



INSTITUTE FOR DEFENSE ANALYSES

International Best Practice for Mission-Oriented Defense Resource Management

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Executive Summary

The Korean Institute for Defense Analyses (KIDA) asked the Institute for Defense Analyses (IDA) in August 2016 to prepare a report on methodologies for conducting mission-oriented defense resource management (MODRM). This report builds upon IDA's earlier work, and it includes an examination of international best practice, reviews KIDA's methodologies, and makes recommendations to improve those methodologies.

The approach taken to this work is different from that conducted previously. In the aforementioned work, IDA conducted the research, held an interim review with KIDA colleagues in Washington, D.C., and then visited Seoul to present the findings. While this kept costs to a minimum, there was a missed opportunity to prepare material that would appeal to a broader audience within the Republic of Korea (RoK)—in particular the Joint Staff and the Central Staff within the Ministry of National Defense (MND). For this work, the approach was refined to include an additional visit to Seoul to present the initial findings to KIDA, the Joint Staff, and the MND. This also enabled the work to be tailored to address issues and concerns identified by other key stakeholders.

This work includes a summary of international best practice for defense resource management (DRM), which is taken from IDA's extensive experience in assisting numerous nations with DRM reform over the past 20 years. Following an analysis of KIDA's methodologies, IDA makes six specific recommendations to improve KIDA's approach to MODRM, including the lead responsibility for each recommendation.

DRM brings together strategy, capabilities, cost, and risk. A MODRM process can provide a mechanism for providing timely and effective advice to senior leaders regarding capability gaps, risk, rough cost, and affordability. Four key elements are required to achieve an effective MODRM process, some of which RoK already has in place:

- Missions with scenarios (RoK has these);
- Joint Capability Areas (RoK has these);
- Mapping of programmed units to Joint Capability Areas (JCAs) (RoK has some); and
- Data to support decision-making (RoK has some).

While the focus of RoK's efforts should be on mapping programmed units to JCAs, IDA recommends additional work on each of the areas above.

Military Judgement Panels (MJPs) have an important role in the MODRM process. Properly constructed, with the right, empowered participants and a strong chairperson, MJPs can provide effective and efficient means of gaining capability insights. Providing the MJPs with suitable tools (database, spreadsheets, etc.) and with support from the analytic community (KIDA) helps to provide confidence in the MJPs' deliberations and conclusions.

Finally, IDA recommends that MND Force Policy, with support from KIDA (and IDA) and participation of the Single Services, develop and implement a RoK MODRM process with the necessary supporting tools.

Contents

1.	Introduction	1
2.	Background.....	3
	A. The Evolution of Defense Resource Management.....	3
	B. International Best Practice.....	6
	C. What is the Purpose and Value of DRM?	8
	D. Functional Elements of Defense Resource Management.....	8
	1. Strategy Planning	10
	2. Capability Planning	10
	3. Program and Budget Planning.....	11
	4. Acquisition Planning	11
	5. Execution.....	11
	6. Cost Analysis.....	11
3.	Mission Orientated Defense Resource Management	13
	A. Conduct Mission Area Analysis.....	15
	B. Apportion Military Units.....	16
	C. Adjust Unit Capability Based on Historic Readiness Level.....	17
	D. Identify Gaps and Overages in Current Capabilities.....	18
	E. Four Keys to MODRM Success	19
	1. Scenarios	19
	2. Joint Capability Areas	20
	3. Mapping Units to JCAs	20
	4. Data Integrity.....	20
4.	Specific Guidance for RoK	23
	A. Roles and Responsibilities with MODRM.....	23
	B. Structure and Use of Mission Area Framework.....	25
	1. Missions.....	26
	2. Joint Capability Areas	27
	3. Mapping of programmed units to JCAs	28
	C. Use of Framework – Gap Identification.....	31
	D. Use of Framework – Addressing Specific Questions.....	34
	E. Database	35
5.	Summary.....	37
	Appendix A. Force Orientated Cost Information System (FOCIS).....	A-1
	Appendix B. Illustrations	B-1
	Appendix C. References	C-1
	Appendix D. Abbreviations	D-1

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1. Introduction

The Korean Institute for Defense Analyses (KIDA) has worked with the Institute for Defense Analyses (IDA) for over 4 years. During that time, IDA has produced a number of reports in response to specific requests from KIDA. In chronological order these are:

- *Observations on the Republic of Korea Requirements Verification System*, October 2013, IDA Document D-5044;
- *Analysis of the International Best Practices in the use of Defense Planning Scenarios*, April 2015, IDA Document D-5434; and
- *Scenarios – International Best Practice: An Analysis of their use by the United States, United Kingdom, and Republic of Korea*, February 2016, IDA Document D-5665.

In August 2016, KIDA asked IDA to prepare a report on methodologies for conducting mission-oriented defense resource management, including the structure and quantitative methodology for mission area assessment. This report builds upon IDA's earlier work, and it includes a review of KIDA's methodologies for mission-oriented defense resource management, examines best practice, and makes recommendations to improve KIDA's methodologies.

This report:

- Reviews international best practice for mission-oriented defense resource management, including a discussion of the attributes and relationships among Budget Management (Future Years Defense Program, national budget, etc.), Capability Management (fire support, air defense, indirect fire, etc.), and Functional Management (personnel, facilities, etc.);
- Reviews KIDA's proposed methodologies for mission-oriented defense resource management; and
- Provides recommendations for improving KIDA's methodologies.

The approach taken to this work is different from that conducted previously. In the aforementioned work, IDA conducted the research, held an interim review with KIDA colleagues in Washington, D.C., and then visited Seoul to present the findings. While this kept costs to a minimum, there was a missed opportunity to prepare material that would appeal to a broader audience within the Republic of Korea (RoK)—in particular the Joint Staff and the Central Staff within the Ministry of National Defense (MND). For this

work, the approach was refined to include an additional visit to Seoul to present the initial findings to KIDA, the Joint Staff, and the MND. This also enabled the work to be tailored to address issues and concerns identified by other key stakeholders.

2. Background

A. The Evolution of Defense Resource Management

Annual planning cycles and functional-based planning have a significant weakness in that they cannot keep pace with the demand for new capabilities and ever more-expensive weapons systems. This weakness stems from two major causes: a lack of a multi-year planning process to develop a mid-term defense program and no method to translate mid-term resource plans into budget programs.

Functional-based (platform centric) planning favors system requirements over joint military capability, focusing on what is wanted in a specific system rather than the joint capability needed to meet the military strategy. More often than not, Services fall into the trap of functional-based planning when they try to solve a service problem (e.g., replace a weapons system) rather than solve a joint capability problem (e.g., address a specific need in the strategy).

Annual planning cycles and functional-based planning are reactive. They do not anticipate needed defense capabilities in sufficient time to field the capability when it is needed. They also do not consider the impact of current decisions on future defense programs, which often leads to a defense budget that is unaffordable and inflexible.

As decision makers recognized the need to avoid near-term choices that were not sustainable in the future, they were driven to a different approach to planning, with a determinant link to strategy as the means of prioritization.

Defense Resource Management (DRM) Systems, and their planning processes, exist to convert a nation's financial resources into military capability. This conversion of resources occurs in three critical parts:

- Translation of military strategy into affordable resource plans capable of executing that strategy,
- Conversion of those resource plans into executable annual budgets, and
- Effective and efficient execution of those annual budgets to procure the goods and services that comprise the Armed Forces.

As previously defined in other IDA publications, DRM “includes a range of activities, from the definition of mid- to long-term defense objectives, through the formulation of intermediate plans to achieve those objectives, to the development and execution of annual budgets that implement the plans, and finally to the collection and review of data

on the results of actual expenditures and the adjustment of the plans to recognize those results.”¹

In the broader context of ministry responsibilities, DRM operates at the intersection of four core management processes:

- DRM,
- Defense strategy and policy,
- Defense human resource management, and
- Defense logistics (Figure 1)

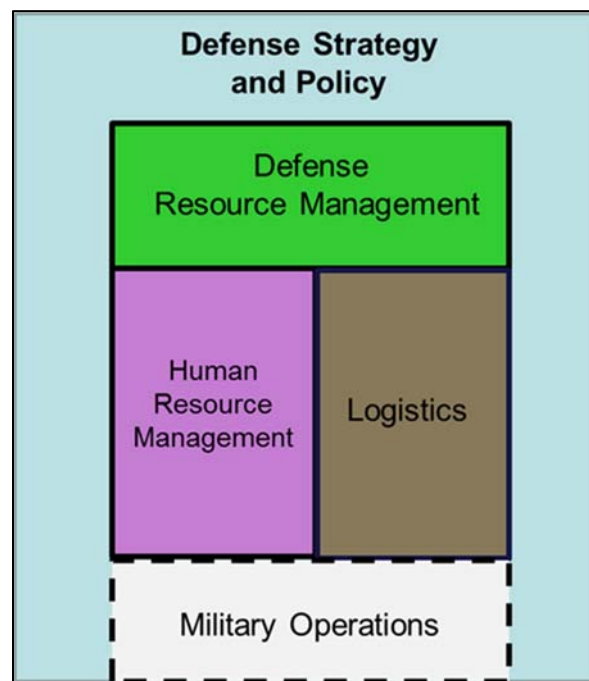


Figure 1. Defense Management Processes

Properly designed and implemented, the DRM process links the defense strategy and policy process to resource plans and budgets, and it translates the resultant military capability to warfighters (forces), largely through the defense human resource management (personnel) and defense logistic (equipment, facilities, and infrastructure) processes. When effectively executed by the nation’s defense establishment, these four core processes work in unison so that the Armed Forces of the nation are properly organized, appropriately trained, effectively equipped, and adequately sustained.

¹ C. Vance Gordon and Wade P. Hinkle, *Best Practices in Defense Resource Management*, IDA Document D-4137 (Alexandria, VA: Institute for Defense Analyses, January 2011), 2–3.

Successful design, implementation, and execution of these core processes are some of the most significant tasks of defense institutions.

Despite the importance of these core processes, especially DRM, their implementation has been challenging in many countries. The increasing roles and missions of the Armed Forces, combined with the difficulty of maintaining and sustaining ever more sophisticated military equipment, complicates defense planning and budgeting. At the same time, many militaries face flat or even decreasing financial resources. These limited defense resources, increasingly complicated planning problems, and complex weapons systems expose weaknesses in annual planning cycles and functional-based planning—most notably, the inability to forecast resource demands into the future or to effectively prioritize the capabilities needed to address changes in the security environment.

Effective resource planning and multi-year procurement efforts undertaken by even the smallest of militaries demands that these future obligations be recognized and balanced against other commitments. Budget limitations make predicting the future impact of current decisions imperative, but single-year planning cycles do not account for future obligations well. The need to maximize defense resources demands cost-effective military alternatives while prioritizing the most-needed capabilities.

Best practice suggests that effective DRM systems successfully accomplish four basic functions:

- Analyze (convert data into information essential to the planning process),
- Plan (consider options and ultimately publish a defense program),
- Execute (spend the military budget to procure goods and services), and
- Report (collect essential data for use in the next round of planning) (see Figure 2).

Accomplishing these critical functions is challenging in many nations, but it is critical to significantly increasing the quality of military capability that a nation can acquire, maintain, and sustain.

Another continuing challenge in DRM is the acquisition of new systems. In general, IDA research shows a bias toward platform-centric planning that tends to favor system requirements planning to the detriment of joint capability planning.

The Military Services (referred to hereafter as the Services) are particularly prone to systems-based planning. Service efforts to solve their own problems are, by their nature, parochial, since the Service has no alternative but to plan for its own future and no option to produce joint capability solutions due to the absence of joint capability planning processes. This absence of a joint capability planning processes results in Service-centric

capability planning, which produces domain-specific solutions to Service capability gaps. The Services drive the capability planning process, mostly through systems acquisition, and joint military capability suffers while defense budgets decline. Joint capability planning offers the defense institution a better alternative.

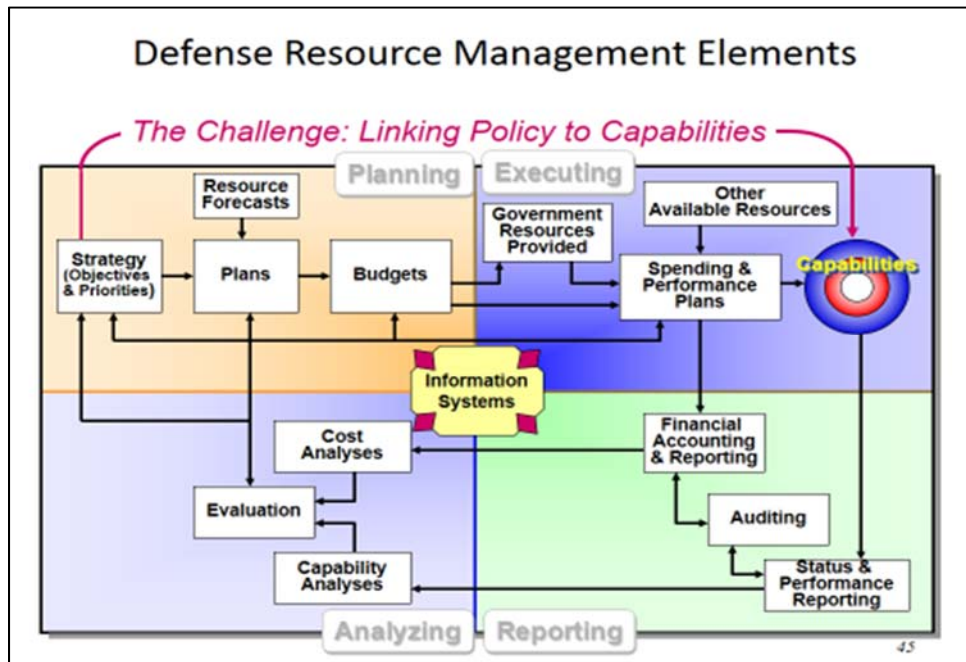


Figure 2. Defense Resource Management Functional Elements

A successful DRM process must do three things:

- Translate military strategy into affordable resource plans capable of executing that strategy;
- Convert those resource plans into executable annual budgets; and
- Effectively and efficiently procure goods and services.

Capability Planning is the critical step in the process. It is the link to strategy; it defines the capability gaps filled by defense acquisition; and it values the contribution of readiness in defense planning. It creates the balance between what is needed, what is affordable, and the associated risk.

B. International Best Practice

As was previously provided in the *Observations on the Republic of Korea Requirements Verification System* report, no single DRM or capability planning system is universally applicable in all nations because of differences in national public financial management laws, culture, and customs. However, 20 years of IDA research has

identified best practices for the design and implementation of DRM and capability planning systems.

One of the key findings from this research is that DRM systems—and capability planning systems more specifically—universally benefit from the application of five enabling attributes that improve the effectiveness of both DRM and capability planning systems. The five enabling attributes are:

- Sound process design (to ensure effective interaction between all functions),
- Standardized taxonomy (to facilitate information exchange and communication),
- Data integrity (to ensure accuracy),
- Analytic rigor (to support decision-making with the right tools), and
- Organizational alignment (to ensure proper assignment of roles and responsibilities).

The enabling attributes provide consistency in the application of best practice across the complete DRM system and in each of the functional elements individually. The cross-functional relationship of the enabling attributes to the functional elements is shown in Figure 3.

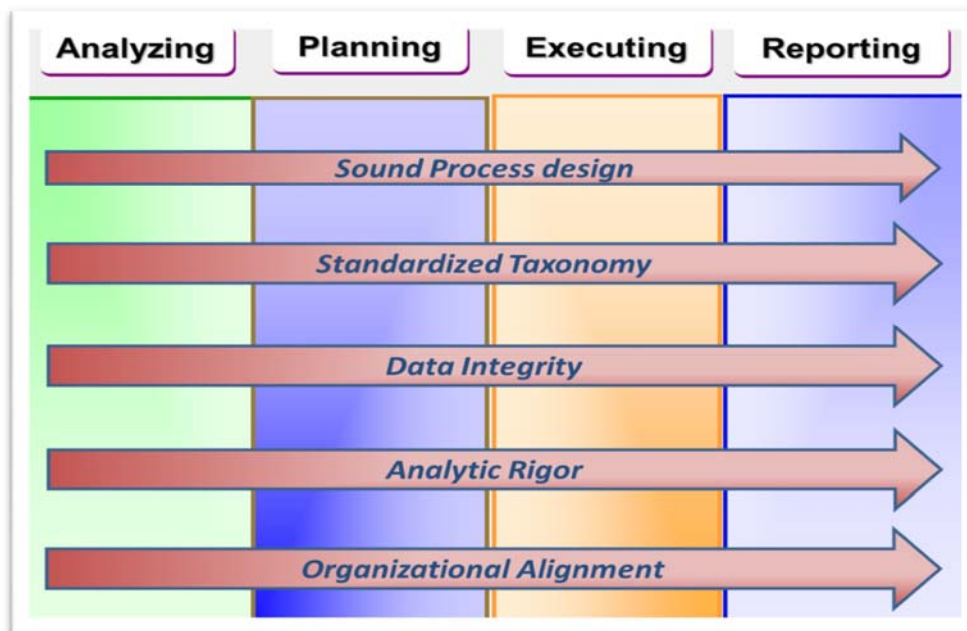


Figure 3. Relationship of Enabling Attributes to DRM Functional Elements

Sound process design ensures each of the functional elements accomplishes its primary function, and it also ensures that an effective interface exists between each of the functions. The taxonomy must be standardized across all functional elements such that

each part of the system communicates in common planning terms with the others. Data must be collected, analyzed, and presented consistently across the functional elements. Analytic tools support each functional element but produce products designed to inform analysis and decision-making in later elements. Organizational alignment must be maintained in each of the functional elements as well as the DRM system as a whole. While the enabling attributes are broadly applicable across the whole of the DRM system, they are specifically applicable to capability planning.

A useful secondary benefit of the enabling attributes is their use as a framework to examine established capability planning processes. By viewing candidate planning processes from the perspective of the enabling attributes, areas where the candidate differs from best practice in each attribute may be observed and described. Bringing established planning processes in line with the five enabling attributes of best practice is a proven approach, illustrated in Figure 3.

C. What is the Purpose and Value of DRM?

As stated earlier, DRM is the management process that identifies the best mix of current and future capabilities that meet defense objectives within available resources and acceptable risk. It converts a nation's financial resources into a military capability that is aligned to the national strategy and objectives.

This is increasingly important as limited defense resources and increasingly demanding requirements expose the weaknesses in annual planning cycles. The need to leverage scarce defense resources forces the system to identify alternatives that best balance cost-effectiveness and risk. The more complex security environment has naturally led to increasing military complexity and more-complicated military planning. Limited resources make rigorously assessing the potential future impact of current decisions imperative.

Functional-based planning must have some mechanism for prioritizing the most-needed functions over the less-needed functions. This drives the system toward a capability-based approach to planning, with a determinant link to strategy as the means of prioritization.

D. Functional Elements of Defense Resource Management

IDA previously identified four essential elements that have to work together to provide a quality DRM process. As depicted in Figure 4, they are:

- Planning:
 - Strategy, Capability,
 - Acquisition, Budget;

- Analysis:
 - Cost/Risk Analysis,
 - Capability Analysis:
- Execution:
 - Budget execution,
 - Procurement;
- Reporting:
 - Performance,
 - Finance and Accounting,
 - Readiness.

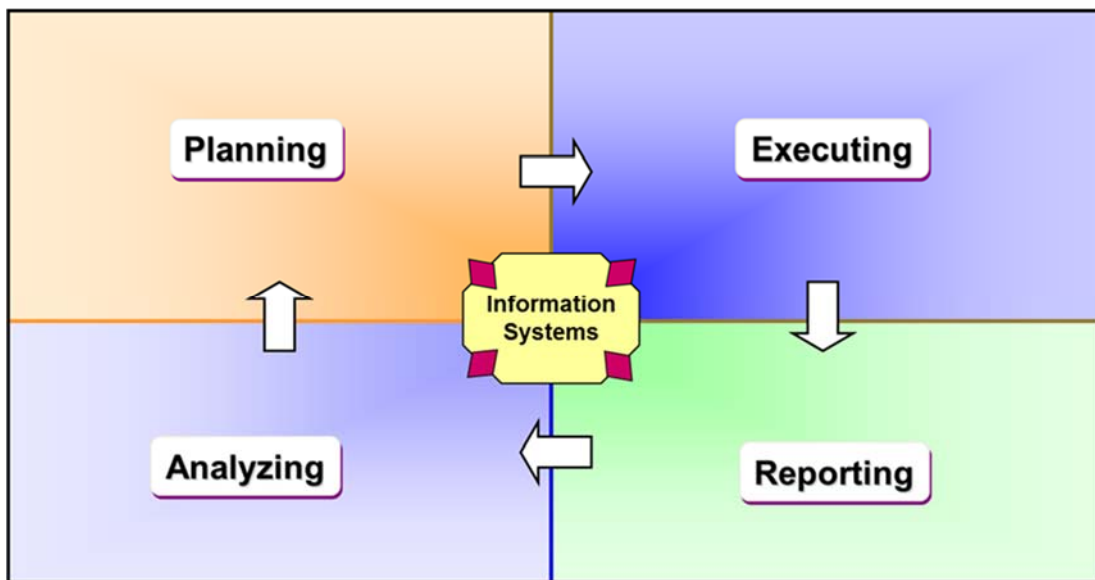


Figure 4. Functional Elements of DRM

This study is firmly focused on the “Planning” element, which includes strategy planning, capability planning, program and budget planning, and acquisition planning, as shown in Figure 5.

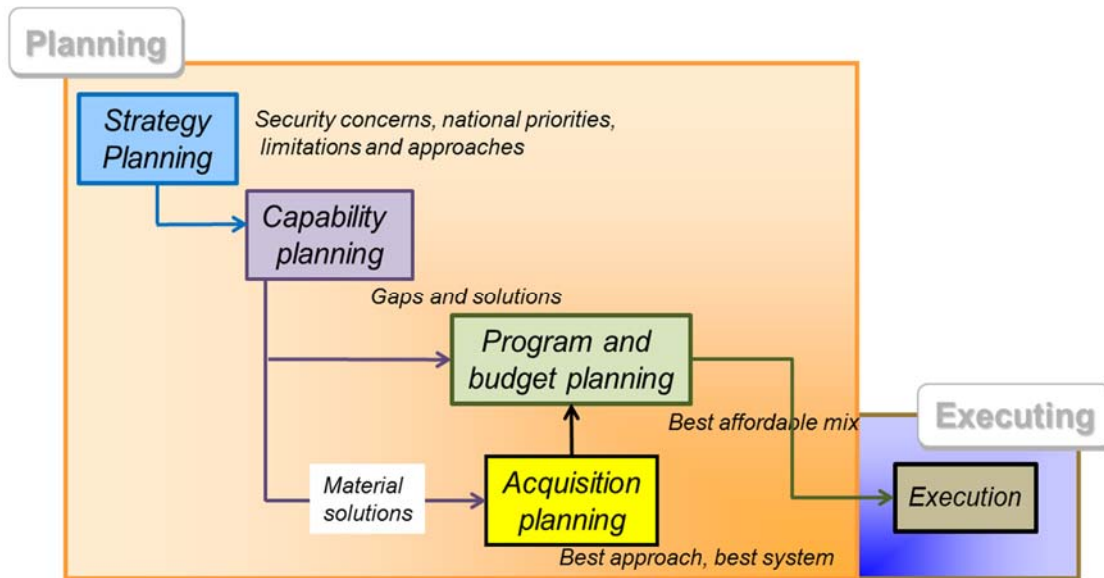


Figure 5. Planning Model

1. Strategy Planning

Strategy planning derives a “military strategy” from national strategy to inform defense resource planning. At a minimum, strategy planning must yield a set of military objectives and priorities for resource planning. It should identify any limitations of and restrictions on the use of the military as articulated by the national and ministerial leadership. It must consider many of the external inputs to resource planning, such as the strategic environment and the threats and challenges the military must address. These are then translated into defense scenarios that represent future defense challenges.² Priorities established in strategy planning also influence program and budget planning.

2. Capability Planning

Capability planning uses the guidance and scenarios from strategy planning to determine whether planned capabilities are sufficient to meet national objectives. Capability planning identifies and assesses options for reducing risks through improvements in capabilities. It is crucial that effective capability planning precede acquisition planning. The most cost-effective option to resolve a capability gap may not involve new, more, or modified equipment, e.g., improved training or maintenance often can provide significant increases in capability. Capability planning constrains program and budget planning to the bounds of the strategy, and it creates the demand for acquisition planning.

² Neill, Martin and Hinkle, Wade. “Scenarios – International Best Practice: An Analysis of their use by the United States, United Kingdom, and Republic of Korea,” February 2016, IDA Document D-5665.

3. Program and Budget Planning

Program and budget planning allocates funding among defense objectives and capabilities, ensuring the best mix of capabilities (the best cost-capabilities-risk tradeoffs) within the program budget. Those decisions are recorded in the program of record by account for submission with the annual budget. In addition, it examines performance and prior funding through program evaluations.

4. Acquisition Planning

Acquisition planning refines the products of capability planning into recommendations about which systems should be acquired, with what precise characteristics, in what quantities, and on what schedule. These recommendations, once reconciled with fiscal realities, are incorporated into the program budget along with their sustainment requirements.

5. Execution

Execution of the program and budget plan is an in-year activity that delivers the allocated resources to the approved programs and activities. Execution of these programs and activities must be in line with the defined policy and strategy of the government. The process normally involves compliance with appropriate accounting, legal, and administrative requirements.

6. Cost Analysis

Finally, underpinning this is cost analysis. Any DRM system relies on cost analysis and estimation to calculate the demand for future resources. DRM is very difficult without a reliable means to quantify, understand, and compare costs across disparate systems, independent processes, and future time horizons. Cost analysis is a systematic effort to estimate the direct and indirect costs of existing and new policies, which are routinely revised as conditions change. It is required in all resource management structures to provide senior leaders with unbiased estimates of program and operations costs at each step in resource decision-making. Cost analysis is performed according to an agreed upon set of rules so that estimates are consistent, comparable, and open and transparent to all in the process. One of the most important rules requires the estimation of the total lifetime cost of all new systems as resource plans are developed and not just the acquisition cost.

The elements must work together, require senior leadership involvement early and often, and must align with the nation's public financial management processes such that budgets can be submitted in completeness and on time. Said another way, the elements are not distinct modules completed independent of each other or out of sequence. The

process is not autonomous, and its pace must match outside processes, normally those controlled by the Ministry of Finance.

3. Mission Orientated Defense Resource Management

Mission-orientated defense resource management (MODRM) is a subset of the planning model and focuses on providing senior leaders with timely, resourced, and informed options regarding missions, capabilities, and risk. MODRM focuses on capability planning and the use of mission area assessments to transition to program and budget planning. This is shown in Figure 6.

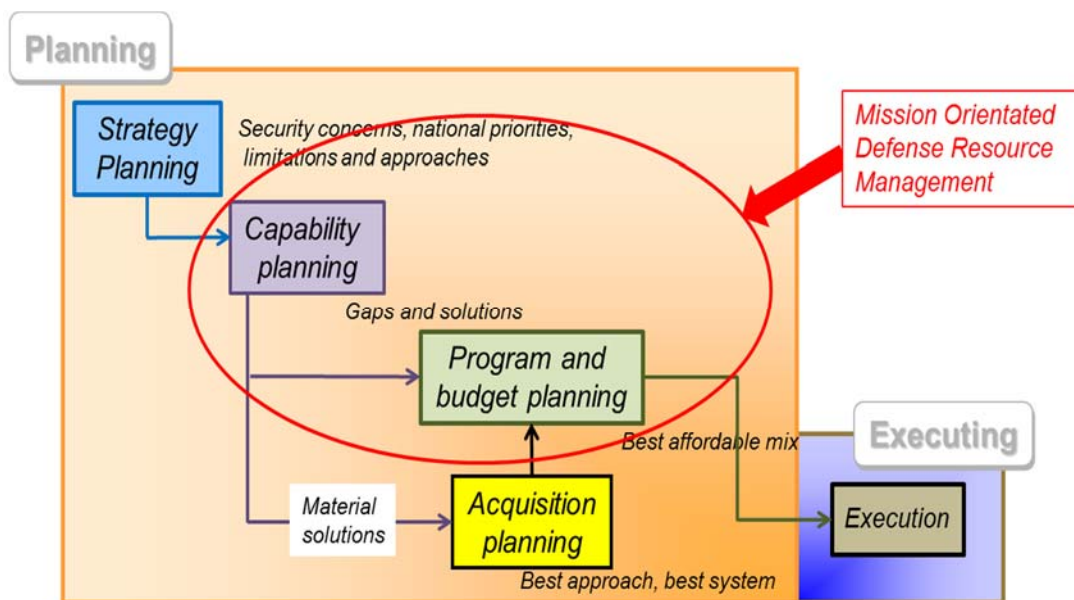


Figure 6. Mission Orientated Defense Resource Management Model

Many of the steps in MODRM are the same as in capability planning:

- Conduct mission area analysis,
- Apportion military units to accomplish those missions,
- Adjust unit capability based on unit readiness level, and
- Identify gaps and overages in current capabilities.

The difference is that it includes elements of program and budget planning as it considers the whole force structure and compares that against available resources. While this is done at a high level (i.e., not at budget-level detail), it does enable an assessment of whether or not future plans are sufficient to meet national objectives within a given

budget total, at an acceptable risk. MODRM enables the identification and assessment of options for any known capability gaps and includes balancing the functional components that deliver capability—Forces, Equipment and Readiness and Operations (see Figure 7).

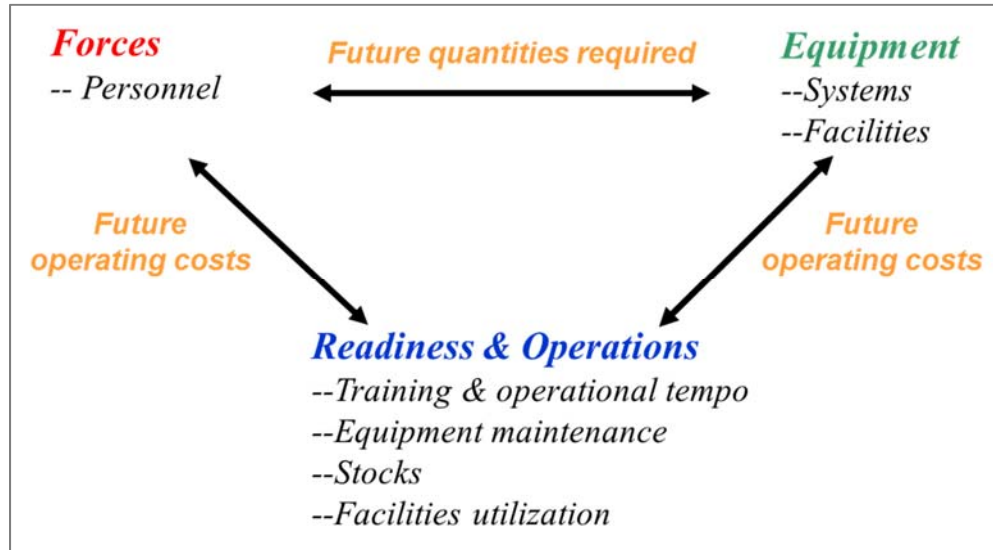


Figure 7. Three Functional Components of Capability

Within these constraints, the purpose of MODRM is to determine whether planned military capabilities (those that are owned now and planned to be owned in the mid-term) are sufficient to meet national objectives. If they are not, capability planning must identify the shortfalls, called gaps, and overages and assess options for near and mid-term improvements. It is essential that capability planning occur at the joint operational level and be supervised by the Ministry, led by a joint organization reporting to the Minister, and informed by the combined operational expertise of the independent Services.

A common, and grave, error in capability planning is the emergence of weapons system nominations from the independent Services. These weapon system requests may masquerade as capability requirements, but in fact they represent Service acquisition requests rather than solutions to joint capability gaps. No new weapon system proposal from the Services should be accepted unless it is generated first from the joint capability planning process. Maintaining this process discipline so that capability planning always drives acquisition planning is a critical step in controlling future acquisition costs and ensuring that every defense investment solves a joint capability gap.

The start point is capability assessments, which identify the capabilities necessary to accomplish the missions delineated in strategy planning. They also answer the most fundamental question of military force planning—can the planned force complete the planned missions (those relative to the strategy) at an acceptable level of risk? The capability assessment occurs very early in the capability planning process since it

provides context for many of the analytic tools used later in capability planning. It is the precursor to, and must precede, capability proposals. Capability assessments determine which planned capabilities are needed most prior to identifying capability gaps and overages.

Once these capability needs are determined, the process identifies gaps and overages of those specific capabilities by comparing the needed capability to the planned capability in the mid-term force structure. Identifying these capability gaps and overages is the primary goal of capability assessment. Three types of gaps may be discovered:

- Type 1: No units of the type needed exist in the planned force structure.
- Type 2: Units of the correct type exist but there are too few to accomplish the missions required by the strategy.
- Type 3: Units of the correct type exist, but some or all have inadequate capability.

The capability assessment may also identify overages in certain capabilities. These overages can result when mission demand for a particular capability is significantly less than planned, or when capability planning identifies that a particular capability is no longer required at all. (It is not uncommon for each Service to have a capability that independently meets a need but that represents an overage when taken together in a joint capability analysis.)

The capability assessment has four steps:

- Conduct mission area analysis,
- Apportion military units,
- Adjust unit capability based on historic readiness level, and
- Identify gaps and overages in current capabilities.

A. Conduct Mission Area Analysis

Mission area analysis defines in operational mission terms what forces do for the nation. This step can use current missions or future anticipated missions from strategy planning as the basis for defining mission areas. Operational planning skills³ are particularly useful at this stage to decompose the mission areas into capability areas and capability sub-areas. Joint Capability Areas (JCAs), if available, are helpful at this point. The output of this first step is a mission area assessment framework, as shown in Table 1.

³ The skills from planning and executing real military operations.

Table 1. Mission Area Assessment Framework

Mission Area	Capability Areas	Capability Sub-Areas
Humanitarian Assistance/ Disaster Relief	Austere Airfield Opening	Aerial Port
		Engineer Construction
		Tactical Airlift
		Airfield Operations
	Humanitarian Operations	Bulk Water Supply
		Field Kitchen
		Engineer Construction
	Medical Operations	Field Medical Support
		Tactical Airlift

B. Apportion Military Units

Military units are apportioned using the current or planned mid-term force structure so that each of the capability sub-areas in the mission area assessment framework is assigned an actual military unit. Force allocation in this step is based on factors such as current operational tempo (OPTEMPO), rotation rates, sortie rates, etc. Tools such as operations research and campaign analysis can be particularly useful in both mission area analysis and in apportioning forces. Normally each military unit is used only once, unless planners can accurately account for the use of a unit in more than one mission, given that those missions would not occur at the same time. Units at this stage should be apportioned by unit name (Table 2) to ensure that unit readiness rates can be assigned in the next step.

Table 2. Apportioned Units by Unit Name

Mission Area	Capability Areas	Capability Sub-Areas	Apportioned Unit Name
Humanitarian Assistance/ Disaster Relief	Airfield Opening	Aerial Port Operations	1st Aerial Port Squadron
		Engineer Construction	1st Horizontal Construction Flt
		Tactical Airlift	128th Tactical Airlift Sq
		Airfield Operations	1st Operations Support Flt
	Humanitarian Relief Operations	Bulk Water Supply	1st Water Production Flt
		Field Kitchen	3rd Mission Support Flt
		Engineer Construction	1st Vertical Construction Flt
	Field Medical Operations	Field Medical Unit	3rd Field Hospital
		Tactical Airlift	129th Tactical Airlift Sq

C. Adjust Unit Capability Based on Historic Readiness Level

Readiness rates have a direct impact on the military capability of a unit at any given time. Since very few military units operate continuously at 100 percent of design capability, adjusting for readiness is an essential part of capability planning. Acceptable readiness rates are directly dependent on adequate funding of readiness accounts. Military planners can calculate the actual military capability of a unit by applying annual readiness rates to planned unit capabilities. For example, a tactical airlift unit may be assigned 12 aircraft. If its aircraft readiness rate is 50 percent, then it typically has just six aircraft ready to fly missions. If the mission area analysis framework required the unit to provide 12 aircraft for a particular mission, then the unit is only 50-percent mission ready. See Table 3.

By including this step in capability planning, the value of readiness to military capability can be measured and readiness accounts adjusted, as necessary, when readiness is limiting the ability of military units to accomplish their assigned missions. If available, historical program data (normally the last 3 years) is preferred when applying readiness rates. The correlation between readiness rates and readiness planning is important for capability planners to understand. In most cases, as readiness funding is increased, readiness rates improve. Based on this relationship, planners can estimate the impact of increases, or decreases, in readiness funding and the related improvement, or decline, in military capability.

Military judgment plays a key role in this step, since this process is equally subjective and objective. The major risk in this process is failing to value the contribution of readiness in capability planning at all. Failing to consider readiness and to fund

readiness accounts sufficiently ensures that the force structure will never produce its designed military capability. It also risks having too much force structure with too little actual capability.

Table 3. Complete Mission Area Assessment Matrix

Mission Area	Capability Areas	Capability Sub-Areas	Apportioned Unit Name	Readiness Rate (%)
Humanitarian Assistance/ Disaster Relief	Airfield Opening	Aerial Port Operations	1 st Aerial Port Squadron	90
		Engineer Construction	1 st Horizontal Construction Flt	90
		Tactical Airlift	128 th Tactical Airlift Sq	50
		Airfield Operations	1 st Operations Support Flt	65
	Humanitarian Relief Operations	Bulk Water Supply	1 st Water Production Flt	25
		Field Kitchen	3 rd Mission Support Flt	25
		Engineer Construction	1 st Vertical Construction Flt	90
	Field Medical Operations	Field Medical Unit	3 rd Field Hospital	60
		Tactical Airlift	129 th Tactical Airlift Sq	85

D. Identify Gaps and Overages in Current Capabilities

Gaps and overages in current capabilities should be identified by determining which sub-areas have inadequate force structure. As mentioned earlier, gaps can come in three forms: no units of the type needed, too few units available to achieve what is needed, and inadequate readiness of the units available. Planners must also determine whether any force structure remains unassigned; this unassigned force structure may represent force structure overages. These overages present opportunities to divest of unneeded capabilities in order to acquire new or additional capabilities in capability areas with shortages. However, not all overages should be considered bad. For example, fire support includes all-weather artillery and weather-dependent close air support. The artillery might be considered redundant—unless weather grounds the aircraft. The key thing is to recognize the opportunity cost of resourcing a potentially redundant capability vice a priority capability shortfall.

Planners should list sub-areas with inadequate force structure, provide the rationale for this assessment (i.e., explain the capability gaps), and list the units that remain unassigned as a way to indicate potential areas of declining relevance and opportunity for reinvestment.

A final important part of this step is assessing the relative importance of each capability gap—some gaps may be critical to national security while others may be gaps

that have little strategic or operational impact. Once the importance of each gap has been determined, planners should produce a final integrated and prioritized list of gaps. This integrated list of gaps and overages is a key input to developing capability and resource proposals for consideration by senior leaders in the decision-making part of the process.

It is important to note that capability assessment is a process of discovery, and going through the process is more important than following an exact process. Describing major mission areas in terms of needed capabilities ensures that capability assessments remain grounded in strategy. Associating units and their readiness rates to the capability sub-areas ensures that the contribution of readiness to the strategy is protected in the planning process.

E. Four Keys to MODRM Success

As stated previously, MODRM focuses on capability planning and the use of mission area assessments to transition to program and budget planning. Four keys are critical to a process that will convert a nation's resources into military capability aligned with national strategy and priorities: scenarios, Joint Capability Areas (JCAs), the mapping of units to the joint capability areas, and data integrity.

1. Scenarios

The role of a scenario is to provide a common framework for analysis to support decision-making consistent with current government policy. The connection to current policy is vital to ensure that the scenario is relevant to challenges that the current government wants the Armed Forces to be able to undertake in the future.

A scenario should represent the joint environment and not advocate for a particular component, capability, or solution. It should provide the context to address levels of warfare from the strategic through the operational to the tactical.

Scenarios are a tool for analysis that provides standards and commonality across the defense enterprise to enable proper bench-marking and/or comparisons on often disparate things. Properly conducted evidenced-based analysis to support senior decision-makers needs to be based on an agreed set of common assumptions and models. Only then will it be possible for the baseline and viable alternatives to be analyzed and compared.

Scenarios should cover all the potential missions for the Armed Forces, all the potential operational environments, and all current and planned capabilities. However, working in close cooperation with Ministers, the Policy area should prioritize the missions and scenarios, since not all are examined at the same time or during the same year or planning cycle.

2. Joint Capability Areas

The JCAs provide a common language for comparing Service contributions to joint warfighting and enterprise support and enabling a discussion of capabilities across the defense enterprise's many related activities and processes.

The development of JCAs, which cover all functions of the defense enterprise, is crucial in ensuring that all activities and costs are represented. Often missed are the "Corporate Management and Support" activities, which consume considerable resources. This JCA covers essential areas such as MND Headquarters staff, strategy development, capability development, program, budget, and finance. Responsibility for the development and management of the list of JCAs should be with the Joint Staff and typically with the J7 (Force Development).

Experience indicates that while initial creation of the JCAs is a time-consuming process, they comprise a very powerful and influential framework that has multiple uses across the defense enterprise, including capability planning and force development.

3. Mapping Units to JCAs

Mapping planned units to the JCAs is essential to ensuring that the capabilities can be costed and that the full utility of each unit is properly represented. Any units that do not map to a JCA may not be required.

Mapping the units to JCAs is a difficult process and is best managed by the Joint Staff in close cooperation with the Services. As the representative of the Joint Warfighter, the Joint Staff should have the final say over the mapping and have overall responsibility for ensuring it is current and available for use.

In conducting such a mapping, it will be evident that a number of JCAs can be supported by more than one unit and that a unit can support more than one JCA. During the mapping, every JCA that a unit can provide should be identified and recorded. It is during the mission area assessment that a particular unit will be chosen to support that capability for that particular mission/scenario.

Similar to the creation of the JCA framework, the initial mapping of the units to JCAs is time-consuming, but it will pay dividends during the mission area assessment and in the ability to respond quickly to questions from senior leaders.

4. Data Integrity

Capability planning requires a systematic approach with respect to data, because data provides the basis for decisions within the capability planning processes. Data integrity refers to data that is verified at its collection, effectively integrated into the analytic process, and recorded dutifully as decisions at each step of the planning process.

A systematic approach to data integrity increases transparency in the overall planning process by explaining how data was first gathered, subsequently reported for decision-making at key milestones, and finally recorded as planning decisions.

Access to and sharing of data is a major consideration in capability planning. But exclusive ownership of data is a popular Service assertion, albeit an unfounded one since the data represents the consumption of resources to which only the nation itself lies claim. This false sense of ownership makes retrieving data from the Services, especially when it will be shared with other Services and the Ministry, a major challenge in the institution of joint capability planning. The solution to this specific data issue takes many forms, so the best practice is awareness of the challenge.

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4. Specific Guidance for RoK

From the discussion regarding best practice during IDA's visit to Seoul in October 2016 and a subsequent meeting between IDA and KIDA in Washington, D.C., in January 2017, it was clear that KIDA understood the overall process for conducting MODRM. However, they asked a few specific issues to be addressed:

- The role and responsibility of each RoK organization within a DRM process, specifically focusing on the conduct of capability planning and mission area analysis;
- The structure of the KIDA mission area analysis framework;
- The use of the KIDA mission area analysis framework for:
 - Identifying capability gaps,
 - Addressing specific questions (e.g., sufficiency of KAMD); and
- Best practice and the attributes for a database containing force elements, cost, and scenarios for use in strategic and capability planning.

Each of these issues is addressed in the following sections.

A. Roles and Responsibilities with MODRM

It is important that within the Mission-Oriented Defense Resource Management process, all participants understand their roles and responsibilities. Without such clarity, there will be both duplication of effort and omissions of process and/or material. It was agreed that IDA would both provide best practice and make recommendations for RoK on their roles and responsibilities. Tables 4 and 5 provide a summary of best practice and IDA's recommendations for RoK roles and responsibilities for MODRM.

Table 4. Roles for MODRM

Function	Best Practice		IDA Recommendation for RoK	
	Lead	Participant(s)	Lead	Participant(s)
Strategy Planning	MoD – Policy	Staff, Services, MoD – Plans & Programs	Office of National Defense Policy	JCS – Strategy Planning, Service – Planning and Coordination MND – Office of Force Policy, Programming and Budgeting
Capability Planning	MoD – Plans and Programs	J5, Service Planning and Coordination	MND – Office of Force Policy	JCS – Strategy Planning, Service – Planning and Coordination
Mission Area Assessment	J5	MoD – Plans and Programs, Service Planning and Coordination	JCS – Strategy Planning	MND – Office of Force Policy, Service – Planning and Coordination
Program and Budget Planning	MoD – Plans & Programs, MoD – Comptroller	J5, Service Planning and Coordination	MND – Programming and Budgeting	JCS – Strategy Planning, Service – Planning and Coordination
Acquisition Planning	MoD – Acquisition Staff	J4, Service Planning and Coordination	Defense Acquisition Program Administration	JCS – Logistics, Service – Planning and Coordination

Table 5. Responsibilities for MODRM

Organization – Best Practice	IDA Recommendation for RoK	Function		
		Capability Planning	Mission Area Assessment	Program and Budget Planning
MoD – Plans and Programs	MND – Office of Force Policy	Lead – Manage process, provide mission and capability priorities, represent Secretary of Defense, adjudicate differences.	Participate – Ensure policy and strategy are being followed, provide additional guidance as required.	None
MoD – Plans and Programs	MND – (Office of Force Policy, Programming and Budgeting)	None	None	Co-Lead – Manage process, co-Chair meetings, ensure policy and capability priorities are being followed.
MoD - Comptroller	MND – Programming and Budgeting,	None.	None.	Co-Lead - Manage process, co-Chair meetings, ensure fiscal reality and discipline, adjudicate differences.
J5	JCS – Strategy Planning	Participate – Provide Joint-user perspective.	Lead – Manage process, Chair meetings, represent Joint-user, adjudicate differences, prioritize capabilities.	Participate – Provide Joint-user perspective.
Single Services and Agencies	Single Services and Agencies	Participate – Provide individual service user perspective.	Participate – Provide individual service user perspective.	Participate – Provide individual service user perspective.

One of RoK's challenges in conducting better resource management is that the investment budget and the operations and maintenance (O&M) budget are managed separately by different offices. The investment (equipment) budget is the responsibility of MND Force Policy, and the O&M budget is the responsibility of MND-Plans and Programs. While this is not uncommon in developing countries, it is unusual to see this division of budgets in a country with a military as complex and sophisticated as that of RoK.

The issues of this separation are widely known and lead to perceived capability gaps being resolved only through the acquisition of new equipment without first examining non-material solutions such as changes to readiness posture, training, or doctrine. In addition, the decision to acquire new equipment will likely not consider the sustainment costs of maintaining the equipment once it is in service, since these costs reside in a different budget and are not the responsibility of those making the investment decisions. (This makes life cycle cost analysis, although essential, nearly impossible.)

It is beyond the scope of this study to recommend changes to the organizational structure of MND regarding budgeting. However, any attempts to improve resource management within the RoK defense establishment are going to be severely hampered by this separation of investment and O&M budget accounts.

The role and responsibilities of JCS (Strategy Planning) within RoK are significant in a MODRM model. They represent the Joint Warfighter, who must ensure that single-Service parochialisms and agendas do not compromise the process. JCS are either leading one of the processes or are an active participant, assisting in the seamless transition from one process to the next and providing continuity throughout. In particular, JCS (Strategy Planning) leadership of the Mission Area Assessments is crucial because they ensure the Joint Warfighter is the focus of the assessment, and they adjudicate differences yet make sure that the Single Services participate and are listened to.

Recommendation

Led by MND-Force Policy, the roles and responsibilities of the participants in Capability Planning, Mission Area Assessment and Program and Budget Planning must be clearly understood and articulated to all relevant offices.

B. Structure and Use of Mission Area Framework

Before looking at the use of a mission area framework within a MODRM process, it is necessary to step back and ensure that all the required pieces to create and use a mission area framework are present. Three core elements are required to create and use a mission area framework:

- Missions,

- Joint Capability Areas (JCAs), and
- A mapping of programmed units to the JCAs.

1. Missions

Within their Defense Planning Guidance (DPG), RoK identifies the missions of their Armed Forces (these are not listed here for security reasons). These missions resonate closely with the missions from other nations. The United States has 12 missions⁴:

1. Maintain a secure and effective nuclear deterrent;
2. Provide for military defense of the homeland;
3. Defeat an adversary;
4. Provide a global, stabilizing presence;
5. Combat terrorism;
6. Counter weapons of mass destruction;
7. Deny an adversary's objectives;
8. Respond to crisis and conduct limited contingency operations;
9. Conduct military engagement and security cooperation;
10. Conduct stability and counterinsurgency operations;
11. Provide support to civil authorities; and
12. Conduct humanitarian assistance and disaster response.

The United Kingdom has 8 missions⁵:

1. Defend and contribute to the security and resilience of the UK and Overseas Territories;
2. Provide the nuclear deterrent;
3. Contribute to improved understanding of the world through strategic intelligence and the global defense network;
4. Reinforce international security and the collective capacity of our allies, partners and multilateral institutions;
5. Support humanitarian assistance and disaster response, and conduct rescue missions;

⁴ 2014 US Quadrennial Defense Review, 4 March 2014, pp. 60–61.

⁵ 2015 UK Strategic Defence and Security Review, November 2015, pp. 28–29.

6. Conduct strike operations;
7. Conduct operations to restore peace and stability; and
8. Conduct major combat operations if required, including under North Atlantic Treaty Article 5.

Comparison of the RoK missions with those of the US and UK indicates that two mission areas are not covered. These are the provision of military support to the civilian authority for disaster relief or domestic security incidents (US #11, UK #1) and providing international humanitarian assistance (US #12, UK #5). If those two mission areas were added to the existing RoK Missions, they would cover all the likely missions the RoK Government would ask the RoK Armed Forces to undertake.

One other observation is worth making. While the RoK Missions are contained within their DPG, the DPG does not stipulate that these are the *only* missions that are to be used for planning, programming, and budgeting. Therefore, it is conceivable that a Service could develop their own mission outside the DPG for their planning, programming, and budgeting. This is very undesirable since it will lead to unconstrained and unprioritized decisions. A simple solution would be for the next version of the DPG to state that only the missions within the DPG can be used for planning, programming, and budgeting.

One omission from the U.S., UK, and RoK missions that is recommended by best practice is a Central Support mission. This mission covers a number of fundamental military activities that are not specific to the other particular missions, such as basic training, officer schools, specialist schools, provision of military staff to the civilian central staff, etc. These should be accounted for and are best captured in a Central Support mission.

2. Joint Capability Areas

The RoK has developed their own JCAs and in doing so have ensured that all the functions of the military are represented, including the often forgotten corporate management and support. Unfortunately, the RoK JCAs cannot be provided in this report, but they are not dissimilar to the U.S. JCAs (see Figure 8).

- U.S. DoD JCAs
 1. Force Support
 2. Battlespace Awareness
 3. Force Application
 4. Logistics
 5. Command and Control
 6. Net-Centric
 7. Protection
 8. Building Partnerships
 9. Corporate Management and Support

Figure 8. U.S. JCAs

Recommendation

IDA recommends that the RoK JCS continue to refine and reduce the number of JCAs to a more manageable number.

3. Mapping of programmed units to JCAs

It is important to understand that the mapping of *programmed units* means two very specific things. *Unit* refers to the fact that this is an actual force element and not just equipment—it has people, equipment, supplies, and a state of readiness. Capability is provided by a unit that is manned, trained, and equipped in accordance with future concepts and doctrine. In fact, a unit provides capability if it has all the lines of development— DOTMLPF-P.⁶ Therefore, that mapping should list actual units and not generic ones; e.g., 104th Armored Battalion or 91st Fighter Squadron. It is preferable that the units are defined at broadly the same level. A suggestion is: Army Battalions, Air Force Squadrons, and Navy vessels (ships/submarines). *Programmed* refers to the fact that these units have been identified and funded to exist in the future—that is there is a defined plan and funding for the units' existence in the future. Within the United States this is identified by having the unit in the Future Years Defense Program (FYDP). It is understood that RoK has a 5-year plan and we believe that if a unit is funded in the 5-year plan, then it should be mapped to the Joint Capability Areas.

⁶ Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy (DOTMLPF-P).

Due to the complex nature of a unit, it is very unlikely that it will provide only one capability. Each and every capability that a unit can provide should be identified in the mapping, meaning that a unit is likely to appear more than once. For example, the 21st Artillery Battalion is capable of providing “Hit Long Range” and “Hit Middle Range” in the Force Operation Level 1 JCA, as depicted in Table 6. Equally, it is unlikely that a JCA can be provided by only one unit, with each unit capable of providing all that is needed for the JCA being identified. For example, “Hit Short Range” could be provided by the 104th Armored Battalion, 22nd Special Forces Battalion, or 99th Infantry Battalion, as depicted in Table 6.

Table 6. Example Framework Structure

JCA – Level I	JCA – Level II	JCA – Level III	JCA – Level IV	Units
Command, Control, Communication	C2 System and Employment	Joint C2 System		1 st HQ Battalion
		Airborne C2 System		13 th Support Sqn
Force Operation	Battle (Maneuver + Fire)	Hit Ground Point Target	Hit Short Range	104 th Armd Battalion, 22 nd SoF Battalion, 99 th Infantry Battalion
			Hit Middle Range	21 st Arty Battalion, 22 nd SoF Battalion
			Hit Long Range	21 st Arty Battalion, 22 nd SoF Battalion, 91 st Fighter Sqn
Protection	Minimize the Damage and Recovery	Chemical/Biological		27 th CBRN Battalion

Scenarios are the mechanism by which the double counting of units in the mapping is resolved. During the analysis phase of the framework the scenario plays an important role by providing the mission context (threat, environment, etc.) for determining the most appropriate unit for delivering that JCA. This is described in more detail below.

The mapping of programmed units to JCAs should be conducted for each mission, e.g., a mapping for total war with North Korea and another for providing international humanitarian assistance. While conducting this mapping for the first time is resource

intensive, thereafter the mapping should require updating only if something has changed, e.g., a unit develops a new capability, a new unit is formed, or a unit is disestablished.

The mapping should be led by the Joint Staff with active participation of MND and the Single Services, and it should be supported by KIDA. The most cost-effective and efficient means of conducting the mapping for each of the missions is using Military Judgement Panels (MJPs). They are used frequently in both the United States and the United Kingdom to good effect, providing the following principals are followed: leadership, participation, and accountability.

Leadership of these MJPs should be provided by the Joint Staff (often the J5) with the active support of MND Policy. The J5 representative should typically be at the Brigadier General level or above and have a combination of operational experience and experience chairing complex meetings with many different participants/stakeholders. The Chairperson does not need to drive the MJP to consensus, but the majority opinion should be the baseline, with dissenting views recorded as lesser options. Since these are subjective panels that use military knowledge and experiences, it can be a difficult and contentious panel to chair. Skill and experience in diplomacy and in being tenacious will provide the Chairperson with good prospects for being successful.

Active participation of the attendees of the meeting is also important. Each participant brings knowledge and experience, which they are expected to draw upon during the MJP. Each organization invited to the MJP should provide only one (1) representative who is capable and prepared to represent their organization's interests. More than one representative per organization not only creates a much larger meeting (2x or more), but it can create an imbalance, with one organization having two or three representatives and another having only one, as well as the potential for having representatives from the same organization disagree on the advice from or viewpoint of that organization.

The representative from each participating organization is accountable for providing that advice and views at the MJP. Each participant needs to be empowered to provide the authoritative view from their organization. This may require preparation prior to the MJP to ensure that the participant understands the views and thoughts from throughout their organization. What is important here is that after the MJP, unless something is egregiously incorrect, the decision of the MJP is final and cannot be revised just because an organization subsequently disagrees with the views of their MJP participant.

Recommendation

Led by J5, a series of MJPs are held to conduct the mapping of programmed units to the JCAs for each of the RoK Missions. Participants should include representatives at the colonel or one-star level from MND Force Policy, MND Plans and Programmes, the

Single Services, and any relevant Agencies (e.g., intelligence, logistics). It should be supported by KIDA. It may be prudent to run a number of small “test” MJPs to build competence and confidence and to determine data requirements.

C. Use of Framework – Gap Identification

Using the completed frameworks to identify potential capability gaps can be done relatively quickly and effectively in order to provide insights to senior leaders. Despite being at quite a high level, it is possible to provide some granularity to the gap analysis by focusing the analyses on three areas: quantity (sufficiency), status (readiness), and technical capability (relevance).

- Sufficiency is the determination of whether there are enough units to provide each of the JCAs identified for the chosen scenario. Although we are using the mission framework, a scenario provides context such as scale, geography, readiness needs, enemy (threat), etc.
- Readiness is the determination of whether the identified units are at the required readiness for the scenario, including whether they are appropriately manned, equipped, and trained, and have sufficient war stocks.
- Relevance is the determination of whether the unit is technically capable of delivering the capability required within the scenario and against the enemy.

Using the framework for gap identification is a two-step process. The first step is at a high level to identify the potential gaps for a particular scenario using an MJP. These gaps are prioritized by the MJP and then provided to a senior leader (Minister) for review and prioritization. Because it is unlikely that all potential gaps can be examined in detail, this prioritization by the Minister is important to ensure that the limited analytic capability is focused on the Minister’s priorities. The second step is to develop options for resolving each capability gap, remembering that non-material solutions should be considered first, before options requiring new equipment are considered. The output from the second step feeds directly into the programming process. The two-step process is summarized in Figures 9 and 10.

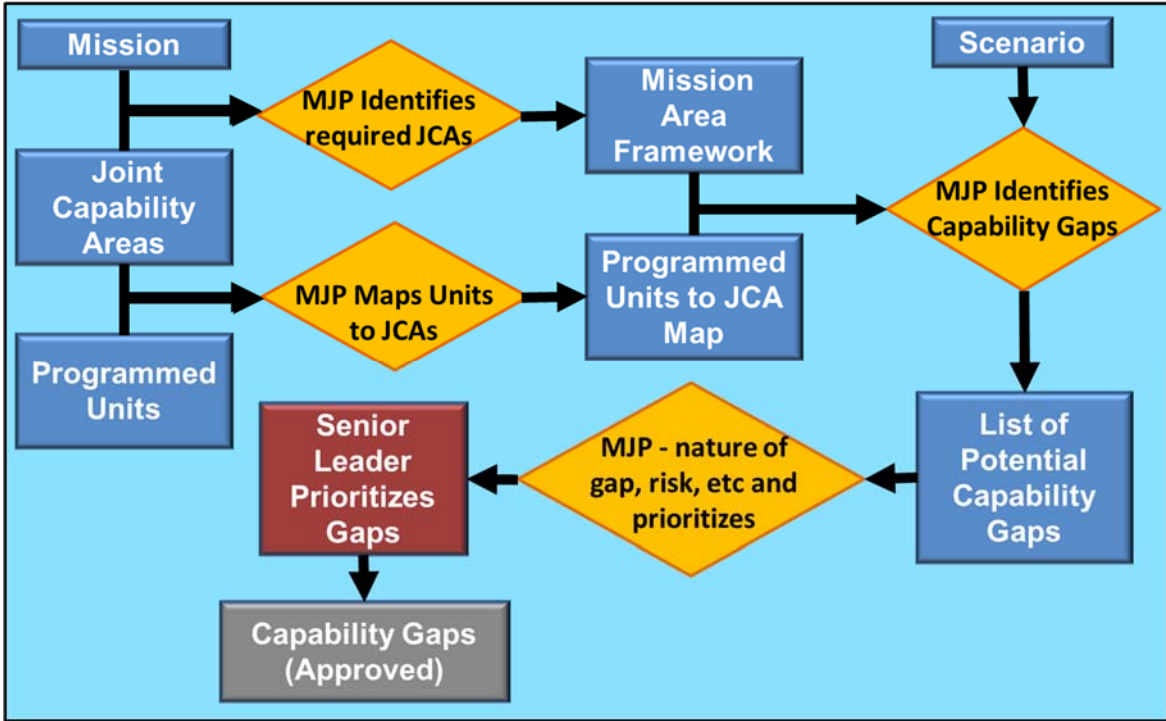


Figure 9. Capability Gap Identification and Prioritization

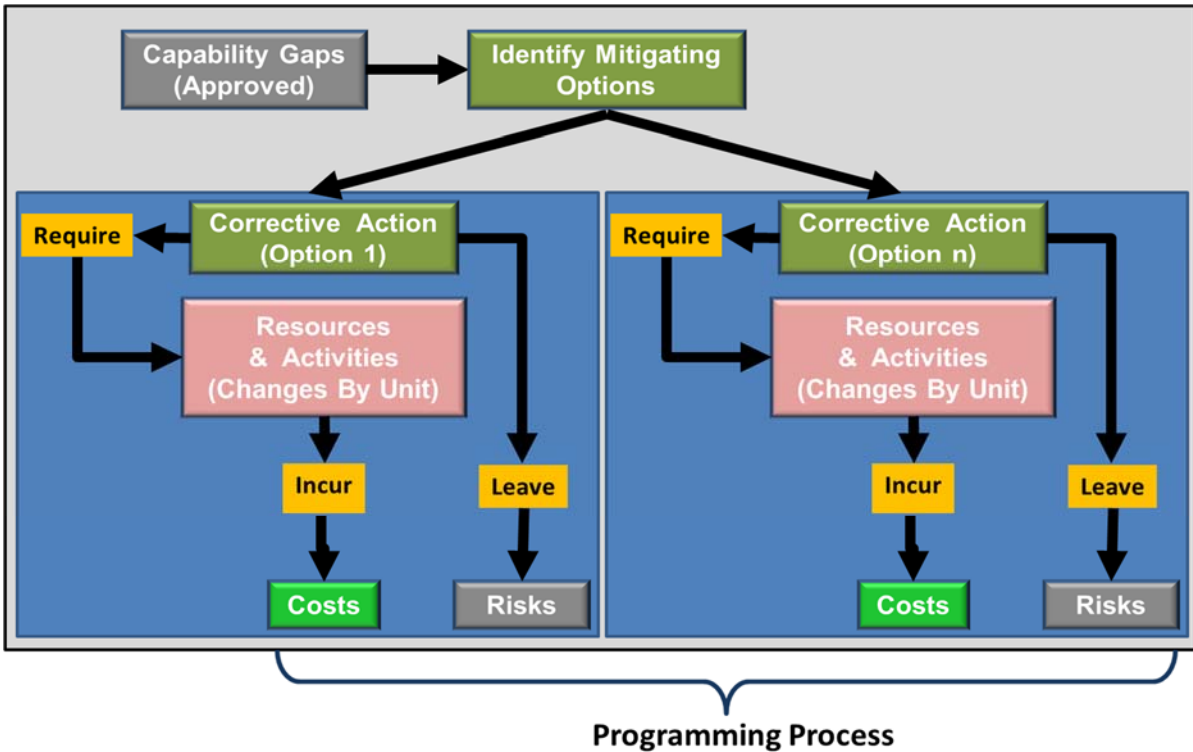


Figure 10. Capability Gap Solution Identification

Gap identification requires an MJP to use the completed framework for a particular mission and the scenario being considered. In addition, the MJP is often provided with details from the analytic community (KIDA) to assist them in their deliberations such as deployment schedules, threat analysis, logistics requirements, etc. At this stage in the process, the identification of potential gaps by the MJP is acceptable, since they use their combined military judgement to subjectively determine whether the units identified are sufficient, ready, and relevant to the scenario. It is during this process that JCAs with more than one unit mapped to them will be resolved. The MJP will decide on which unit is the most appropriate to deliver that capability, given the specifics of the scenario being considered.

As well as the type of potential capability gap, the MJP needs to decide on—risk, cost, and affordability. In each case, these should be high-level decisions not involving the details. The risk associated with the potential gap should be described in terms of the likely success of the mission:

- Very little risk,
- Mission successful but not efficient,
- Mission may be successful, and
- Mission failure.

Similarly the costs associated with eliminating the gap should be considered as rough order of magnitude (ROM) costs. These estimated costs should be life-cycle costs, and not just the acquisition cost. The analytic community can provide assistance to the MJP in doing this, which can be considered in bands:

- Less than \$10 million,
- \$10 million to \$99 million,
- \$100 million to \$500 million, and
- More than \$500 million.

Finally, affordability is different from cost because it considers the ROM costs of the gaps in the context of a budget. Again, the analytic community can support the MJP in making these judgements. Affordability can also be considered at a strategic level:

- Affordable,
- Likely to be affordable,
- Unlikely to be affordable, and
- Unaffordable.

Therefore, the end of the stage 1 gap analysis should result in a list of gaps for each scenario, which can be summarized to a senior leader in terms of the nature of the gap (sufficiency, readiness, relevance), the risk associated with the gap, the ROM cost of eliminating the gap, and how affordable it might be. Using this information, the senior leader (Minister) will be able to prioritize the potential capability gaps for detailed analysis and solution development.

The analysis of a scenario by an MJP should not take more than day, if properly prepared, empowered, and supported. The characterization of the potential gaps, risk, ROM cost, and affordability is then likely to take an additional 0.5 to 1 day per scenario, with the results being recorded by the analytic community.

This should be considered within context. A senior leader asks what are the likely capability gaps, risks, and costs of conducting an international peacekeeping mission in 2020. Assuming that the mapping of the programmed units to JCAs has been completed earlier, a response to the senior leader could be provided in a matter of days, which would provide a broad indication of the gaps, risks, and costs. Once the senior leader has prioritized these, a more detailed analysis would then provide (detailed) costed options from which a solution could be chosen and fed into the programming process. The alternative is to conduct detailed analysis from the outset using existing tools and techniques, which would not engage the senior leader, but it would provide a detailed response within several months and after considerable staff effort and use of resources.

D. Use of Framework – Addressing Specific Questions

The framework can also be used to address specific issues or questions such as, do we have enough ballistic missile defense? Or, do we have the right CBRN⁷ protection? In these cases, the framework is effectively used in a different manner. By using the framework, which scenarios and missions require those capabilities and specific units can quickly be established. This can be provided to the MJP so they can then subjectively decide on any capability gaps, their nature, the risk, the ROM cost, and affordability. In doing so, the feature of a JCA having more than one unit associated with it is very helpful. This will assist the MJP in evaluating whether the capability can be provided using alternate means within the programmed force structure. This is an analysis of approaches and not an analysis of alternatives.

This is an extremely effective and efficient means of gaining capability insights using a mission-based approach, which can then be prioritized by a senior leader for further analysis.

⁷ Chemical, biological, radiological, and nuclear.

Recommendation

IDA recommends that KIDA create a clear and transparent process for gap identification and analysis and to address specific issues and questions.

E. Database

Managing the information that is needed in this process is not a trivial task. In particular, mapping the programmed units to the JCAs will result in a large matrix/table for each mission. The challenge becomes even more significant as we need to consider multiple years so that we can reflect and ultimately feed into the multi-year planning process. The most sensible means of managing this large dataset is using a database.

Such a database will enable resource allocation by mission and JCA, and it will support capability gap analysis and affordability assessments of alternatives.

The capabilities described in the JCAs are provided by units that are manned, equipped, and trained. These units use resources (manpower, equipment, facilities, stockpiles, and consumables) and activities (training, operations, and equipment usage), all of which have costs.

All units that are programmed to exist in the future years defense program (FYDP) need to be identified and incorporated into the database, including combat, combat support, and central support units. Each unit should be represented within its hierarchy and at the lowest level practicable. For most nations with a large, sophisticated force structure, this is at the battalion, squadron, and individual ship level. While this may initially seem difficult information to obtain, experience has shown that, while perhaps not held centrally, the Single Services have this information.

Building such a complex database is a resource-intensive process that can take several attempts and years to get right, and it should not be entered into lightly or thinking that all the data required is going to be available immediately.

IDA has built such a database management program, Force Orientated Cost Information System (FOCIS). Appendix A has a series of slides that illustrate the capability of FOCIS, noting that it assumes that the mission area framework has been created, there is an agreed set of JCAs, the programmed units have been mapped to the JCAs, and the relevant agreed cost data has been provided. RoK has a number of these elements right now, but not all of them. In particular, the mapping of the programmed units to JCAs and the relevant agreed cost data are missing.

Recommendation

IDA recommends that KIDA identify the data requirements, agree access with Stakeholders, and explore the database options prior to committing to building a database.

5. Summary

Defense resource management (DRM) brings together strategy, capabilities, cost, and risk. A MODRM process—which is a subset of DRM—can provide a mechanism for providing timely and effective advice to senior leaders regarding capability gaps, their risk, rough cost, and affordability. Four key elements are required to achieve this, some of which RoK already has in place:

- Missions with scenarios (RoK has these);
- Joint Capability Areas (RoK has these);
- Mapping of programmed units to JCAs (RoK has some); and
- Data to support decision-making (RoK has some).

While the focus of RoK should be on mapping programmed units to JCAs, IDA recommends that each area would benefit from additional work.

Military Judgement Panels (MJPs) have an important role in the MODRM process. Properly constructed, with the right empowered participants and a strong chairperson, these MJPs can provide very effective and efficient means of gaining insights. Providing the MJPs with suitable tools (database, spreadsheets) and supported by the analytic community (KIDA) help to provide confidence in the MJPs deliberations and conclusions.

Recommendation

IDA recommends that MND Policy, with support from KIDA (and IDA) and the participation of the Single Services, develop and implement a RoK MODRM process with the necessary supporting tools.

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Appendix A. Force Orientated Cost Information System (FOCIS)

FOCIS Software Tool

- Many countries use database tools for program development and cost estimation
- One such tool is a software package developed by IDA called FOCIS — the Force Oriented Cost Information System
- What follows is an illustration for a fictional country



1

A New National Policy

- National Security Strategy:
 - “Create the capability to participate in United Nations peacekeeping operations”
 - “We will participate only in non-combat missions”
 - “The threat to our national borders is low”
- Defense Minister Instruction:
 - Investigate options for contributing non-combat units to U.N. peacekeeping operations:
 - Achieve full capability by 2020
 - Units must be rapidly deployable — i.e., highly ready
 - Must have mobility to operate in remote areas
 - Must have some self-protection capability
 - Assume transportation to operating area will be provided by U.N. airlift
 - Resource any increased capability from within existing resources

2

Capability Planning Process

- Capability planning staff assesses the options for meeting the minister’s guidance
- Recommends the following:
 - Utilize Army engineers to support U.N. operations by providing reconstruction assistance to civil population
 - Ideally, need three engineer battalions
 - Use Air Force transport helicopters for mobility
 - Ideally, one squadron of transport helicopters
 - Use Air Force armed helicopters for force protection
 - Ideally, one squadron of armed helicopters
 - To meet U.N. requirements, units must be deployable within 60 days
 - Requires unit readiness rating of 90%

3

Service Program Staffs

- Determines that the following existing units were best suited to the new peacekeeping requirement
- Army
 - 11th, 12th, and 13th Engineer battalions
- Air Force
 - 13th Attack Squadron
 - Has both transport and armed helicopters
- Each Service staff then analyzes these units' already-planned capabilities
 - Since they are existing units, they are already included in the multi-year program of record
 - However, they determine there are issues with equipment and personnel readiness, and insufficient air transport capacity

4

Cost of Current Program

- This is current funding in the program of record

		Baseline							
Unit Service	Cost Driver	2017	2018	2019	2020	2021	2022	2023	2024
Minister of Defense		31,227,960	31,265,486	31,265,486	31,265,486	31,265,486	31,265,486	31,265,486	31,265,486
General Staff		84,300,393	84,541,932	84,541,932	84,541,932	84,541,932	84,541,932	84,541,932	84,541,932
Army	Personnel	200,967,891	202,152,048	202,152,048	202,152,048	202,152,048	202,152,048	202,152,048	202,152,048
	Equipment Operations	13,182,283	13,182,283	13,182,283	13,182,283	13,182,283	13,182,283	13,182,283	13,182,283
	Unit Operations	195,876,110	195,876,110	195,876,110	195,876,110	195,876,110	195,876,110	195,876,110	195,876,110
	Line Items	675,545	675,545	675,545	675,545	675,545	675,545	675,545	675,545
Army Total		410,701,828	411,885,986	411,885,986	411,885,986	411,885,986	411,885,986	411,885,986	411,885,986
Air Forces	Personnel	55,968,105	56,306,069	56,306,069	56,306,069	56,306,069	56,306,069	56,306,069	56,306,069
	Equipment Operations	44,814,262	44,814,262	44,814,262	44,814,262	44,814,262	44,814,262	44,814,262	44,814,262
	Unit Operations	55,171,950	55,171,950	55,171,950	55,171,950	55,171,950	55,171,950	55,171,950	55,171,950
	Line Items	650,871	650,871	650,871	650,871	650,871	650,871	650,871	650,871
Air Forces Total		156,605,188	156,943,152	156,943,152	156,943,152	156,943,152	156,943,152	156,943,152	156,943,152
Navy		71,021,082	71,542,581	71,542,581	71,542,581	71,542,581	71,542,581	71,542,581	71,542,581
Grand Total		753,856,451	756,179,138	756,179,138	756,179,138	756,179,138	756,179,138	756,179,138	756,179,138

5

Program Options

- Option 1 (Baseline): The program of record (equipment, personnel, and O&M)
 - Does not fully meet guidance
 - Lack of Army equipment and personnel readiness, and insufficient air transport
- Option 2: Improve readiness of required units
 - Increase unit personnel fill *and* training tempo
 - Repair inoperable Army engineer equipment
- Option 3: Improve readiness *and* aviation support capacity
 - Option 2 *plus*
 - Procure 2 additional used UH-60 helicopters
 - Program flight hours and maintenance for additional helicopters

6

Option 2: Increase Unit Readiness Personnel

- Achieve 85% of required personnel fill in 2018 and 90% by 2019

Unit Manning Summary

Un... ↑	PKO packag... ↓	2017		2018		2019		2020		2021		2022		2023		2024	
		Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill
<input type="checkbox"/> Army	Baseline	516	71	516	71	516	71	516	71	516	71	516	71	516	71	516	71
	Readiness Increase	0	0	105	0	141	0	141	0	141	0	141	0	141	0	141	0
	Army Total	516	71	621	85	657	90	657	90	657	90	657	90	657	90	657	90
<input type="checkbox"/> Air Forces	Baseline	725	70	725	70	725	70	725	70	725	70	725	70	725	70	725	70
	Readiness Increase	0	0	154	0	206	0	206	0	206	0	206	0	206	0	206	0
	Air Forces Total	725	70	879	85	931	90	931	90	931	90	931	90	931	90	931	90
	Grand Total	1,241	70	1,500	85	1,588	90	1,588	90	1,588	90	1,588	90	1,588	90	1,588	90

Includes 11th, 12th, 13th Engineering BNs in the Army and 13th Attack Squadron in the Air Force

7

Option 2: Increase Unit Readiness

Training

- Achieve 85% of required **training** in 2018 and 90% by 2019

OpTempo

Un...	Metric Name	PKO packag...	2017		2018		2019		2020		2021		2022		2023		2024	
			Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill	Actual	% Fill
<input type="checkbox"/>	Army																	
<input type="checkbox"/>	Kilometers	Baseline	21,900	67	21,900	67	21,900	67	21,900	67	21,900	67	21,900	67	21,900	67	21,900	67
		Readiness Increase	0	0	5,769	0	7,395	0	7,395	0	7,395	0	7,395	0	7,395	0	7,395	0
		Kilometers Total	21,900	67	27,669	85	29,295	90	29,295	90	29,295	90	29,295	90	29,295	90	29,295	90
<input type="checkbox"/>	Operating Hours	Baseline	5,700	53	5,700	53	5,700	53	5,700	53	5,700	53	5,700	53	5,700	53	5,700	53
		Readiness Increase	0	0	3,480	0	4,020	0	4,020	0	4,020	0	4,020	0	4,020	0	4,020	0
		Operating Hours Total	5,700	53	9,180	85	9,720	90	9,720	90	9,720	90	9,720	90	9,720	90	9,720	90
<input type="checkbox"/>	Meters	Baseline	345	58	345	58	345	58	345	58	345	58	345	58	345	58	345	58
		Readiness Increase	0	0	170	0	195	0	195	0	195	0	195	0	195	0	195	0
		Meters Total	345	58	515	86	540	90	540	90	540	90	540	90	540	90	540	90
	Army Total		27,945	64	37,364	85	39,555	90	39,555	90	39,555	90	39,555	90	39,555	90	39,555	90
<input type="checkbox"/>	Air Forces																	
<input type="checkbox"/>	Firing Exercises	Baseline	10	33	10	33	10	33	10	33	10	33	10	33	10	33	10	33
		Readiness Increase	0	0	16	0	17	0	17	0	17	0	17	0	17	0	17	0
		Firing Exercises Total	10	33	26	87	27	90	27	90	27	90	27	90	27	90	27	90
<input type="checkbox"/>	Flight Hours, Basic	Baseline	720	36	720	36	720	36	720	36	720	36	720	36	720	36	720	36
		Readiness Increase	0	0	980	0	1,080	0	1,080	0	1,080	0	1,080	0	1,080	0	1,080	0
		Flight Hours, Basic Total	720	36	1,700	85	1,800	90	1,800	90	1,800	90	1,800	90	1,800	90	1,800	90
	Air Forces Total		730	36	1,726	85	1,827	90	1,827	90	1,827	90	1,827	90	1,827	90	1,827	90
	Grand Total		28,675	62	39,090	85	41,382	90	41,382	90	41,382	90	41,382	90	41,382	90	41,382	90

8

Option 2: Repair Army Equipment

- In 2018 and 2019, repair and return to service all inoperable engineer equipment

Add funding for refurbishments of engineering equipment

Budget Line Items		11h BDE Engineering Eqp Restoration		11 Eng BN Read Inc					
Currency	Account	Type	2017	2018	2019	2020			
Dollars	2003 Equipment Overhaul	Desired	0.000	2,200,000.000	2,200,000.000	0.000			
		Actual	0.000	2,200,000.000	2,200,000.000	0.000			
		Base Year	2017	2017	2017	2020			
Budget Line Items		12h BDE Engineering Eqp Restoration		12 Eng BN Read Inc					
Dollars	2003 Equipment Overhaul	Desired	0.000	2,200,000.000	2,200,000.000	0.000			
		Actual	0.000	2,200,000.000	2,200,000.000	0.000			
		Base Year	2017	2017	2017	2020			
Budget Line Items		13h BDE Engineering Eqp Restoration		13 Eng BN Read Inc					
Dollars	2003 Equipment Overhaul	Desired	0.000	2,200,000.000	2,200,000.000	0.000			
		Actual	0.000	2,200,000.000	2,200,000.000	0.000			
		Base Year	2017	2017	2017	2020			

9

Option 2 Cost Summary

	Service	Cost Category	2018	2019	2020	2023	2024
Option 1 (Baseline)	Costs without inflation (in Millions)		756.2	756.2	756.2	756.2	756.2
Option 2 Improve PK Unit Readiness							
	Army	Personnel	.4	.9	1.1	1.1	1.1
		Equipment Operations	.4	.7	.7	.7	.7
		Line Items	6.6	6.6			
	Army Total		7.4	8.3	1.8	1.8	1.8
	Air Forces	Personnel	.4	1.0	1.2	1.2	1.2
		Equipment Operations	18.7	20.6	20.6	20.6	20.6
	Air Forces Total		19.1	21.6	21.8	21.8	21.8
Option 2 Improve PK Unit Readiness Total			26.5	29.9	23.5	23.5	23.5
Grand Total			782.7	786.1	779.7	779.7	779.7

Note: the Line Item funds the repair of Army Engineer Equipment

Increase Operating and Support (Recurring)	19.9	23.3	23.5	23.5	23.5
% Baseline	2.6%	3.1%	3.1%	3.1%	3.1%
Increase Operating and Support (One Time)	6.6	6.6	.0	.0	.0
% Baseline	0.9%	0.9%	0.0%	0.0%	0.0%
Increase Operating and Support (Total)	26.5	29.9	23.5	23.5	23.5
% Baseline	3.5%	4.0%	3.1%	3.1%	3.1%

Option 2 has a one-time cost of \$13.2 million and an annual recurring cost of \$23.5 million more than Option 1

10

Option 3: Option 2 plus 2 additional UH-60s

- Option 3: Option 2, plus
 - Procures two used UH-60s and operates and supports them

UH-60 Inventory

Equipment	2017	2018	2019	2020	2024
UH-60	8	9	10	10	10

Additional Flight Hours for Training

Equipment	Measure of Use	2017	2018	2019	2020	2024
		Addition	Addition	Addition	Addition	Addition
UH-60	Flight Hours, Basic	0	100	200	200	200

	Service	Cost Category	2018	2019	2020	2021	2022	2023	2024
Option 3									
Additional Helos									
	Air Forces	Equipment Operations	1.2	2.5	2.5	2.5	2.5	2.5	2.5
		Equipment Procurement	5.0	5.0					
	Air Forces Total		6.2	7.5	2.5	2.5	2.5	2.5	2.5

Note: Option 3 will use existing flight crews and maintenance personnel

11

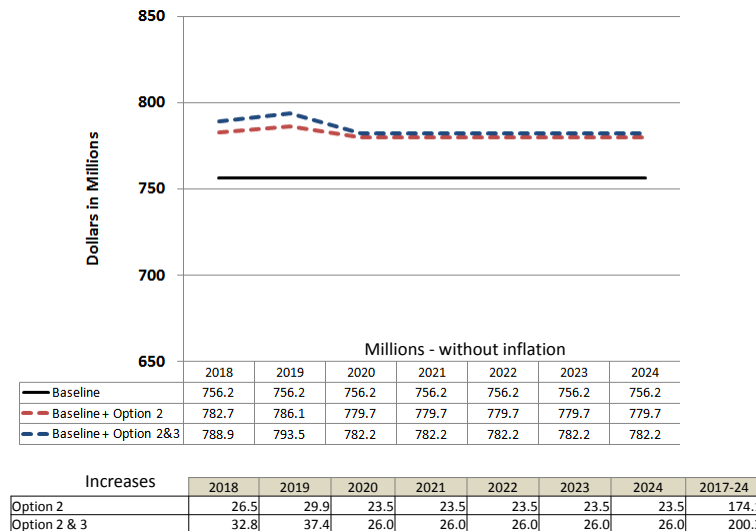
Comparison of All Options

Service	Cost Category	2018	2019	2020	2021	2022	2023	2024	
Option 1 (Baseline)		756.2	756.2	756.2	756.2	756.2	756.2	756.2	5,293.3
Option 2 Improve PK Unit Readiness									
Army		7.4	8.3	1.8	1.8	1.8	1.8	1.8	
Air Forces		19.1	21.6	21.8	21.8	21.8	21.8	21.8	
Option 2 Improve PK Unit Readiness Total		26.5	29.9	23.5	23.5	23.5	23.5	23.5	
Option 3 Add Helos									
Air Forces	Equipment Operations	1.2	2.5	2.5	2.5	2.5	2.5	2.5	
	Equipment Procurement	5.0	5.0						
Air Forces Total		6.2	7.5	2.5	2.5	2.5	2.5	2.5	
Option 2 & 3 Total		32.8	37.4	26.0	26.0	26.0	26.0	26.0	
Grand Total		788.9	793.5	782.2	782.2	782.2	782.2	782.2	

	2017-2024
Option 2 & 3 – Recurring	21.2 25.8 26.0 26.0 26.0 26.0 26.0 26.0 177.1
% Baseline	2.8% 3.4% 3.4% 3.4% 3.4% 3.4% 3.4% 3.4% 3.3%
Option 2 & 3 - One Time	11.6 11.6 .0 .0 .0 .0 .0 .0 23.2
% Baseline	1.5% 1.5% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.4%
Option 2 & 3 - Total Increase	32.8 37.4 26.0 26.0 26.0 26.0 26.0 26.0 200.3
% Baseline	4.3% 4.9% 3.4% 3.4% 3.4% 3.4% 3.4% 3.4% 3.8%

12

Option Cost Summary



13

Offsets Required

- As per Minister’s guidance, “Resource any increased capability from within existing resources”
- Offsets needed: (millions)

	2018	2019	2020	2021	2022	2023	2024	‘17 – ‘24
Option 2	26.5	29.9	23.5	23.5	23.5	23.5	23.5	174.1
Option 2 & 3	32.8	37.4	26.0	26.0	26.0	26.0	26.0	200.3

- Per Defense Planning Guidance, cuts should be considered first in lowest priority mission:
 - Territorial defense is a low priority due to the low present threat

14

Potential Sources of Offsets

- Eliminate the 21st Attack Squadron in 2018
 - Savings ~ \$18M annually
 - Rationale: F-15s used primarily for air defense
 - Existing air defense missiles plus remaining 2 squadrons of F-15s sufficient for low threat
- Eliminate 50th Tank Brigade in 2018
 - Savings: ~\$11 million annually
 - Rationale: low threat of invasion; government policy states no combat role envisioned in international missions
- Problem
 - No attractive options for the large one-time expense of \$11.6 million in 2018 and \$11.6 million in 2019 of Option 2 (increase readiness) and Option 3 (2 additional UH-60s)

15

Risk Assessment

- Option 1 (Program of Record)
 - Does not meet full peacekeeping requirement
 - Provides only 2 engineer battalions in 120 days
 - Insufficient air mobility and force protection readiness and capacity
 - No change to territorial defense capabilities
- Option 2 (Increase Readiness)
 - Provides 3 engineer battalions in 60 days
 - Meets 80% of mobility and force protection requirement
 - Cuts 33% of interceptor component of air defense capability
 - Eliminates heavy armor component of ground defense
 - Due to low threat, resulting territorial defense capability still adequate
- Option 3 (Option 2 plus 2 UH-60s)
 - Option 2 + mobility capability to 100%
 - Infeasible unless defense budget is increased

16

Recommended Program: Option 2

- Provides 3 engineer battalions
 - Increased to 90% readiness* by 2018
- Provides 1 squadron of transport and attack helicopters
 - With 80% of required airframes
 - Increased to 90% readiness* by 2018
- Eliminates one F-15 squadron in 2018
- Eliminates one armor brigade in 2018
- No change to total defense spending

* 90% personnel fill and training attainment, and with Army units at 100% equipment fill

17

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Appendix B. Illustrations

Figures

Figure 1. Defense Management Processes.....	4
Figure 2. Defense Resource Management Functional Elements	6
Figure 3. Relationship of Enabling Attributes to DRM Functional Elements	7
Figure 4. Functional Elements of DRM.....	9
Figure 5. Planning Model	9
Figure 6. Mission Orientated Defense Resource Management Model	13
Figure 7. Three Functional Components of Capability	14
Figure 8. U.S. JCAs	28
Figure 9. Capability Gap Identification and Prioritization	32
Figure 10. Capability Gap Solution Identification.....	32

Tables

Table 1. Mission Area Assessment Framework	16
Table 2. Apportioned Units by Unit Name	17
Table 3. Complete Mission Area Assessment Matrix	18
Table 4. Roles for MODRM	24
Table 5. Responsibilities for MODRM.....	24
Table 6. Example Framework Structure	29

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Appendix D. Abbreviations

CBRN	chemical, biological, radiological and nuclear
CONOPS	concept of operations
DOD	Department of Defense
DOTMLPF-P	doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy
DPG	Defense Planning Guidance
DPS	Defense Planning Scenarios
DRM	Defense Resource Management
FOCIS	Force-Orientated Cost Information System
FRVS	Force Requirements Verification System
FYDP	Future Years Defense Program
IDA	Institute for Defense Analyses
JCA	Joint Capability Area
JCS	Joint Chiefs of Staff
KIDA	Korean Institute for Defense Analyses
MJP	Military Judgement Panel
MND	Ministry of National Defense
MODRM	Mission Orientated Defense Resource Management
NCOE	net-centric operational environment
O&M	operations and maintenance
OPTEMPO	operational tempo
RoK	Republic of Korea
ROM	Rough Order of Magnitude
UK	United Kingdom
U.S.	United States
NCOE	Net-centric operational environment

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