manag er	Target eer	Comba t Report s	Wx	IW Team	ato	Space	IM	C4I Systems	JAG	CSAR	
Understands combat operations processes, functions	A	A	I	I	A	B	A	I	I	I	I	I	A	B	B	A	B	B	B	A	A	A	B	I	I	I	
Understands the operational kill chain (find, fix, track, target, engage, & assess)	A	A	B	B	A	_	A	I	B	_	_	B	A	A	A	A	A	_	B	A	_	A	_	_	A	A	
Understands how to monitor the battlespace (INDIVIDUAL POSITION)	A	A	I	I	A	B	A	I	I	A	A	A	A	A	A	A	A	B	I	A	I	A	_	I	I	A	
Understands how to adjust to battlespace dynamics	A	A	I	I	A	B	A	I	I	A	A	A	A	A	A	A	A	B	I	A	I	A	_	I	I	A	
Understands ATO change process and procedures	A	A	I	A	A	A	A	A	I	_	_	B	A	B	B	I	I	B	B	A	I	A	_	B	B	A	
Understands how offensive operations puts acceptable ordnance on the target in a timely, effective, and efficient manner	A	A	I	A	A	B	A	I	B	_	_	B	A	B	B	B	A	B	B	A	B	B	_	_	I	B	
Understands C2 authorities and the decision making process	A	A	B	B	A	_	A	A	B	A	A	B	A	_	_	I	_	_	_	A	_	A	_	_	I	B	
Understands how to coordinate with TACS units	A	A	B	I	A	_	A	A	A	B	B	I	I	I	B	B	_	B	B	B	B	B	_	_	B	A	
Understands the data link architecture	I	I	_	_	I	_	A	I	I	A	A	A	A	B	B	A	_	B	_	I	B	A	_	I	_	B	

**Key: What level of knowledge or skill is required for effective performance of the job?**

**B=Basic**

**I=Intermediate**

**A=Advanced**

**\_ =Not Applicable**

Experts were also able to identify the appropriate level of Knowledge and Skills for Combat Operations. In addition, they were able to effectively map these KSs to individual positions. Note that not every position requires every knowledge and skill.

### **Implications**

Before trying to generalize the MEC methodology to the AOC domain, we had several questions as to how scalable the process is. In other words, can the MEC process be scaled up to a large, multi-division organizational entity like the AOC? Overall, our preliminary findings do suggest that the MEC methodology continues to generalize across settings.

#### *Questions and Preliminary Answers:*

- Will the process take the same amount of time?
  - No. The process takes somewhat longer. In addition, there may also be differences regarding time intensiveness between the different divisions within the AOC.
- Will the general process structure hold up?
  - Yes. The general process structure has help up very well so far.
- Will the number of MECs be roughly the same?
  - Yes. The number of MECs are same where a division within the AOC = a platform like AWACS.
- Will it be possible to map knowledge and skills onto a larger number of positions?
  - Yes. SMEs have had little trouble mapping the knowledge and skills to a larger number of positions. There may be a need, however, to further discriminate the level of knowledge or skills needed for a particular position.
- Will the survey process work in a similar manner?
  - Too early to say.