TRAC-TD-05-012
June 2005

# Joint Capabilities Integration and Development System (JCIDS) Analysis

*Code of Best Practice (COBP)*


**TRADOC Analysis Center**

**255 Sedgwick Avenue**

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## *Code of Best Practice (COBP)*


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This document addresses the conduct of JCIDS analysis. The COBP begins with background on JCIDS and the development of this COBP. It then covers basic definitions and conventions used throughout the document before illustrating the general process and methodology that serve as the structure for performing JCIDS analysis.

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# Content

**CJCSM 3170.01B, *Operation of the Joint Capabilities Integration and Development System* (JCIDS), lays out required analyses for identifying the shortfalls that the Joint Force (and Army) has in achieving the desired effects to attain military objectives described in future concepts.**

**This document addresses the conduct of JCIDS analysis. The COBP begins with background on JCIDS and the development of this COBP. It then covers basic definitions and conventions used throughout the document before illustrating the general process and methodology that serve as the structure for performing JCIDS analysis.**

**In the conduct of JCIDS, there are certain guiding principals, or tenets, that, when adhered to, facilitate completion of structured, defensible analyses. The COBP addresses these tenets and then follows with some considerations for employing subject matter experts (SME) and for using surveys in obtaining SME input.**

**After describing the framework established by the preceding topics, the COBP addresses, in more detail, the procedures to follow for conducting three of the four major analyses that make up JCIDS analysis: Functional Area Analysis (FAA); Functional Needs Analysis (FNA); and Functional Solution Analysis (FSA). The COBP does not address the fourth component of JCIDS, the Post-Independent Analysis (PIA).**

**The COBP concludes with a summary that re-emphasizes the major guidelines of the COBP.**

# Purpose

**To provide guidelines and techniques, in the form of a code of best practice (COBP), for use in the conduct of JCIDS analysis.**

## References

- **DODD 5000.1, *The Defense Acquisition System*, May 2003.**
- **DODI 5000.2, *Operation of the Defense Acquisition System*, May 2003.**
- **CJCSM 3170.01 B, *Operation of the Joint Capabilities Integration and Development System*, May 2005.**
- **CJCSI 3170.01 E, *Joint Capabilities Integration and Development System*, May 2005.**
- **TRADOC Regulation 71-20, *Capabilities Integration and Development System*, (Coordinating Draft), 29 October 2004.**
- **TRADOC Pamphlet 71-20, *Operation of the Capabilities Integration and Development System*, (Coordinating Draft), 29 October 2004.**

**TRADOC personnel who have led or conducted JCIDS analysis provided practical input for the COBP.**

# Purpose

**The purpose of this COBP is to provide guidelines for conducting JCIDS analysis. The guidelines describe things that must be done, things that should be done, and things that must not be done when conducting JCIDS analysis. The intended audience for the COBP is TRADOC personnel who conduct JCIDS analysis and who are new-to, or re-visiting, the component analyses prescribed in the JCIDS process.**

**Much of the source material for developing this COBP came from the documents listed above. Those sources provided the framework for the COBP. Note that some of the listed sources are in draft form (as of the writing of this document). Be sure to review the most current version of each to identify any new requirements that must be incorporated in the analyses that the documents require.**

**The real meat of this COBP, however, comes from input provided by TRADOC personnel who have conducted JCIDS analyses. Their execution of JCIDS analysis led to a wealth of lessons learned that have been incorporated into this COBP.**

# Background

- **Joint staff published 3170.01, *Operation of the Joint Capabilities Integration and Development System* (JCIDS), in Jun 2003 (republished 12 Mar 2004 and, again, 11 May 2005).**
- **JCIDS prescribes analyses that must be conducted, but does not prescribe how analyses should be conducted.**
- **TRAC conducted Functional Area Analysis (FAA) and Functional Needs Analysis (FNA) and developed a "Gap Analysis COBP"* in September 2004 that covered the FAA and FNA.**
- **TRAC has since led the third component of JCIDS analysis, the Functional Solution Analysis (FSA).**
- **TRAC incorporated lessons learned from recent JCIDS analyses into this COBP, which addresses the FAA, FNA, and FSA.**

* **The term, "gap analysis" implied completion of the FAA and FNA.**

# Background

**With the Joint Staff's publication of CJCSM 3170.01 and CJCSI 3170.01C in June 2003, JCIDS replaced the Requirements Generation System (RGS). RGS used a mission needs approach to identify the warfighter's operational requirements. JCIDS is based on a joint concepts-centric capabilities identification process that focuses on the Joint Force. Given this joint concepts-centric capabilities identification process, the JCIDS analysis process identifies gaps (and overlaps) in the joint fight by looking across all services' capabilities.**

**The Joint Staff published new versions of the two documents in March 2004 and again in May 2005. In each of the published versions, the Joint Staff lays out the analyses and the component steps that must be performed, but they don't describe how to conduct the analysis.**

**TRAC has been involved in JCIDS analysis from the outset, starting with analysis performed for the Joint Common Missile Program. TRAC led FAAs and FNAs beginning in 2003 that ranged in focus from small unit capabilities to theater air and missile defense capabilities.**

**Using the lessons learned from the efforts it led since the initial publication of JCIDS, supplemented with lessons learned by other services and agencies, TRAC developed a COBP for the conduct of "gap analysis," which provided guidelines and techniques for the FAA and FNA components of JCIDS.**

**Subsequent to its publication of the "Gap Analysis COBP," TRAC led the third JCIDS analysis component, the FSA, for the "Small Unit JCIDS Analysis," and provided analytic oversight for the "Joint, Interagency, Multinational Air and Missile Defense (JAMA) JCIDS Analysis."**

**Incorporating the additional lessons learned from having led the "Small Unit JCIDS" FSA, guiding the JAMA FSA, and other services' efforts it had knowledge of, TRAC developed this COBP.**

**Note: "Gap analysis" is a term that was defined only in the TRAC-developed "Gap Analysis COBP." In that COBP, "gap analysis" consisted of the FAA and FNA, that is, the two analyses that, when completed, resulted in the identification of gaps.**

# COBP Definitions

- **Professional Military Judgment (PMJ)[1]. Qualitative assessments made by those persons who have warfighting or operational knowledge and experience.**
- **Subject Matter Expert (SME)[1]. A professional, a specialist in a specific subject important to the area under consideration.**
- **Capability[2]. The ability to achieve a desired effect through performing tasks under specified conditions to a specified standard.**
- **Required Capability[2]. A capability that must be achieved to attain objectives described in concepts.**
- **Current/Programmed Capability[2]. An existing, programmed, or planned DOTMLPF approach designed to achieve a specific capability.**
- **Capability Gap[2]. The inability of current/programmed capabilities to achieve a required capability.**

**1 – Definition adapted from TRADOC PAM 11 – 8**
**2 – Definition adapted or derived from CJCSM 3170.01B for analysis use.**

# COBP Definitions

**CJCSM 3170.01B provides definitions for terms commonly used in JCIDS analysis. Many of these terms, however, can lead to confusion for those conducting JCIDS analysis. The chart above has terms, with their definitions, that are incorporated in this COBP. The first two, adapted from TRADOC Pam 11-8, are readily understood and in wide use for many types of analyses, not just JCIDS analyses. The comments below provide amplification of the definitions that appear above for the last four terms on the chart above.**

**The definition of the term, "capability," is slightly modified from what appears in CJCSM 3170.01B. Keep in mind that a capability is not a "thing." For example, the M1 tank is not a capability. It cannot achieve a desired effect without its crew, mechanics to keep it running, etc. It does, however enable a capability (as do the crew and ammunition). With its crew operating it and with ammunition, the M1 facilitates achieving a desired effect, e.g., destruction of Threat armor.**

**The definitions for "required capability," "current/programmed capability," and "capability gap," were developed for this COBP based on the context in which CJCSM 3170.01B uses the terms. Further discussion of these terms appears below.**

**"Required capability:" At the beginning of JCIDS analysis, the JCIDS team conducting the analysis may not be able to readily identify if a task derived from a concept can be performed to standard under a given set of conditions, thus achieving the desired effect. A "required capability" is an FAA output and consists of a task that must be performed to standard under a given set of conditions to achieve a desired effect. Whether the task can actually be performed or not is immaterial in the use of the term, "required capability."**

**"Current/programmed capability." The Army (and the Joint Force) has taken steps to develop and field DOTMLPF solutions. The solutions that have already made it to the force and those that are already planned or programmed to enter the force were designed to achieve a specific effect through performance of a set of tasks to specified standards under specified conditions.**

**"Capability gap." This term is defined in CJCSM 3170.01B, but the meaning is not entirely clear. In essence, the definition above says that a capability gap is a shortfall between what the force must do and what it can do.**

# COBP Conventions

- **“JCIDS team” is the core group of personnel responsible for leading and conducting JCIDS analysis. If you’re reading this, you’re probably part of a JCIDS team.**
- **“SME” includes military professionals (warfighters) who provide PMJ.**
- **“DOTmLPF solution” implies solution sets that do not include new materiel starts.**
- **“DOTMLPF solution” implies general solution sets (including new materiel starts).**
- **“Survey” implies employing accepted, defensible survey techniques for incorporation of SME input into JCIDS analysis.**

# COBP Conventions

**The COBP uses several conventions to reduce the need for additional explanation later in the COBP. Descriptions of the conventions appear on the chart above and are amplified below.**

**"JCIDS team" is the group of personnel, usually proponent personnel, responsible for leading and conducting JCIDS analysis. This COBP is written for those personnel who find themselves on JCIDS teams.**

**Any time the COBP uses the term, "SME," it means any SMEs, including warfighting professionals who apply professional military judgment. "Subject matter expertise" includes assessments provided by all SMEs, including warfighting SMEs who use PMJ. As with PMJ, "subject matter expertise" and "SME input" imply the application of SME knowledge and/or experience in making qualitative assessments (i.e., judgments).**

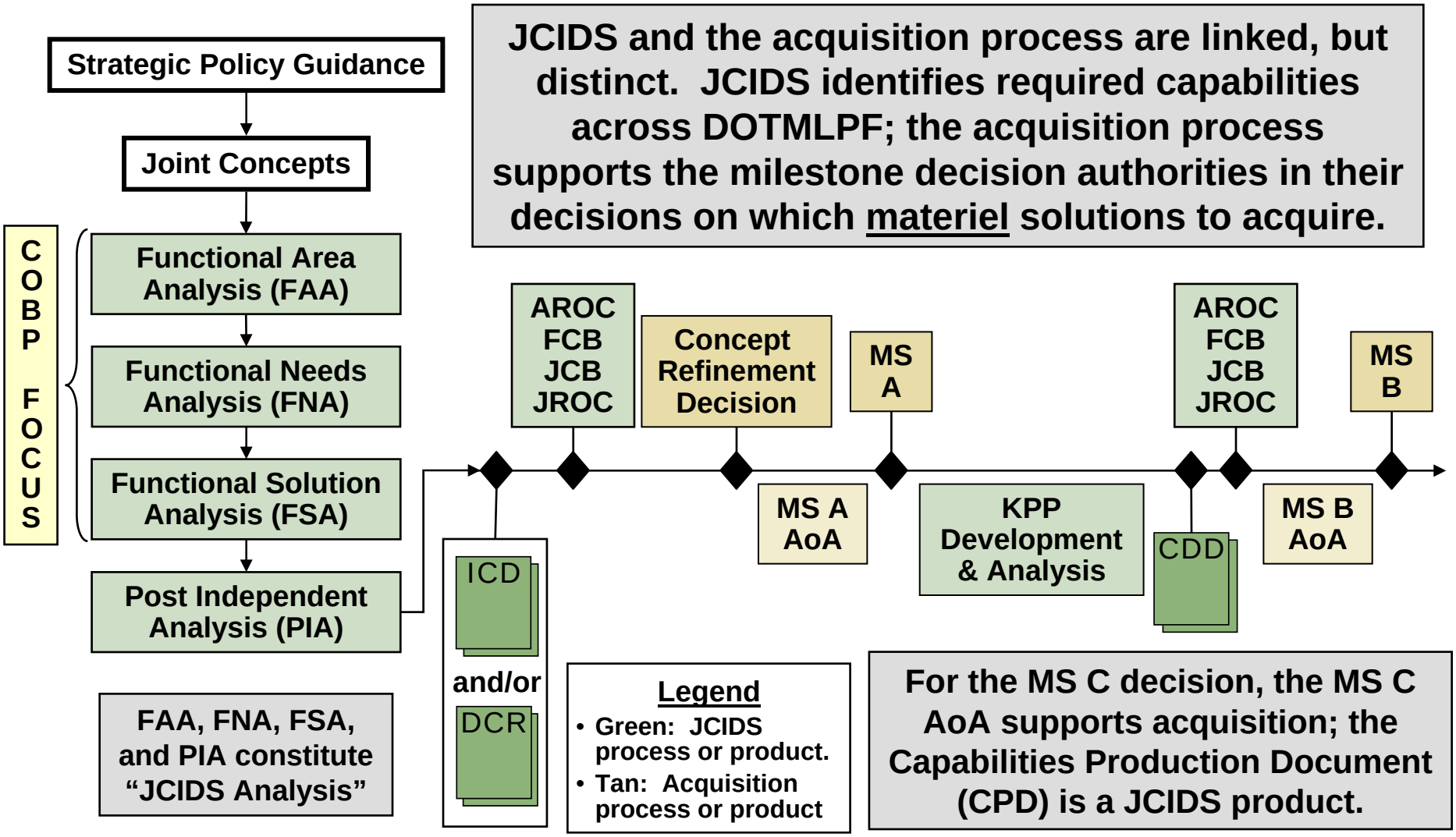
**Warfighting SMEs don't come only from the Army and don't represent only the friendly side. The COBP implies the inclusion of other service military professionals who contribute PMJ and SMEs knowledgeable in Threat objectives, systems, and tactics, techniques, and procedures.**

**"DOTmLPF solution" implies solutions that modify current DOTMLPF (to include changes in the amount of existing materiel), solutions that incorporate product improvements to existing materiel or facilities, and/or solutions that incorporate interagency or foreign materiel. The term does not include new materiel starts.**

**"DOTMLPF solution" is the general term applied to refer to solutions that consist of DOTmLPF solutions and/or new materiel starts.**

**The term, "survey," implies an assessment. Development of the survey plan, the means for collecting input, and the analysis of the collection effort's results must be rigorous and defensible when put before the Joint Staff, Army Staff, and the TRADOC Futures Center. The COBP uses "survey" as both a noun and a verb. In both instances, the tem implies rigor, acceptability, and defensibility.**

# JCIDS and the Acquisition Process




AoA – Analysis of Alternatives
CDD – Capability Development Document
F/JCB – Functional/Joint Capabilities Board
A/JROC – Army/Joint Requirements Oversight Council
DCR – DOTMLPF Change Recommendation
ICD – Initial Capabilities Document
KPP – Key Performance Parameter

# JCIDS and the Acquisition Process

**The chart above illustrates how JCIDS links with the acquisition process. It also illustrates what portion of the linked processes the COBP addresses.**

**There are two major points to consider on this chart. First, JCIDS and the acquisition process, though linked, are distinct processes. As is evident in the references cited on the "Purpose" slide of this COBP, the 3170 series covers JCIDS, and the DoD 5000 series covers acquisition. Though the two are often thought of in the same context, they play significantly different roles. In simple terms, JCIDS answers these questions: 1) "What do we have to do?" 2) "Can we do it?" 3) "What do we need to enable our ability to do what's required?" The FAA and FNA answer the first two questions, respectively. The FSA answers the third question and can lead to recommendations for non-materiel or materiel solutions, which will be incorporated into a DCR or ICD. If the results of the FSA lead to an ICD, only then does the link between JCIDS and the acquisition process get established. If the link is established, JCIDS prescribes the preparation of the CDD (and for MS C, the CPD), which incorporates materiel system performance attribute and KPP development. This development also answers the third question, "What do we need (this system to be able to do)?" The acquisition process, on the other hand, answers the question, "What is the best system to acquire?"**

**The second major point of this chart is that the FAA, FNA, and FSA occur very early in the process. It is absolutely vital that these analyses be conducted rigorously since everything that follows is based on these initial efforts. Good efforts in the FAA, FNA, and FSA facilitate the conduct of follow-on processes, whether those processes are JCIDS processes or acquisition processes.**

# JCIDS Analysis Overview

**Strategic Policy Guidance**

**Functional Area**
**Joint Functional Concepts**
**Army Concepts**

**JCIDS analysis, also known as a capabilities-based assessment (CBA), is a structured methodology that leads to the determination of capability gaps and development of approaches that enable attaining required capabilities.**

***COBP does not cover PIA.**

| Functional Area Analysis (FAA) | Functional Needs Analysis (FNA) | Functional Solution Analysis (FSA) | Post Independent Analysis (PIA)* |
|---|---|---|---|
| Identifies operational tasks, conditions, and standards for achieving the effects needed to accomplish military objectives. | Assesses the ability of current and programmed capabilities to accomplish the FAA-identified tasks, under the full range of operating conditions and to the designated standards. | Develops and assesses potential DOTMLPF approaches to solving one or more capability gaps identified in FNA. | Sponsor considers compiled analysis results and determines which DOTMLPF approach or approaches best address capability gaps. |
| Output: Tasks to be reviewed in FNA. | Output: Prioritized list of capability gaps. | Output: Potential solutions to needs. | Output: DCR or ICD. |

**DCR = DOTMLPF Change Recommendation** **ICD = Initial Capabilities Document**

***Sources: CJCSM 3170.01B and CJCSI 3170.01E (March 2005 Draft)***

# JCIDS Analysis Overview

**The JCIDS analysis process is a structured process that consists of four analysis efforts: FAA, FNA, FSA, and PIA. The starting point for conducting JCIDS analysis consists of reviewing strategic guidance, Joint concepts, and Army concepts (and, in many cases, other services' relevant concepts). Guidance and concepts provide the context for completing JCIDS analysis.**

**The FAA identifies tasks, conditions, and standards necessary for achieving the desired effects to attain military objectives. The list of tasks, conditions, and standards resulting from the FAA is used in the FNA to enable the assessment of current/programmed joint capabilities' accomplishment of those identified tasks. The result of the FNA is a list of tasks that can (or cannot) be accomplished to standard under identified conditions, with current/programmed capabilities. The tasks that can be accomplished with multiple current/programmed capabilities may constitute "overlaps." The tasks that cannot be accomplished with current/programmed capabilities constitute "gaps."**

**The remainder of this COBP addresses the FAA, FNA, and FSA, and the analytic procedures for underpinning development of tasks, conditions, and standards, identifying gaps, and developing solutions for overcoming gaps.**

**The COBP does not address the PIA, which consists mainly of the sponsor's review of the FAA, FNA, and FSA to ensure that the results resulted from employment of a defensible methodology and that the results are valid. The COBP focuses on gaps, but the methodology that follows is applicable to identifying overlaps also.**

**The result of JCIDS analysis is either a recommended DOTMLPF Change Recommendation (DCR) or an initial capabilities document (ICD), which includes materiel approaches for overcoming gaps. Refer to CJCSM 3170.01B or TRADOC Pam 71-20 for more information on the format and contents for both the DCR and ICD.**

# JCIDS Analysis Methodology

**Follow these steps in order.**

## FAA Methodology

- Review OE for investigated timeframe
- ID tasks from OE, concepts, doctrinal task lists, and current operational experience
- ID conditions under which tasks are performed
- ID standards for task completion
- Identified tasks, conditions, standards for FNA

## FNA Methodology

- Compile list of current/programmed capabilities that may accomplish tasks
- Assess current/ programmed capabilities against required capabilities, and ID gaps
- Assess operational risk of not filling gap
- Prioritized list of capability gaps for FSA

## FSA Methodology

- ID DOTmLPF solutions for gaps
- If new materiel required*
- Re-assess gaps based on DOTmLPF changes
- ID materiel approaches for remaining gaps
- Analyze materiel approaches
- Prioritized list of potential solutions for PIA

**Briefing of results to sponsor**

* If not, requires DCR  OE = Operational Environment

# JCIDS Analysis Methodology

**TRAC developed the JCIDS analysis methodology illustrated above based on CJCSM 3170.01B (and its predecessor versions) and practical experience conducting JCIDS analysis. The steps of the methodology above also serve as the organizing framework (or outline) for the "practices" described in the FAA, FNA, and FSA sections of the COBP.**

**The FAA begins with reviewing strategic policy guidance and joint (and Army) concepts. Review the strategic policy guidance, functional concepts, and operational environment for the timeframe under investigation to establish context for the work that follows. The FAA continues with identification of tasks, the conditions under which the force must accomplish those tasks, and the standards to which the tasks must be accomplished. When the FAA is complete, the result is a set of tasks that must be performed to standard under the FAA-identified conditions. The set of tasks, conditions, and standards (TCS) constitute "required capabilities" and serves as input to the FNA.**

**The FNA consists of identifying current/programmed capabilities that may contribute to achieving the required capabilities and then assessing whether the current/programmed capabilities can achieve the required capabilities (by their ability to perform the requisite tasks to standard under the given conditions). If current/programmed capabilities cannot be used to achieve the required capability, then a "gap" results. During the FNA, the JCIDS team takes the list of gaps and assesses the operational risk associated with not filling each gap. The resulting prioritized (by operational risk) list of gaps serves as input to the FSA.**

**The FSA begins by identifying DOTmLPF solutions for the gaps and then reassessing the operational risk of not filling the gaps, taking into account acceptable DOTmLPF changes. For gaps that still exist, the JCIDS team identifies new materiel approaches and assesses them. The output of the FSA is a prioritized list of approaches for overcoming gaps.**

**Having an overarching body (to include the sponsor) isn't required by 3170, but it's a must. The body (e.g., a study advisory group (SAG)) should consist of senior TRADOC, Army, or OSD leaders. The review body will ensure the scope of the effort is adequate and it will validate the methods the JCIDS team uses. Brief the sponsor/review body at the points indicated on the chart above to ensure the analysis path to the end of the JCIDS process arrives at a point where the analytic approach and results will not be discounted or refuted.**

# JCIDS Analysis Tenets (1 of 2)

- **Think through the entire JCIDS analysis process before beginning the FAA; a "small" misstep or omission early can adversely impact later steps in the process.**
- **Do not conduct JCIDS analysis to justify a preconceived materiel solution.**
- **Follow the JCIDS analysis methodology described in this COBP; the steps are defined and defensible.**
- **Take a joint perspective and conduct JCIDS analysis within a joint context.**
- **Use PMJ as a cornerstone for JCIDS analysis to maintain an operational perspective.**
- **Engage concept developers and the testing community early; JCIDS analysis informs concept and KPP development and testing.**

# JCIDS Analysis Tenets (1 of 2)

**In conducting JCIDS analysis, there are certain principles, or tenets, to keep in mind to ensure that the analysis is relevant and defensible.**

**First, and perhaps most important, be sure to think through the entire process prior to beginning the analysis. JCIDS analysis starts on a foundation, and that foundation must be solid for completing the rest of the process. There are many different SMEs who will be involved, there are ideas developed early that must be expanded upon in later steps, and there are key interactions (e.g., across functional areas) the must be taken into account for planning the analysis.**

**Don't use the analysis to build an argument for pursuing a materiel solution. The focus of JCIDS analysis is to identify gaps and to develop approaches for overcoming those gaps. The output of the JCIDS process leads to approaches (considering all DOTMLPF) to overcome gaps. The output does not include development or justification of specific materiel systems.**

**Although every JCIDS analysis contains unique elements, adhere to the methodology laid out in this COBP. The FAA, FNA, and FSA are prescribed in CJCSM 3170.01B and TRADOC Reg 71-20. This COBP incorporates and expands on the analysis components to provide practical and defensible means for producing relevant results.**

**Maintain a joint context and perspective throughout the analyses and include joint SMEs. Don't home in on an Army-specific approach. The other services provide tremendous capabilities.**

**Maintain an operational perspective. PMJ contributes "common sense" and the warfighter's perspective to JCIDS analysis. In addition to providing an operational perspective, the warfighting SMEs' assessments of gaps and solutions form the foundation upon which to base JCIDS results.**

**Include concept developers and the testing community in JCIDS analysis. Identification of required capabilities forms the foundation for system characteristics that will ultimately become performance attributes and key performance parameters.**

# JCIDS Analysis Tenets (2 of 2)

- Identify required SMEs (including Threat SMEs) early in the process; employ SMEs who:
  - Come from authoritative organizations (e.g. TRADOC schools and centers, operational units, other services, program management offices, etc).
  - Have relevant knowledge and/or experience related to the problem.
  - Provide a breadth of seniority and experience.
- Conduct a good literature search before beginning JCIDS analysis; use work that's already been done.
- Use functional tasks as the basis for defining capability gaps; do not define gaps based on a particular program's specifications.
- Use accepted, defensible techniques when incorporating SME input in the analysis.
- Don't be compelled to use simulations.
- Consider current/programmed capabilities and gap solutions that reside across DOTMLPF, i.e., don't focus only on materiel.

# JCIDS Analysis Tenets (2 of 2)

**Identify early the types of SMEs that will be necessary for successful JCIDS analysis. The FAA requires mainly warfighting SMEs, but the FNA, and particularly the FSA, require affordability, supportabillity, etc. SMEs.**

**SMEs are vital to JCIDS analysis. They lend substance and credibility. Ensure SMEs are credible. They must represent the right organizations, have relevant knowledge and experience, and represent a breadth of seniority and experience. Use SMEs from other services, TRADOC schools, operational units with recent combat experience, and program management offices, among others.**

**Do a good literature search before beginning the effort. Plenty of others will have conducted, or will be in the process of conducting, JCIDS analysis. When appropriate, incorporate what's already been done. It will facilitate completion of the JCIDS analysis.**

**Focus on the functional tasks that must be accomplished. A number of "good (materiel) ideas" will surface that might make the force "better." "Better" does not necessarily equate to achieving a required capability. Many materiel ideas put forth will highlight an ability to accomplish some task at some level of proficiency. Take the JCIDS approach in addressing this, i.e., "What is the required task, what are the conditions and standards, and what do we currently have in the joint force that could accomplish this task?"**

**In completing any of the component steps, there may be one or more techniques available to accomplish the step. Use accepted, defensible techniques, especially when using the input from SMEs as the basis for reaching conclusions about gaps and solutions. The results of JCIDS analysis will get close scrutiny and the analysis must stand on solid techniques.**

**Combat simulations may have limited use in conducting JCIDS analysis. Don't feel compelled to use them. Simulations are often handy tools given the right analytic conditions. For JCIDS analysis, however, there are better tools that save time, resources, and provide rigorous results.**

**Remember that attaining required capabilities consists of more than just identifying new materiel solutions. Throughout the analysis, continue to think of DOTmLPF changes that could result in accomplishing the FAA-identified tasks that would preclude the Army (and the Joint Force) from having to invest in a new materiel approach.**

# Using SMEs

**PMJ and SME input are key enablers of JCIDS analysis.**

- **Have SMEs provide input for two major categories:**
  - **Factors, e.g., tasks, solutions, to consider in the analysis.**
  - **Formal assessments (via questionnaires) that form the basis of analytic results.**
- **Use the appropriate SMEs at the appropriate time during the analysis.**
  - **The FAA requires warfighting SMEs.**
  - **The FNA requires warfighting, current/programmed capabilities, and technology SMEs.**
  - **The FSA requires the same types of SMEs as the FNA plus affordability SMEs.**


**Make sure SMEs have appropriate competencies.**

- **Develop a strategy for using SMEs. For particularly large-scale (i.e., many tasks, conditions, or standards to consider) FAAs and FNAs, two different groups of SMEs might be necessary:**
  - **Use a small group of SMEs (one or two for each relevant area of expertise required) to hone the list of factors to consider in the analysis.**
  - **Use a larger group of SMEs to finalize the list of factors and to make formal assessments.**

# Using SMEs

**The SME input provided for JCIDS analysis is not only necessary, but vital for completing the JCIDS analysis in a credible, defensible way.**

**SMEs provide the preponderance of input to JCIDS analysis, and their input generally falls into one of two major categories. First, SMEs provide important input on tasks, conditions, standards, current/programmed capabilities, and solutions identification. Through their independent research and preparation, the JCIDS team generates the initial lists of these items for SME consideration. SMEs validate what the JCIDS team develops and provide additional input to expand the lists to ensure that all relevant items are accounted for in the analysis. Don't subject this SME input to unnecessary screening or rigorous acceptance, but make sure that the final list of factors considered is generally acceptable to relevant SMEs. Second, SMEs provide assessments of what gaps really exist and what solutions fill the gaps. In incorporating this input, use accepted, defensible survey techniques. The analysis of the results of these assessments will be subjected to scrutiny by TRADOC and the Army and Joint Staffs.**

**JCIDS analysis requires many different types of SMEs. Have the right ones participate at the right time. Warfighting SMEs are necessary for providing operational input to the FAA. Warfighting and current/programmed capability SMEs (e.g., Modularized Force SMEs, G8 or OSD PA&E representatives, program management representatives) are necessary for the FNA. These types of SMEs, plus affordability (e.g., DASA-CE), technology (e.g., RDECOM), and other SMEs are necessary for the FSA.**

**Develop a strategy for using SMEs. It may be best to use a small, but representative group of SMEs to provide the initial input on factors to consider in the analysis. It may also be best to use a small group of SMEs to conduct an initial assessment of gaps and solutions to screen out some gaps or solutions when the list of potential gaps or solutions is especially large. After the small group of SMEs provides factors or conducts an assessment, gain acceptance on the factors from a larger group of SMEs and conduct more comprehensive assessments of gaps and solutions by surveying a larger group of SMEs.**

# Using Surveys

**Turning SME assessments into defensible analytic results requires the use of accepted survey techniques.**

- **Develop relevant criteria and measures.**
- **Identify the appropriate target audience.**
- **Develop unbiased questions.**
- **Keep the survey as short as possible.**
- **Develop rank ordering, but avoid having respondents rate or directly rank more than 5-7 items within a category. Select an acceptable rating and ranking method. Some useful approaches:**
  - **Identify the preferred alternative for each pair-wise combination of choices.**
  - **Allot 100 points for the preferred choice and some value less than or equal to 100 points for each of the remaining choices.**
  - **Provide a maximum of 100 points to be allotted among all choices.**
- **Have a survey expert (contact e.g., TRAC) review the survey to assess its sufficiency for meeting the survey objective.**
- **Test the survey with a knowledgeable group before administering it to the target audience.**

**Be aware that some SMEs will provide biased input; develop the survey and choose respondents to mitigate that bias.**

# Using Surveys

**JCIDS analysis requires SMEs to provide assessments. SME assessments are subjective and must be obtained and incorporated using accepted techniques so that the assessments can be transformed into defensible analytic results. The appropriate development and use of surveys enables defensible results. Major considerations for developing and using surveys appear below.**

**Develop relevant criteria (categories for assessment) and measures (the scale used) in developing surveys. For example, don't develop criteria to assess a solution's ability to draw information from the world-wide web when the requirement is for the solution to transmit information among soldiers in an artillery battery.**

**Have only knowledgeable SMEs (i.e., the target audience) respond to applicable survey components. For example, have CASCOM respond to supportability questions.**

**Be careful about wording survey questions to avoid bias. For example, "Is this a small gap, a moderate gap, or a large gap," is biased because it doesn't allow for, "This is not a gap."**

**People will be filling out the surveys. They want to provide the best input they can, but their principal day-to-day focus isn't on completing surveys. Keep their attention by developing a survey that is short, but that gets to the required input.**

**The SME assessments provided during JCIDS analysis will be used to develop rank orders. Use an accepted technique, and don't require SMEs to rate or rank order more than 7 items within a category. Having SMEs evaluate more than 7 items within a category results in their not remembering the criteria they used for ranking number 2 against number 3 versus the criteria they used for ranking number 12, say, against number 13.**

**Surveys can be rife with bias. They can also address plenty of questions that are irrelevant to the objective set forth for the survey. Talk to a survey "expert" to make sure that JCIDS analysis surveys obtain the requisite data while remaining un-biased.**

**After the survey expert reviews the survey, test it with a knowledgeable group, e.g., a subset of the group of SMEs that will ultimately be surveyed. Discuss the results of the test survey with the survey expert to determine if the test survey has provided unbiased, informative results.**

# Before Beginning a JCIDS Analysis

- **Have the study sponsor identify:**
  - **Relevant Joint Functional Area(s) and their associated Joint Functional Concepts (JFC) and Joint Integrating Concepts (JIC).**
  - **Relevant Army concept.**
  - **The level of conflict (major combat operation, stability operations, etc.).**
  - **The timeframe to consider.**
  - **The principal Army echelon (e.g., squad, battalion) of concern.**
  - **The battlefield conditions to include for investigating the concept.**
  - **The Threat's technological and military capabilities.**
- **Make sure the sponsor (or study directive) explicitly tasks organizations to provide appropriate SME support for the effort.**
- **Review the JCIDS analysis code of best practice (this document).**
- **Review completed JCIDS analyses and obtain lessons-learned from the organizations that performed them.**


**Be clear on the scope of the JCIDS analysis.**

**Study sponsor guidance is necessary for scoping JCIDS analysis.**

# Before Beginning a JCIDS Analysis

**A gap analysis is similar to any other study or analysis in that the sponsor must provide guidance to appropriately scope the analysis for facilitating its completion.**

**Have the study sponsor identify the items listed above. When the sponsor first directs the analysis, this information may not be included in the analysis guidance, but the team conducting the analysis must ensure that these elements of guidance are specified by the sponsor (this will require back-and-forth coordination between the analysis team and the sponsor). This sponsor-provided information/guidance provides context, scope, and direction for the analysis.**

**It is absolutely essential that the appropriate SMEs participate in this effort, but getting the appropriate SMEs involved in the study often creates a challenge. Taskings to obtain SMEs must be made by a person with the authority to mandate participation. If the JCIDS team participates in the writing of the analysis/study directive, the JCIDS team must make an early, careful assessment of the SMEs that will be necessary and have the sponsor explicitly task organizations to provide the required SMEs. If the JCIDS team does not participate in drafting the directive, the JCIDS team must make an assessment of what SMEs are required, draft a memorandum that tasks appropriate organizations, and have the sponsor sign the memorandum tasking those organizations.**

**There will be those instances where the sponsor does not have tasking authority over some of the SMEs (e.g., other service SMEs) who will be required. In this case, have a general officer-level person request the participation.**

**Review the JCIDS Analysis COBP and review other completing or ongoing JCIDS analyses. Contact others who performed or who are performing JCIDS analysis to obtain their input on factors to consider and analysis approaches they used that resulted in rigorous JCIDS analyses. Have the others also identify the challenges they faced in completing their efforts.**

# FAA Practices (1 of 4)

**Step 1: Review the operational environment for the timeframe under investigation.**

- Read the sponsor-identified concepts (joint and Army).
- For the echelon of concern for the JCIDS analysis, identify:
  - The objectives described in the concept.
  - The functions performed by the other services as they apply to the Army.
  - Non-service agencies (e.g., State Department) and their potential roles in the conduct of combat operations.
- Read TRADOC ADCSINT-Threats' most recent rendering of the operational environment.
- Read lessons learned reports (CALL is a good source) to determine what gaps have already been identified.
- Read *The World Factbook*, available at www.cia.gov, for the countries/regions of interest to get an indication of demographics, climate, terrain, etc.

**This review is vital to framing the development of tasks, conditions, and standards.**

# FAA Practices (1 of 4)

**Identifying the appropriate operational environment (OE) is essential to the development of relevant tasks, conditions, and standards during the FAA. Begin the FAA by first reviewing the operational environment. This step sets the context for the rest of the JCIDS analysis. It is also very informative. Most analyses usually incorporate military operational considerations; however, there are many more considerations that warrant investigation and inclusion.**

**The OE consists of many elements. Consideration of these elements may lead to the development of tasks and conditions that the analysis might not otherwise consider. Determine the roles of the other services and of non-military organizations, such as the State Department. The presence of others in the battlespace may lead to additional requirements.**

**Become knowledgeable on the Threat and their objectives, tactics, techniques, and procedures, and general capabilities for the timeframe under consideration. This review will likewise lead to a better definition of tasks, conditions, and standards. TRADOC ADCSINT-Threats provides the accepted description of how the Threat will fight.**

**Many other resources exist for fully defining the operational environment and important considerations. CALL's lessons learned describe challenges that current forces face and how the forces overcome the challenges. The CIA's World Factbook has a lot of information, by country, that would be very useful in gaining insights into the challenges that the force might face and may lead to the development of tasks and conditions that may not have been considered.**

**Note: Operational Environment definition. "A composite of the conditions, circumstances, and influences that affect the employment of military forces and bear on the decisions of the unit commander." (JP 1-02)**

# FAA Practices (2 of 4)

**Step 2: Identify tasks.**

- **Identify the desired effects that must be achieved to attain the objectives described in the concept.**
- **Begin development of the list of tasks that must be performed (by the echelon of concern) to achieve the desired effects by reviewing current, known tasks. Use, e.g.,**
  - **Mission Training Plans (MTP).**
  - **Unit Mission Essential Task Lists (METL).**
  - **Previously-completed FAAs.**
- **Use PMJ to identify additional tasks to perform that will achieve the desired effects in the future environment.**
- **Gain concurrence on the list of tasks from SMEs who are familiar with the relevant concepts, concept objectives, and warfighting.**


**The FAA is the most vital step since it serves as the foundation; take the time to do it right.**

**The output of this step is the list of tasks that must be performed to achieve the desired effects that will enable attainment of the concept objectives.**

# FAA Practices (2 of 4)

**This step in the process is extremely important since the output list of tasks serves as the foundation for the remaining steps in the JCIDS analysis. Before developing those tasks, identify the effects that must be achieved to attain the concepts objectives. Develop a comprehensive list of the tasks that need to be performed to achieve the desired effects. In developing the list of tasks during this step, include all tasks that may be required. At the start of this step, it is better to go with too many than to discard tasks that may be relevant.**

**Start developing the list of tasks from what's known. Review known tasks that appear, for example, in doctrine, in unit METLs, and from previous FAAs. Other sources, e.g., CALL might also provide input to tasks to be performed. Focus initially on identifying the tasks that are relevant to the echelon of focus for the analysis. There will be other tasks for different echelons that will also require review, however. Include the relevant tasks, and be sure not to include tasks that aren't necessary for attaining the objectives described in the concept. The tasks identified as a result of reviewing current tasks will form the bulk of the final list of tasks that must be accomplished.**

**Identify SMEs who can provide input to the list of tasks. Provide them background on the OE and the list of tasks already identified. Obtain input from the SMEs on additional tasks that may be required as a result of the implications of the future battlefield. These SMEs may provide tasks that are truly new or they may highlight a current task that the analysis team didn't identify in the initial list. Keep the OE in mind in developing tasks. Changes in the OE may require new tasks to be completed.**

**Obtain concurrence on the list of tasks with a wider body of SMEs. Again, make sure the SMEs have the appropriate knowledge and experience to provide meaningful feedback on the list. "Concurrence" for this step implies "good enough" and obtaining this concurrence doesn't require use of a rigorous survey technique.**

# FAA Practices (3 of 4)

**Step 3: Identify relevant conditions.**

- **Begin identification of conditions under which each of the tasks must be performed by reviewing UJTL (Appendix C) conditions.**
  - **Incorporate relevant UJTL conditions into the analysis.**
  - **Eliminate from further analysis, but document the reason for non-inclusion of, non-applicable UJTL conditions, e.g., "sea state."**
- **Add relevant conditions from the sources from which tasks were drawn, e.g., MTP, previously-completed FAAs.**
- **Use SME input to identify additional relevant conditions that might exist in the future.**
- **Add the associated conditions to each task from the FAA to develop a task-conditions (TC) list.**
- **If the TC list is too large to allow credible investigation of each task during the FNA, survey SMEs, then eliminate those tasks that have a low operational risk associated with not being performed.**
- **If the TC list is small, gain general concurrence on the list of conditions from the same SMEs who reviewed the list of tasks.**

**The output of this step is the list of tasks and the conditions under which they must be performed.**

# FAA Practices (3 of 4)

**The next step in the FAA consists of identifying the relevant conditions under which the identified tasks must be performed.**

**Start the development of the list of conditions for each task by using Appendix C of the UJTL. Appendix C is fairly comprehensive, it's well-organized, and it provides appropriate descriptors for each of the listed conditions. Use of the UJTL conditions also re-emphasizes consideration of joint capabilities.**

**Match the relevant conditions from the UJTL to the list of tasks. Initially consider each of the UJTL conditions in the review, but eliminate irrelevant conditions from further analysis. One example of a UJTL condition that may not be relevant for most Army-led JCIDS analyses is "bioluminescence of the sea," for example.**

**Supplement the list of conditions for each task with the conditions, if any, from the sources used for developing the list of tasks. To complete the TC list, obtain input from SMEs on what they think will be relevant conditions of the operational environment.**

**At this point, the TC list may be so large that the JCIDS team will not be able to rigorously conduct the step in the FNA that requires assessing current/programmed capabilities against required capabilities. To reduce the size of the TC list, survey SMEs on the operational risk associated with not performing the task. Have the SMEs identify the likelihood that the task will have to be performed what the severity of the impact is if the task is not performed. The graph on slide 46 illustrates output that could be developed from the output of this type of survey. Consider eliminating tasks that are low frequency and low impact and gain sponsor approval for eliminating those tasks from further analysis. There is risk associated with reducing the list at this point because the potential exists for eliminating a task that could have a gap associated with it.**

**If the TC list is of a size that the JCIDS team can conduct credible analysis during the FNA, gain concurrence (i.e., a "good enough") from the same body of SMEs who reviewed the list of tasks.**

# FAA Practices (4 of 4)

**Step 4: Identify standards for task completion.**

- Review the TC list and begin developing standards by identifying standards already prescribed in doctrine for the given tasks.
- Using vignettes that create context for the identified tasks and conditions, have warfighting SMEs:
  - Identify other conditions (as applicable).
  - Validate or modify already-defined standards.
  - Develop general standards for task-condition sets for which no standards exist.

Wargame vignettes to account for battlefield geometry over time.

- Add the standards to the TC list to develop a task, condition, standard (TCS) set that achieves the desired effects and defines the required capabilities for achieving the military objective.
- Link the required capabilities (TCS set) to the objectives described in joint and Army concepts (for ICD writing purposes).
- Obtain concurrence on the TCS set from SMEs.
- Present results to sponsor prior to continuing with the FNA.

Completion of this step ends the FAA. Output of the FAA is the TCS (required capabilities) necessary to achieve concept objectives.

# FAA Practices (4 of 4)

**The standards identified in this step of the FAA will ultimately be translated into metrics in the FNA. The FNA metrics will also be used in the FSA.**

**For the tasks from the TC set, review doctrinal sources to determine if standards have already been defined for the tasks. It may be necessary to list a standard from one source to a task obtained from another source. Be aware that the standards described in the various sources may be either very specific or very general. Don't be concerned about that yet since this list of standards will be used only as a starting point for standards development.**

**Develop vignettes that facilitate the investigation of tasks and conditions from the TC list. Using a wargaming approach, have SMEs identify additional conditions, if any, that arise during the wargaming, and have them validate or modify the existing standards to establish TCS that would achieve the desired effect for the objective described in the concept. Make sure that the SMEs develop general standards. For example, a task may require dismounted soldiers to fight in conjunction with armor in a variety of conditions. An acceptable general standard associated with this task is that the force conduct coordinated movement. A specific standard, which is not the intent of this step, would be that all directions provided to the armor force by the dismounted force are executed within 10 seconds. The result of the wargaming is a set of TCS that define the required capabilities.**

**After developing the TCS set, link the set/required capabilities back to the objectives described in the concept. This task should be somewhat trivial since the steps to this point have all been driven by the concept descriptions. Still, the linkage must be clear for writing the ICD, if one results from JCIDS analysis.**

**The output of this step is the list of TCS that define the required capabilities for attaining the military objectives described in the concept. The list should be of a size that's manageable for use in the FAA since any initial screening out, if necessary, of task-condition sets was in step 3 of the FAA.**

**At this point, the FAA is done. Brief the results of the FAA to the sponsor, who may provide specific guidance on carrying forward only a subset of the TCS set to the FNA.**

# Illustrative FAA Output

**The product of the FAA is the list of tasks, conditions, and standards. The TCS set makes up "required capabilities."**

**ARTEP 7-5 MTP tasks.**

**Conditions, considered singly and in relevant combinations. (Those shown all appear in the UJTL.)**

**Include an additional column to illustrate TCS linkage to concept objectives.**

| Task | Conditions | Standards |
|---|---|---|
| Leader gains and maintains situational awareness / situational understanding. | • Negligible light<br>• Heavy precipitation<br>• Severe fatigue<br>• Dense vegetation<br>• Moderate urbanization | Leaders have knowledge of their location and locations and activities of subordinate, higher, and adjacent units. Leaders have understanding of terrain and environment in AO to include location of obstacles. Leaders know their mission parameters. Leaders have a comprehensive understanding of how friendly and enemy locations and activities, terrain, and the unit mission interact. (extra-doctrinal standard). |
| Fight dismounted in conjunction with armored vehicles. | Same as above | Standard: Fires and movements between the mounted elements and dismounted elements are coordinated. There are no instances of fratricide. FM 2-21.9, The SBCT Infantry Rifle Platoon and Squad, pg 6-44. |

**Standard developed during FAA.**

**Current standard (not modified during FAA).**

Illustrative case derived from "Small Unit JCIDS Analysis."

TCS = tasks, conditions, standards

# Illustrative FAA Output

**The output shown above is derived from the "Small Unit JCIDS Analysis" and is for illustrative purposes only. The output illustrates only a very small sample of what the output of the FAA would look like. This type of summary serves several important purposes. First, it shows the sponsor the list of TCS. With an additional column included, it can also show the TCS linkage to the concept objectives they enable. Second, the output can be further developed during the FNA to include a column with the gaps, if any, associated with each TCS combination. Finally, the compilation of this information in a single document facilitates the remainder of the JCIDS analysis while also serving as a principal source of analysis information for writing the ICD.**

**Note that the tasks shown both came from ARTEP 7-5 MTP. During the conduct of the actual "Small Unit JCIDS Analysis," the list of tasks included tasks from sources other than ARTEP 7-5 MTP. It also included tasks provided by SMEs. Remember to include all relevant sources for identifying tasks, and focus the research effort on those tasks specific to the echelon of concern.**

**As with the tasks, the conditions for the actual "Small Unit JCIDS Analysis" came from many different sources. For the tasks shown, the conditions illustrated just happen to appear in the UJTL (Appendix C).**

**This illustration on the chart above highlights the idea that standards can come from the two means discussed under the "Identify standards for task completion" step. The first task had no associated standard so SMEs developed this standard during the FAA. The second task had an associated standard, however, note that the shown standard did not come from the document from which the task did. Specifically, the task came from ARTEP 7-5 MTP, but the standard came from FM 2-21.9.**

**Keep the compilation of tasks, conditions, and standards. As mentioned earlier, it can easily be built on to facilitate further conduct of the JCIDS analysis. It is also extremely informative for others to reference in conducting different JCIDS analyses.**

# FNA Practices (1 of 4)

**Step 1: Compile list of current/programmed capabilities that may accomplish tasks to standard under the given conditions.**

- **Draw relevant current/programmed capabilities from, e.g.:**
  - **Proponent schools and centers.**
  - **Current/past analysis efforts that represent the force year(s) under consideration.**
  - **Program management offices.**
  - **Other services.**


**Use authoritative sources for determining current/ programmed capabilities.**

- **Have an authoritative source (e.g., CAC for modular force organizational capabilities) review the list of current/programmed DOTmLPF capabilities that will be used in the FNA.**
- **Verify current/programmed materiel capabilities with an authoritative source, e.g., Army G8 or OSD PA&E).**
- **Use authoritative (e.g., AMSAA-certified) system performance data to determine materiel performance characteristics.**
- **Base performance characteristics for those systems where no certified data exists on acquisition documents, e.g., ICD, CDD.**

**The output of this step is a list of current/programmed capabilities.**

# FNA Practices (1 of 4)

**The first step of the FNA requires identifying current/programmed capabilities that could potentially be applied to execute the required capabilities (TCS set) determined in the FNA.**

**Draw current/programmed capabilities that may accomplish the given tasks from multiple and diverse sources and consider all of the DOTmLPF components that enable the current/programmed capability. Current/programmed capabilities could be drawn from only one area of DOTmLPF (the ability to ues hand and arm signals to communicate) or from multiple DOTmLPF areas (an infantry company and its equipment and TTP for closing with and destroying the enemy).**

**Use authoritative sources for identifying the DOTmLPF components of current/programmed capabilities. Authoritative sources include TRADOC proponent schools and centers, program managers (PM), and other services. Schools and centers can provide authoritative doctrine, TTP and organizational designs. When considering programmed materiel, have an authoritative source, e.g., a TRADOC system manager, PM, or G8, verify the type of materiel (e.g., a UAV) and its contribution to the programmed capability (the programmed capability will consist of other DOTmLPF contributors). The ultimate authoritative test of the existence for a current or programmed cability is funding. There are a number of systems and concepts that are not funded or have low quantities funded in the period of interest and should not be considered a capability in the FNA. Funding levels can be found in the Army Program Objective Memorandum/Budget Estimate Submission (POM/BES) lock position and the OSD Future Years Defense Plan (FYDP).**

**For system performance data, use AMSAA-certified data. If AMSAA does not have certified data for one of the programmed materiel systems, base the systems' performance characteristics on acquisition documents like an ICD or Capabilities Development Document (CDD).**

**The output of this step is a listing of current/programmed capabilities that might accomplish the required capabilities. Remember that the current/programmed capabilities will often have multiple components of DOTmLPF incorporated to define the capability.**

# FNA Practices (2 of 4)

**Step 2: Assess current/programmed capabilities against required capabilities, and identify gaps.**

- A gap exists when current/programmed capabilities cannot achieve a required capability (i.e., performing a task to standard under specified conditions).
- Identify gaps that have already been identified for any of the FAA-TCS combinations; review, e.g.,
  - Operational lessons-learned (CALL is a good source).
  - Operational Needs Statements (ONS).
  - Previous JCIDS analyses.
- Use SMEs to identify additional potential gaps.
  - Provide SMEs with the TCS set and the list of current/programmed capabilities.
  - For each TCS combination, have SMEs determine if each can be accomplished with current/programmed capabilities.

**Use PMJ and SME input as the principal means for identifying gaps. The input must be credible, but does not have to meet the rigor associated with accepted survey techniques.**

**FNA step 2 continued on next slide.**

# FNA Practices (2 of 4)

**This step of the FNA consists of identifying potential gaps and then determining if a gap exists. This step's purpose is to identify the inability of current/programmed capabilities to achieve a required capability.**

**Start the identification of potential gaps by reviewing a variety of sources that may have already highlighted some gaps. In many cases, the gaps highlighted in these sources will remain gaps unless some action is taken. Be sure, however, to identify the required capability (the FAA TCS set) first and then see if that TCS set has a demonstrated gap. Don't identify something as a gap unless it can be tied to the TCS set that defines the required capabilities. Use a variety of sources for compiling this initial list of potential gaps. Use IPLs, ONSs, lessons learned, and in-theater surveys. A vital source of gaps may be JCIDS analyses that have already been completed.**

**Continue the identification of gaps by having SMEs provide input. Give the SMEs the list of TCS (the required capabilities) from the FAA along with the list of current/programmed capabilities that may accomplish each of the TCS. Have each of the SMEs identify whether the TCS can be done with current/programmed capabilities. Use a simple technique for obtaining SME input. Allow for "yes"/"no" answers, that is, the SME thinks that current/programmed capabilities listed can/cannot complete the task to standard under the given conditions. Allow the SMEs to identify a current/programmed capability that would perform the task that the SME may know about (to account for the fact that one may have been missed in the previous step).**

**The JCIDS team now has a list of potential gaps. The gaps came from the JCIDS team's research of already-identified gaps and from SME input. SME input for the first part of this step does not have to be obtained in a particularly rigorous way. The rigor comes next when a larger audience of SMEs assesses whether a gap exists or not.**

**FNA step 2 text continued on page 41.**

# FNA Practices (3 of 4)

**Step 2 (cont'd): Assess current/programmed capabilities against required capabilities, and identify gaps.**

- **Survey a larger audience of SMEs to obtain their assessment of whether a gap exists.**
- **Write clear statements of the gaps, e.g.,**
  - **Task: Fight dismounted in conjunction with armored vehicles.**
  - **Standard: Fires and movement coordinated; no instances of fratricide.**
  - **Conditions under which gap exists: Negligible light, heavy precipitation.**
  - **Gap: Voice communication between dismounted soldiers and armored vehicle crew-members is poor or non-existent. Given conditions severely limit visual communication (e.g., hand and arm signals). Poor communication precludes coordinated movement and could result in fratricide.**

**Example adapted from "Small Unit Gap Analysis."**

**The output of this step is the gaps.**

# FNA Practices (3 of 4)

**This will be the first time in the JCIDS analysis process that there's an indication that there's a need (gap) that requires a solution. The process that goes into identifying gaps will have to stand up to close scrutiny. Here, the list of identified potential gaps will get another review from a larger group to assess whether the gaps truly exists.**

**Survey a sufficiently large body (check with a survey expert for a good number) of relevant SMEs to obtain their input on whether gaps exist or don't exist between current/programmed capabilities and required capabilities. Provide the survey respondents with the TCS list and the current/programmed capabilities. The point of this survey is ultimately to identify the gaps.**

**After analyzing the results, and for each of the resulting gaps, write clear statements of the gap. The gap needs to be tied to a task that must be performed to standard under the given conditions to meet the objective of the concept. An example statement of a gap appears on the chart above.**

**As with the preceding steps in the FAA and FNA, quality output of this step of the FNA greatly facilitates follow-on steps.**

# FNA Practices (4 of 4)

**Step 3: Assess the operational risk of not filling the gap.**

- Operational risk consists of the gap's likelihood of occurrence and the severity of impact of not filling the gap.
- Identify the key areas where not filling a gap may have an impact. For example, identify the impact on:
  - Mission accomplishment.
  - Fratricide avoidance.
  - Timeliness of response.

Areas like these will also be measured in the AMA.

- Survey warfighting and threat SMEs to obtain their assessment of the likelihood of the gap's occurring and the operational impact of not filling the gap.
- Provide the study sponsor results on the FNA-identified gaps and the operational risk of not filling the gaps.

Completion of this step ends the FNA. The output of the FNA is a list of prioritized gaps that require solutions and the operational risk associated with not filling each gap.

# FNA Practices (4 of 4)

**The next step in the process consists of identifying the operational risk associated with not filling the gap. Like the determination of gaps, this constitutes a vital assessment and must be accomplished using accepted survey techniques.**

**An assessment of operational risk consists of assessing the likelihood that a gap will occur and comparing this to the severity of the impact if the gap is not filled.**

**Start by determining in what areas to assess impact. Tie the impact back to objectives stated in the concept. Impact can take many forms, e.g., impact on mission accomplishment or impact on avoiding fratricide. The ultimate resolution of what to assess depends on the desired effects and the objectives outlined in the concept. Select these areas of impact carefully; the same areas will be used during the FSA.**

**Survey SMEs to get their assessment of the frequency of each gap's occurring and the severity of the impact (using the measures identified above) associated with the gap's not being filled. Check with a survey expert to determine appropriate ways of defining the measurement scales.**

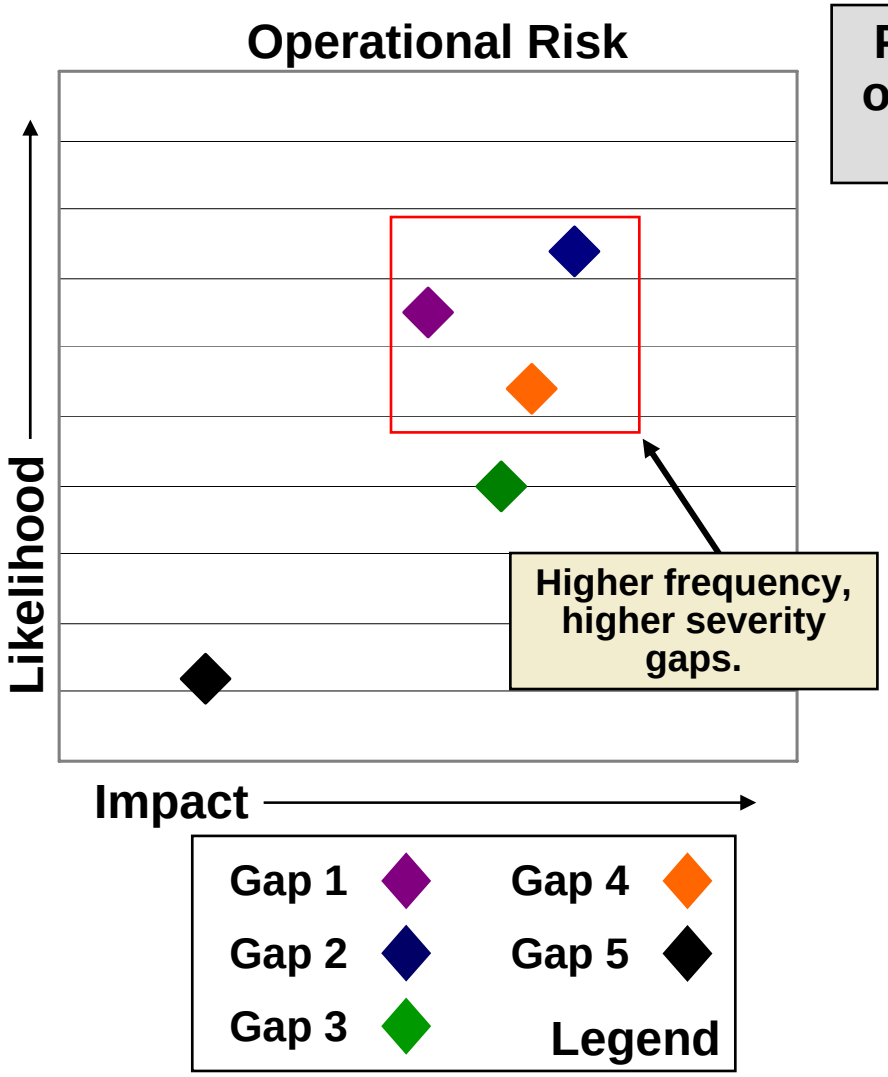
**SME input on the survey will be based on their experience. The output of the survey will enable transformation of this qualitative input into quantitative measures that facilitate the presentation of results.**

**Present the results to the study sponsor to gain the study sponsor's concurrence on the gaps identified and the wording of the gaps. Present the results of the survey to the sponsor (two illustrative methods appear on the next slide), who may use the information to focus the JCIDS team on particular (higher operational risk) gaps during the FSA.**

**Recent experience indicates a preference among sponsors for the JCIDS study team to develop both the operational risk (high, medium, or low) and relative ranks of capability gaps in the FNA final product.**

# Illustrative FNA Output

**The FNA produces a list of gaps requiring solutions.**




**Prioritize gaps based on the measure of operational risk; the sponsor will use the list to provide guidance for the FSA.**

**Gap Prioritization**

| Gap | Impact Severity | Likelihood | Priority for Filling |
|---|---|---|---|
| 2 | 3.5 | 3.7 | 7.2 |
| 4 | 3.2 | 2.7 | 5.9 |
| 1 | 2.5 | 3.3 | 5.8 |
| 3 | 3.0 | 2.0 | 5.0 |
| 5 | 1 | 0.6 | 1.6 |

**Gap prioritization can be in tiers, rather than 1 to n.**

**Illustrated method derived from "Small Unit JCIDS." Numbers are illustrative only.**

# Illustrative FNA Output

**The illustrative output shown above is only illustrative, although the "Small Unit JCIDS Analysis" team used a survey technique for collecting the input that would enable development of what's illustrated.**

**For both the figure on the left and the table on the right, assume that SMEs could rate likelihood and impact severity each on scales of 1 to 5. Say for frequency, 1 represented a gap occurrence less than 20% of the time, 2 represented occurrence between 20% and 40% of the time, and so on. For impact, assume that 1 represented little impact, 2 represented some impact, 3 represented moderate impact, 4 represented high impact, and 5 represented severe impact.**

**In the figure on the left, each gap is plotted as a frequency-impact pair based on averaging the input obtained from the SMEs. For example, the SMEs, on average, said that Gap 2 would occur about 70% of the time and that it would have high impact (on whatever measure was selected). This representation of the output gives the sponsor a quick means of identifying the higher likelihood, higher impact gaps.**

**The table on the right contains the averages for frequency and impact of the SMEs' input for each of the gaps. For each gap, the two measures are added together, and the table is ordered from highest to lowest, by row sum. This presentation gives the sponsor a prioritized list of the gaps. Note that this prioritization can be 1 through n or in tiers, with tier 1 gaps being the more important.**

**The sponsor could use information from both of these to provide for the conduct of the FSA. The sponsor may ask the JCIDS team to weight frequency and impact differently.**

**Keep in mind that these are illustrative only. The data that serves as input came from the surveys that the SMEs completed. This is an example of how qualitative assessments can be transformed into quantities that enable easy presentation of results.**

# FSA Practices (1 of 4)

**Step 1: Identify DOTmLPF solutions for overcoming or mitigating FNA-identified gaps.**

- **Provide SMEs with a list of:**
  - **FNA-identified gaps.**
  - **Current/programmed capabilities that may be modified to fill gaps.**

**The FSA requires a broad range of SMEs and expertise.**

- **Note that one approach may resolve or mitigate multiple gaps, and that one gap may require a combination of approaches.**
- **Have the SMEs develop solutions that can fill or mitigate the gaps by adopting the following, in order:**
  - **Changes to existing DOTmLPF.**
  - **Product improvements to existing materiel or facilities.**
  - **Interagency or foreign materiel approaches.**
- **Obtain guidance from the sponsor on the solutions; the sponsor may deem one or more of the solutions to be infeasible, unacceptable, or unsuitable.**
- **Don't consider new materiel starts yet!**

**The output of this step is a list of gap-filling or mitigating solutions that don't require new materiel starts.**

# FSA Practices (1 of 4)

**The first step of the FSA prescribes an analysis to determine if DOTmLPF solutions can overcome or mitigate the gaps resulting from the FNA. Once again, SME input is the principal means for conducting the review. In this case, it is best to have the SMEs together for the review since the background and knowledge each has can be shared to develop better solutions. This step requires both warfighting SMEs and SMEs familiar with current/programmed capabilities.**

**Provide the SMEs with the gaps that came from the FNA and the list of current/programmed capabilities that could most likely be modified to fill or mitigate the gaps. Recognize that modifying one current/programmed capability may resolve multiple gaps and that one gap may require modifications to multiple current/programmed capabilities.**

**Provide SMEs the gap and the TCS sets that cannot be accomplished. Set an operational context for the SMEs and let them develop ideas on how current/programmed capabilities could be modified. Encourage creativity in the approaches to solutions, but define some limits of feasibility. Have the SMEs consider solutions using the three sets, in order, illustrated above. For example, the SMEs should first develop solutions using only current/programmed capabilities, then (un-programmed) product improvements to existing materiel and facilities, etc.**

**Record the list of solutions and present them to the sponsor to see if the solutions are feasible and acceptable. Maintain the feasible, acceptable solutions for the analysis of materiel (and non-materiel) approaches, during which, SMEs will assess suitability of the solutions. Example: The SMEs may determine that a particular gap may be overcome by adding an additional radio-telephone operator to each dismounted infantry platoon. Although the solution might be feasible, the sponsor might determine that the solution is not acceptable because the addition to each platoon would not result in a sufficient benefit.**

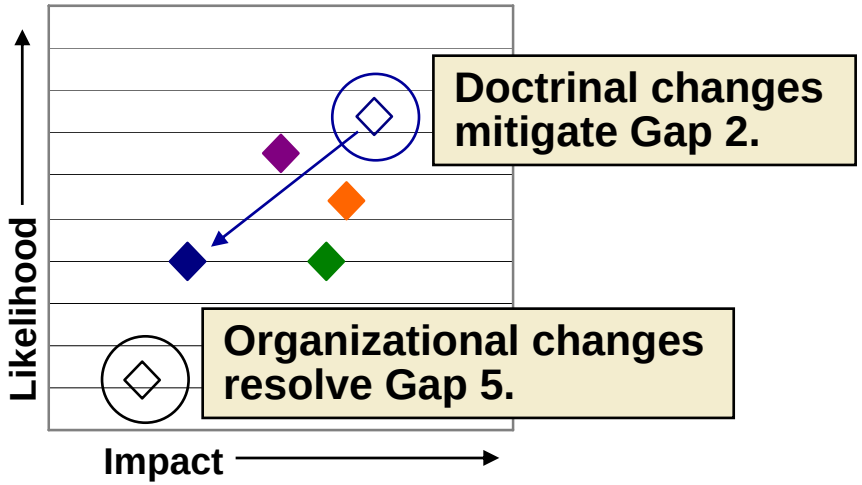
**If the solution involves only changes to current/programmed capabilities, the sponsor may choose to do a DCR.**

**Note: Refer to FM 5-0, *Army Planning and Orders Production*, for the definitions of "feasible," "acceptable," and "suitable."**

# FSA Practices (2 of 4)

**Step 2: Re-assess the operational risk of not filling the gap.**

- **Survey SMEs on the gaps and their associated operational risk, as modified by applying the sponsor-accepted solutions developed in step 1 of the FSA.**
- **Examples:**
  - **(Gap 2) Doctrinal changes prescribe helicopter security for logistics operations; likelihood and severity of Threat ambushes reduced.**
  - **(Gap 5) Organizational changes add liaison officers to BCT staffs to enable coordinated planning with coalition battalions; resolves gap.**




**DOTmLPF solutions resolve or mitigate gaps, eliminating or reducing the size of the gap requiring a materiel approach.**

**The output of this step is a refined/reduced list of the gaps that will require materiel approaches.**

# FSA Practices (2 of 4)

**Since some of the solutions in the previous step resolved or mitigated some of the gaps, the JCIDS team needs to re-assess the severity of the gaps that remain. For example, one solution may have resolved a communication gap for fighting dismounted in conjunction with armor, but it may not have resolved a recognition of friendly forces gap for the same required capability. Any new materiel start would have only to fill the second gap.**

**Survey SMEs using the same type of survey used for assessing the operational risk associated with not filling a gap that was used in the last step of the FNA, but exclude from the survey those gaps that the sponsor said had feasible, acceptable solutions developed in the first step of the FSA.**

**Document and include all proposed solutions—DOTmLPF and materiel concepts—in the FSA portion of the report. As conditions change, previously non-selected solutions may become reasonable and feasible to mitigate gaps.**

**Brief the sponsor on the results using similar means described for "FNA Illustrative Output," and show the changes in operational risk associated with incorporating the DOTmLPF solutions from the preceding step (as in the illustration on the left in the chart above). The sponsor may provide additional focus on which gaps to concentrate on in developing ideas for materiel approaches.**

# FSA Practices (3 of 4)

**Step 3: Identify materiel approaches.**

- **Provide SMEs with background:**
  - **Required capabilities (the TCS set).**
  - **Gaps that remain from step 2 of the FSA.**
  - **DOTmLPF solutions from step 2 of the FSA.**

**Include technology SMEs for this step.**

- **Using operational vignettes that set the context for the gaps, obtain input from SMEs to identify materiel approaches for overcoming the remaining gaps. Have SMEs:**
  - **Identify multiple approaches for each gap.**
  - **Identify DOTmLPF implications for each identified approach.**

**The output of this step is a list of new materiel approaches. Combine this list with the DOTmLPF solutions from step 1 to conduct the analysis of materiel approaches (AMA).**

# FSA Practices (3 of 4)

**At this point in the JCIDS analysis, some gaps remain that can be filled or mitigated only through new materiel starts. This step of the process enables identification of a variety of materiel approaches for overcoming the gaps.**

**The set of SMEs required for this step is more broad than in previous steps. In addition to warfighting and Threat SMEs, include technology SMEs (e.g., from RDECOM) to provide information on technology maturity, other service SMEs, and representatives from industry.**

**It's best to have the SMEs meet to facilitate the free-flow of ideas for the materiel approaches. Drive the discussion with operational vignettes to focus the SMEs on the true nature of the gap. As with the development of DOTmLPF solutions (step 1 of the FSA), provide some limits on the approaches by having the various SMEs identify when a proposed solution is infeasible.**

**Have the SMEs identify as many materiel approaches as possible during this step to make sure that all "good" ideas get surfaced. Materiel approaches should be non-specific. For example, when fighting dismounted with armor, if the requirement is to identify friendly forces, two materiel approaches might be to network the dismounted soldiers with the armor or to develop a transponder for each soldier that allows him to be interrogated as friend. Don't try to determine the type of network or the type of transponder. If one of these materiel approaches is ultimately pursued, the decision on the type of network or transponder will be made after a milestone A decision.**

# FSA Practices (4 of 4)

**Step 4: Analyze materiel approaches.**

- **Develop a survey that, for each approach, addresses:**
  - **Technology maturity.**
  - **Technological risk.**
  - **Supportability.**
  - **Affordability.**
  - **Operational impact (ability to achieve objective).**
  - **DOTMLPF implications.**
  - **Impact on other functional areas.**

**Identify the appropriate metrics for each of these areas.**

- **Obtain weighting criteria from the study sponsor.**
- **Survey appropriate SMEs, having them assess each approach only as it applies to their area of expertise. For example, a SME from DASA-CE would assess affordability, but not operational risk.**
- **Prioritize the approaches and present results to the sponsor, indicating each approach's ability to resolve a gap.**

**This step completes the FSA. The FSA's output consists of non-materiel and materiel approaches for filling gaps.**

# FSA Practices (4 of 4)

**This portion of the FSA is called the analysis of materiel approaches (AMA) and it consists of an assessment of DOTmLPF solutions (FSA step 1) and new materiel approaches (from step 3) for overcoming capability gaps. The output is a prioritized list of the more desirable materiel approaches to pursue. Develop a survey to capture the assessment of SMEs for the following areas (list below gives area, a brief description, and authoritative organizations from which to draw SMEs)**

- **Technological Maturity: degree to which current technology exists <u>today</u> to support implementation of a particular materiel solution (RDECOM, CECOM, AMSAA).**
- **Technological Risk: a combined measure of the likelihood that the technology required to support a materiel solution can be developed and the consequence that a failure to develop the technology would have on implementation of fielding the materiel solution (RDECOM, CECOM, AMSAA).**
- **Supportability: a measure of the time, personnel, and logistics support requirements necessary to implement a materiel solution (CASCOM, other logistics schools, TRAC LEE).**
- **Affordability: degree to which the Army will be able to pay for a new materiel program (DASA-CE, G-8, PMs).**
- **Operational impact: degree to which implementation of a particular materiel solution will fill its related capability gap and attain the objective (Proponents, other Army schools, other services).**
- **DOTMLPF implications: degree to which implementation will require associated DOTMLPF changes (Appropriate TRADOC representatives for each DOTMLPF component).**
- **Impact on other functional areas: a measure of how much impact implementation of a materiel solution will have on other functional areas (including joint) (CAC, other services, JFCOM).**

**Obtain any weighting criteria from the sponsor and then survey the SMEs. Make sure that the survey focuses on the metrics from the FNA. For example, if lethality was not a metric in the FNA, don't include survey questions that address lethality for any of the areas above.**

**Prioritize the approaches, by gap, based on the survey responses. Present the results to the sponsor. This ends the JCIDS team's major efforts for JCIDS analysis, although they may be called upon to assist organizations that conduct analyses of alternatives (AoAs).**

# Illustrative FSA Output

**The FSA produces a prioritized list of non-materiel and materiel approaches for filling gaps.**

**Approaches to include in ICD. May be two alternatives for MS A AoA.**

**Approach assessed infeasible. Presented to sponsor, but not part of ICD.**

| Approach | Tech maturity (1) | Tech risk (3) | Supportability (3) | Affordability (2) | Opn'l Impact (4) | DOTMLPF implications (Go / No Go) | Functional area impacts (Go / No Go) | Total (lower better) |
|---|---|---|---|---|---|---|---|---|
| A | 2 | 6 | 12 | 4 | 20 | Go | Go | 44 |
| B | 2 | 6 | 15 | 6 | 24 | Go | Go | 53 |
| C | 4 | 12 | 15 | 6 | 30 | Go | Go | 67 |
| D | 5 | 12 | 6 | 8 | 4 | No Go | No Go | N/A |

Criteria weight in parentheses; higher weight is more important. Numbers are illustrative only.

# Illustrative FSA Output

**The output above is only illustrative. The technique used in the illustration is a means for representing a prioritization of the approaches (both new materiel and DOTmLPF approaches). It also illustrates the factors that led to the overall assessment of each approach.**

**In the illustration, the numbers are determined by multiplying the average of the SME's assessments and then multiplying that average by the category weight (if the sponsor desired different weightings). The total column is simply a sum of the each row's weighted averages.**

# Cautions

- Think through the entire JCIDS analysis process before beginning the FAA; there are a number of relationships and data/participant requirements that require early identification to ensure a smooth analysis.
- Do not conduct JCIDS analysis to justify a preconceived materiel solution.
- Use functional tasks as the basis for defining capability gaps; do not define gaps based on a particular program's specifications.
- Make sure SMEs have appropriate competencies.
- Be clear on the scope of the JCIDS analysis.
- The FAA is the most vital step since it serves as the foundation; take the time to do it right.
- Use authoritative sources for determining current/ programmed capabilities.
- Brief, and obtain guidance from the sponsor after identifying gaps and solutions (both non-materiel and materiel).

# Cautions

**Throughout this COBP certain key ideas are preceded with caution symbols. These represent those items in which the JCIDS team must take particular care and are summarized below.**

**It should be evident that each step of the JCIDS analysis builds on a previous step. To enable a valid analysis and to ensure identification of the appropriate participants and techniques to use, plan the full process before beginning with the FAA. Don't hop on the bus without knowing the final destination and the route.**

**Be sure to avoid entering the process with the idea that a materiel solution is required or that a specific program is required. Base the entire analysis on what has to be done (i.e., the TCS) from a functional point of view. Be prepared to deal with those who are convinced that their program or their materiel solution will provide some capability that isn't required.**

**JCIDS analysis depends predominantly on input from SMEs. To ensure the analysis can stand the scrutiny that it's sure to receive, make sure the SMEs have the right competencies in terms of knowledge and experience in the areas for which they're providing input.**

**JCIDS analysis can be challenging because units have to conduct numerous tasks. Be clear on the scope of the analysis and don't be reluctant to approach the sponsor if the scope of the analysis is beyond the time limit the sponsor has directed for completing the analysis.**

**The FAA must be done well. Take special care in doing it or all that follows may lose some of its validity or require some revisiting of work already done.**

**Use authoritative sources throughout the analysis. The current/programmed capabilities, whether non-materiel or materiel, must be provided by organizations who are the recognized authorities for having the most up-to-date information or position on the topic.**

**Keep the leadership informed of the analysis progress and results. The leaders/review body will be cognizant of some issues that will facilitate the analysis and the direction it takes. They will also be the best source for identifying which solutions are acceptable.**

# Summary

- **The JCIDS analysis methodology is structured and defensible; follow it.**
- **Maintain a joint and operational perspective.**
- **Incorporate PMJ and SME input in all phases of the JCIDS analysis process.**
- **Use the appropriate SMEs for the appropriate steps; use SMEs to provide ideas and assessments.**
- **Develop and focus on required capabilities; don’t take a program-specific approach.**
- **Use defensible analytic techniques, to include sensitivity analysis, throughout the study.**

# Summary

**This COBP provides guidelines for conducting JCIDS analysis. It describes a structured methodology that, if followed provides defensible underpinnings for capability gap identification and development of solutions.**

**Throughout the analysis process, maintain a joint and operational perspective. Identify the appropriate SMEs to participate in the analysis and base the effort largely on the ideas they provide and the assessments they make.**

**Develop and focus on required capabilities. Don't focus solutions development on materiel solutions, and especially don't begin the analysis process to support a specific program.**

**Every step of the way, follow the structured process and use defensible techniques to facilitate completion of a successful JCIDS analysis.**