INSTITUTE FOR DEFENSE ANALYSES

Defense Governance & Management
Improving the Defense Management Capabilities of Foreign Defense Institutions

Using a Relational Database (FOCIS) to Improve Defense Force Planning and Budgeting

An Overview for Project Leaders

Thomas J. Wallace
Aaron C. Taliaferro
Wade P. Hinkle, Project Leader

March 2017
Approved for public release;
distribution is unlimited.
IDA Paper NS P-5361
Log: H 16-000645

INSTITUTE FOR DEFENSE ANALYSES
4850 Mark Center Drive
Alexandria, Virginia 22311-1882

The Institute for Defense Analyses is a non-profit corporation that operates three federally funded research and development centers to provide objective analyses of national security issues, particularly those requiring scientific and technical expertise, and conduct related research on other national challenges.

About This Publication

The work was conducted by the Institute for Defense Analyses (IDA) under contract HQ0034-14-D-0001, Project DF-6-3870, "Defense Institution Reform Initiative (DIRI) Program Support," for the Under Secretary of Defense for Policy (USD(P)) and the Naval Postgraduate School (NPS) Center for Civil-Military Relations (CCMR). The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

For More Information:

Dr. Wade P. Hinkle, Project Leader
whinkle@ida.org, 703-578-2895
Mr. Michael L. Dominguez, Director, Strategy, Forces and Resources Division mdomingu@ida.org, 703-845-2527

Acknowledgments

The authors wish to thank Charles Fletcher, Patrick Goodman, Harold Laughlin, Iain MacArthur, and James Wilson for case studies of past FOCIS usage; James Wilson for his thoughtful review; and Dana Coppola and Amberlee Mabe-Stanberry for editorial and production assistance.

INSTITUTE FOR DEFENSE ANALYSES

IDA Paper NS P-5361

Defense Governance & Management
Improving the Defense Management Capabilities of Foreign Defense Institutions

Using a Relational Database (FOCIS) to Improve Defense Force Planning and Budgeting

An Overview for Project Leaders

Thomas J. Wallace
Aaron C. Taliaferro
Wade P. Hinkle, Project Leader

This page is intentionally blank.

Executive Summary

This document provides a succinct, non-technical overview of a relational database, the Force Oriented Cost Information System (FOCIS). FOCIS is a software program developed by the Institute for Defense Analyses (IDA) to assist foreign countries in strengthening their defense management capacity and capability. The intended audience of this paper is project leaders who are unfamiliar with relational databases generally and FOCIS specifically. The paper describes scenarios where FOCIS may be useful and provides best practices, based on historical experience, for building a country work plan that includes FOCIS. This document does not describe the technical details of FOCIS. Those seeking information on how to install, operate, and troubleshoot FOCIS should consult IDA Document D-4318, *Force Oriented Cost Information System (FOCIS) User's Manual*, which is an exhaustive user's guidebook.

This document is divided into several sections. Section 1 gives a brief description of FOCIS to orient the reader. Section 2 describes how to use FOCIS. Section 3 discusses the relationship of FOCIS to defense management processes and goals. Section 4 describes common pitfalls that can be encountered in FOCIS implementation. Section 5 describes country-specific challenges that can affect FOCIS implementation, and how a work plan can be developed to mitigate them. A PowerPoint presentation detailing the use of FOCIS as a tool to calculate readiness levels is included in Appendix A as an example of the software's real-world use.

This page is intentionally blank.

Contents

This page is intentionally blank.

1. What is FOCIS?

FOCIS is a relational database. Like any relational database, FOCIS is able to accommodate complicated querying in support of data analysis. It was developed by the Institute for Defense Analyses (IDA) for use on tasks where the intent is to study the defense governance and management practices of foreign defense institutions and familiarize those institutions with management techniques that may improve their capacity and capability to develop and manage their defense forces. Its primary function is to assist defense analysts in estimating costs of different defense management choices and to project those choices over a multi-year financial plan. The choices that affect cost are the design and size of the force structure; the amount and type of equipment, spare parts and reserve material on hand; the number and type of personnel in the force; the planned amount of training the force intends to conduct; and the typical operating tempo of the force. Because it is a relational database, FOCIS can account for all of these variables simultaneously and project the total costs of the force over as many years as an analyst may wish to forecast. As defense leaders make new choices about force design, a defense analyst who has FOCIS available can easily model the choices and describe their effects to defense leaders in terms of both cost and force design.

To use FOCIS, a user's first step is to create an organizational tree representing every unit in a nation's defense establishment. This unit structure can be at any level that fits the national need. The level of detail can vary throughout the structure, with more detail in areas of the highest interest. The user defines various personnel classes, equipment types, and activities (e.g., hours flown or rounds fired) that correspond to their local administrative practices. The user also defines cost factors that are used to estimate the budgetary impact of the assets and activities they choose to represent. For example, a particular personnel grade may carry a salary cost factor, benefits cost factor, uniform costs, pension cost factors, and so on. The user also creates budget accounts (typically corresponding to a nation's legally defined budget account structure) and defines which costs belong to which accounts.

The user then fills units in the organizational tree with personnel, equipment, and activities (e.g. training, operations, maintenance, etc.) The user can vary each unit's personnel and equipment numbers as well as the activity rate by year to represent change over time. FOCIS automatically multiplies the amount of personnel, equipment, etc., in each unit by their corresponding cost factors to calculate a fully burdened cost. The user can manually enter other costs that do not easily correspond to unit resources and activities, such as procurement and construction projects or administrative budget line items. In sum, FOCIS is a relational database that allows an analyst to model the relationships between a force structure and its resource levels, their activities, the planned projects, and their budgetary costs over a multi-year timeframe.

FOCIS also allows a user to group or disaggregate force structure and cost data with a fine degree of control. A user can summarize forces and cost by service, unit, budget account, or

virtually any other distinction. If standard reports are insufficient, the user can create custom reports. The custom reports are labeled as *analysis models* within the database and allow any user to map individual elements within a force structure to some non-standard organizational construct (e.g., joint task forces, mission areas, geographic locations, etc.) and run reports using these constructs. A user can create and save multiple standard reports and analytic models – as many as are needed to represent the potential management choices considered by defense leadership, and run reports comparing them.

As implied in the preceding paragraph, FOCIS is highly customizable. Many aspects of the model are user-defined, allowing defense analysts to tailor FOCIS to their particular defense institution's needs. A practical feature of FOCIS is its ability to translate standard defense terms into multiple languages. The software has a dictionary interface to maintain dual-language features such as English and Spanish in the same database position.

Furthermore, a user can set up different budget accounts that correspond to different types of funds. For example, some assets in the force structure may be paid for by the *Operations and Maintenance* budget and others may be paid for by *Investment* or *Procurement* budgets. Other user-defined design features include inflation factors to account for macroeconomic projections and authorized force levels to account for legal limits on force size or to model planned force requirements.

Finally, FOCIS has a number of features to support secure collaboration using either a network or files transferred and merged through a data maintenance function. Multiple computers can be networked to operate on the same FOCIS database. FOCIS can both import and export data from Microsoft Excel. In addition, FOCIS has access controls to allow specific users access to certain data, and can support classification-based restrictions in its outputs.

2. How to Use FOCIS

FOCIS can be used in different ways, depending on a nation's goals and particular situation. This section outlines four broad paradigms of FOCIS usage that may be integrated into a work plan. Although these paradigms are listed in increasing order of complexity, more complex usage is not necessarily better. Some users migrate from a relatively simple implementation to a more robust version as their processes mature and their understanding of how FOCIS can be used matures. The optimal FOCIS work plan is achievable and meets U.S. government (USG) and the foreign nation's objectives. This section describes how FOCIS can be used; a deeper examination of how these activities connect to larger efforts to improve the management capability of a foreign defense institution is given in the next section.

A. Database of Record

FOCIS can be used as an impetus for the host nation to collect necessary data for effective defense management. FOCIS provides a tool to create an integrated and definitive "database of record" tying forces, resources, and activities to costs throughout a medium-term planning period.

It is common for any type of bureaucracy to lack information needed to support decision-making. The more complex the bureaucracy, the greater the lack due to the scope of the data requirements and the difficulty experienced in usefully collating data. Defense establishments, often the largest public sector institution in any country, typically lack a useful data collection and collation system.

This may be because the information does not exist. For example, some nations do not know how much their military equipment costs to operate, or how operational costs are related to equipment use. Alternately, the information may exist but not be available to the decision makers. It is a common bureaucratic trait to not share information or integrate key processes across intra-organizational boundaries.

It may be that data is available but isolated and not available to senior decision makers in a useful form. For example, a personnel management system tracks people, a financial management system track expenditures, and an equipment inventory system tracks parts distribution, but none of them independently provide useful data for a decision maker considering changes in force structure. Each is adequate for its intended purpose; however, none can be used for integrated planning on their own. Also, changes in one database do not trigger corresponding adjustments in others, causing coordination issues. FOCIS can unite disparate data into a single, validated, multi-year database accepted as the defense sector's approved force

plan[1]. This is a prerequisite to improving defense resource management at the institutional level and adheres to best practices of defense management; effective management occurs if leaders have the information they need and if institutional stakeholders accept the validity of this information and the decisions it informs.

To use FOCIS this way, the host-nation staff needs to understand the data requirements and scope of the data collection effort before work begins. Before beginning data collection, the project team needs to work with host-nation staff to determine whether each data item already exists somewhere in the defense establishment. If yes, where? If not, how could it be generated? This generates a series of tasks for the host nation to pursue. A full listing of data necessary for FOCIS is beyond the scope of this document, but some particularly important items are:

- Structure: Which units and organizations exist? Which units are subordinate and which are superior? Is there an existing, validated Table of Organization and Equipment that provides this information.
- Personnel: What rank structure exists? How many personnel, by rank, are in each unit?
- Equipment: What major equipment items exist? What units have how many of each?
- Activities: What systems or processes are used to record equipment use? How is usage recorded? What are the major activities of units that are tracked? What else should be tracked?
- Budget: What budget accounts exist? What types of costs go with each budget account?
- Cost Factors: How much do people and equipment (and equipment use) typically cost?

To be practical, host nations rarely sign up for U.S. assistance because they have a burning passion for data gathering and validation. Host nations are willing to undertake such work only because they have been convinced that it is a prerequisite for what they actually want to do, which is solve a specific management problem. As such, it is critical that the project leader first convince host-nation leadership on the need to use a relational database to solve their problem in order to motivate them for the hard, upfront work of data wrangling. If they are convinced, then FOCIS is a relational database that is available for their use.

[1] Also referred to as the defense program of record.

However, expect not all data requirements to be filled. Time and labor constraints mean something will be left out. The above-listed items are a good starting point, but should be modified if they prove to be too onerous. For example, a database that contains only two personnel classes (Officer and Enlisted) and four equipment classes (Truck, Tank, Plane, and Ship) to simplify data requirements is still sufficient for planning. FOCIS is a planning tool, not an accounting tool, so the data only needs to be as detailed and complete as is necessary to improve host-nation decision making.

Case Study: Database of Record

In Philippines, data stovepipes were a major impediment to the Ministry of Defense producing integrated, effective, and affordable plans. FOCIS was used to integrate data from all services and now acts as the official database for Ministry-wide budget analyses and decisions.

Another prerequisite to use FOCIS as a database of record is that the data loaded into the database must be accepted by institutional stakeholders as a fair and accurate representation of the force structure. Working with host nation personnel, the project team should strive to include as many services and agencies as possible in the work plan. Principles of data validation and integrity should be introduced to the host nation personnel responsible to gather data and build the program of record within FOCIS. For example, advise the host nation to issue formal guidance specifying the schedule and periodicity of data collection, entry, and measurement. IDA Document D-5044, *Observations on the Republic of Korea Force Requirements Verification System*, contains more detail on the role of data integrity in defense planning.

When using FOCIS as a database of record, a common question is how to validate FOCIS data and ensure that it is accurate. The answer is not to check FOCIS data line by line. FOCIS integrates data from many other sources. Each data source comes with its own assumptions and flaws. The most powerful method to ensure FOCIS data is accurate is to use FOCIS for real budget decisions. By doing so, it becomes in stakeholders' financial self-interest to feed good data into the process. If good data is input into FOCIS, then a more finite and precise validation step is to compare future costs that FOCIS will estimate on the basis of user-identified cost factors, and compare those to actual expenditures when the information becomes available. This validation step helps users refine the model's user-defined cost factors.

Finally, some may question whether a simpler tool, such as Microsoft Excel, could serve the same purpose as FOCIS. The answer is no. Excel is not a relational database. A such, it lacks properties required of a reliable database.[2] In layman's terms, Excel breaks too easily. Excel has almost no data integrity safeguards and has only primitive methods (e.g., VLOOKUP) for locating and manipulating data. In contrast, FOCIS' back end database is Structured Query

[2] The properties are atomicity, consistency, isolation, and durability. Haerder, T. and Reuter, A. (1983), "Principles of transaction-oriented database recovery," *ACM Computing Surveys* 15 (4): 287.

Language (SQL), an industry standard that grants FOCIS both a high degree of reliability and the ability to conduct data analysis at a much higher degree of fidelity than Excel.

B. Cost and Force Analysis

Once sufficient data has been entered, FOCIS can be used to analyze the cost of a force structure. Such analysis can be the "ah-ha moment" that convinces the host nation of the utility of collecting data and entering it into a relational database. It may be the first time the host nation has seen all of its units and their associated costs visually displayed in one place. From this baseline, even simple analysis can generate deep insight. In essence, this paradigm uses FOCIS as a diagnostic tool to identify specific problems that require a remedy. Some examples include:

- Total cost of the defense establishment
  - FOCIS can calculate the fully burdened cost of the defense establishment by year. A comparison of this calculation to the official budget can be illustrative. For example, a FOCIS number much larger than the official or forecast defense budget may indicate that the host nation is failing to take into account the total costs of the defense structure and therefore is inadvertently planning to spend more that its forecast budget allocation will allow.[3] This phenomenon is known as a structural deficit, which is a deficit in which the expected revenue falls below planned expenditures.
- Cost by budget account, unit, or cost driver
  - FOCIS also can conduct more disaggregate cost analysis. A user can identify particularly costly budget accounts or cost drivers and consider whether those high costs are justified. If they were not, this would be indicative of a poor resourcing strategy.

As with any effort that seeks to build the capacity or capability of a foreign nation, the project team should view its task as advising the host nation to conduct such analysis, rather than doing it for them. As required, the work plan will consist of seminars on how to use FOCIS, performing analyses, arranging joint meetings to discuss and interpret results, and the like. Because

Case Study: Cost Analysis

In Colombia, Ministry of Defense officials trained on FOCIS used it to analyze cost drivers. They found that personnel and pension costs comprised more than 65% of the budget and were increasing at a rate of growth significantly above the average annual increase of the defense budget. This threatened to crowd out all other spending. The analytic discoveries led to discussions of reforming national laws regarding service commitments and the structure of the pension system.

[3] As a word of caution, some discrepancy in cost between FOCIS and the official budget is normal because the official budget likely contains many activities not worthy of analytical attention and hence not included in FOCIS (e.g., grounds maintenance).

FOCIS reports can be run on subsets of the overall military establishment, cost and force analysis can be done before data collection is totally complete. A team that needs to quickly demonstrate the utility of the tool may use FOCIS to perform analysis, run reports, and make recommendations on a subset of the overall force structure.

Using FOCIS as a diagnostic tool requires contextual understanding of the host-nation's strategy and resources. FOCIS has no capability to independently identify any force or cost level as too high or too low. The FOCIS user must use their judgment to interpret FOCIS output and make such assessments. FOCIS is an analytic tool. It cannot conduct independent analysis. Similarly, the host-nation staff must conduct root-cause analysis to determine why numbers are too high or too low, if they believe the reports FOCIS generates are inaccurate. Take a unit that FOCIS shows as having fewer planes than expected; FOCIS cannot tell whether the root cause of this problem lies in procurement, maintenance, or doctrine. Until this root cause is identified (which typically occurs through an investigative process of questioning stakeholders), no management action can be taken to fix it.

C. Capability and Readiness

A more advanced use of FOCIS is as a capability and readiness monitoring tool. FOCIS allows a user to define, for any given force element (such an army battalion) within the defense sector, the actual and authorized[4] amount of personnel, equipment, and operational activity. FOCIS automatically compares actual to authorized and calculates a percentage. For example, a military unit authorized to have 100 people but that only has 80 would have an 80% "personnel fill rate." Like most aspects of FOCIS, the granularity of such reports can be adjusted according to a user's needs. For example, FOCIS can calculate the personnel fill rate for the entire Army or for a single army company.

Assume the following statement is true: "Military units are designed to provide a pre-planned, specified amount of capability and their readiness to do so is correlated to the unit's resource inputs." Resource inputs include training, material, equipment, personnel, and facilities. For each of these items, FOCIS allows the host nation to measure and track the inputs to capability. Hence, defense leaders are able to better manage the development of their forces because they are able to model and understand the trade-offs between the costs and capabilities. Readiness metrics rely on a numerator and a denominator. FOCIS is a planning tool. It is not a tool for measuring operational effectiveness. Therefore, the numerator is the amount of personnel and equipment ***assigned*** to the unit. The number is not the actual amount of personnel or

[4] Authorized amount generally refers to a legal limit or a policy limit that defines the highest number of personnel or equipment that a force may have or that an individual force element may have. Some nations may not have authorized limits. In this case, a person instructing a nation on how to use FOCIS may suggest that the authorized field be thought of as "amount required," rather than authorized. If a capability planning process is in place, then the nation ought to be able to derive the number of personnel, equipment, material, training, and facilities a unit "requires," in order to achieve a defined amount of capability.

equipment available, because this number is going to change from week to week based on operational tempo and other day-to-day factors, such as sick leave or maintenance. The denominator is either the amount authorized (the legal limit) or the amount required to provide a preplanned level of capability.

If a nation does not have a denominator, FOCIS cannot measure readiness. If authorized numbers exist but have no correspondence to actual military requirements, FOCIS measurements of readiness are invalid. Thus, using FOCIS for capability and readiness typically goes hand in hand with the larger task of helping a nation develop its unit's design (e.g., a Table of Organization and Equipment or a unit's Designed Operational Capability Statement[5]). It is important to note that FOCIS can only report individual unit readiness metrics (e.g., personnel fill rate, equipment fill rate, and so on) and does not calculate a readiness metric for an aggregation of units, such as a task force or the entire force. A given nation may want to develop a total readiness metric. Best practices for doing so are beyond the scope of this document, so the project team should manage expectations; it is not possible to calculate a single "master metric" of readiness within FOCIS. As already mentioned, FOCIS is not a tool for calculating operational readiness. It cannot and should not be used to identify units most ready to participate in any particular near term operation. Chapter 5, "Common FOCIS Pitfalls" provides more on this potentially dangerous misconception. Accompanying this paper is a short, annotated PowerPoint presentation on what FOCIS can do with respect to calculating readiness and how it can be done.

D. Budget Planning

So far, we have described three ways to use FOCIS retrospectively. Now, we turn to using FOCIS as a future force planning and analysis tool. FOCIS can automatically calculate the cost of changes to a force structure given a change to the resource inputs of the force elements within the model. Therefore, it is a powerful tool for conducting a crosswalk between capability (an output) and costs (the inputs) that any financially constrained planning process requires. In essence, FOCIS allows what-if analysis of future force structures at a level of speed, accuracy, and resource-consciousness unachievable without a relational database.

Case Study: Budget Planning

Botswana sought to transition to a Brigade Combat Team-oriented military. Botswanan analysts used FOCIS software to model different paths to reform and produce validated costs of different options. This multi-year and cost-informed planning led to a sustainable and effective plan for transformation.

[5] Developing a force structure design constitutes an entire line of work related to policy and strategy, and concept and doctrine development. These things are beyond the purview of this paper.

In such a work plan, the country team trains the host nation in best practices for defense budget development. These include elements of program budgeting, capability planning, and life cycle cost estimation[6]. The goal is for the host nation to consider, in a systematic and organized fashion, what future military forces would be required to achieve its strategic goals under projected resource constraints. Once a desired end-state is established, the advisory team trains host-nation staff in the use of FOCIS to cost competing proposals, which develops into an iterative process of puts and takes to fit high-priority future capabilities into the budget. Using analytic models, FOCIS can compare the effects of multiple competing proposals at the same time.

It is unrealistic to expect to tackle the entire defense establishment at once. Rather, the project team should consider establishing a pilot program, in which the host-nation conducts FOCIS budget planning efforts on a particularly high-priority subset of the total force. Reduction of the scope of analysis increases the chances for host-nation success.

[6] For an exhaustive description of program budgeting and its requirements for implementation, see IDA publication NS-P-5317, *Defense Governance and Management: Improving the Defense Management Capabilities of Foreign Defense Institutions, Part 1 and Part 2*. The publication includes seminar material, student handouts, and a pre-made FOCIS database for training purposes.

3. The Relationship of FOCIS to Larger Goals

Previous sections have detailed what FOCIS is and how it can be used. The logical next question is, for what purpose? How does FOCIS assist the larger goals of improving a nation's ability to govern and manage its armed forces? First, it is important to ask why the U.S. government would seek to improve the defense management capacity or capability of a foreign nation. Although a definitive answer is a U.S. government prerogative, it is fair to generally describe the USG's purpose as some combination of the following, with the relative importance of each varying among countries:

- Improve a partner nation's armed forces capacity and/or capability
- Strengthen the transparency, accountability, and effectiveness of a partner nation's defense institutions, and reinforce civilian control of its armed forces
- Engage with a partner nation military to build trust and influence between our governments, and increase access to shared resources that may be important during combined operations.

This section summarizes the multiple ways in which FOCIS can contribute to these ends.

A. Improve a Partner's Nation's Armed Force Capacity or Capability

Security Cooperation[7] engagements are often motivated by DOD's desire to get a partner nation's armed forces to do something better. That something might be to contribute to regional security, to conduct combined operations with U.S. forces, or to secure their own border. Regardless of the specific issue, the overall goal is to build the partner's ability to succeed by addressing the issues that prevent it from doing so. If one conceives of the Ministry of Defense and the headquarters' staff of the armed forces as institutional mechanisms for converting public resources into armed forces' capabilities, then security cooperation at the institutional level consists of finding and fixing bottlenecks that impede the efficiency of this conversion. This results in more capabilities ready and available to contribute to operations that fulfill a common desire of the partner nation and the U.S. government. FOCIS contributes to these ends in at least three ways.

First, FOCIS promotes institutional information sharing and collaboration. This is a common deficit among defense institutions. Senior leaders need accurate and agreed-upon data

[7] As defined by Department of Defense Directive 5132.03, December 29, 2016, Security Cooperation is, "All DoD interactions with foreign defense establishments to build defense relationships that promote specific U.S. security interests, develop allied and partner nation military and security capabilities for self-defense and multinational operations, and provide U.S. forces with peacetime and contingency access to allied and partner nations. This also includes DoD-administered security assistance programs."

on the entire defense structure, yet defense institutions are often structured so that data is available only on a military service-by-military service basis (if at all). This results in poorly informed decisions, asynchronous effort, and both fiscal and operational consequences. FOCIS helps combat this by providing an impetus to induce stakeholders to be transparent about their force structure and its costs. Once agreed upon, the model constitutes a "database of record." In this capacity, FOCIS improves defense management. The institutional leaders do not have to spend time arguing over details of budget data. Rather, they can argue about trade-offs between cost and capability that shape the force structure.

Second, FOCIS helps the host nation identify root-cause problems. FOCIS allows analysts to crosswalk resource inputs to the force's planned capability outputs. This enables a trained FOCIS user to identify the root cause of a deficiency in capability. For example, a shortage of infantry fighting vehicles (IFV) may be due to inadequate maintenance, which may be due to a shortage of trained mechanics, which may be due to a lack of schoolhouses, which may be due to inadequate resourcing for training. In such a country, no amount of foreign spending on new IFVs and parts will produce the desired effect until the root cause is fixed. In this sense, FOCIS allows treatment of the disease rather than the symptom.

Case Study: Root Cause Analysis

In Kosovo, FOCIS was used to identify a lack of radios in key military units. This sparked a root-cause analysis, which found that a lack of national strategy with which to define missions, capability requirements, and unit TOEs were preventing units from knowing how much they should have.

Third and finally, FOCIS helps defense leaders understand how the budget links to the defense policy objectives. Once understood, it enables planning that can result in a policy-driven budget. A common question in defense management is, how much defense is enough defense? Faced with too many challenges for defense to solve, what share of the resources allocated to the defense budget should go to each challenge? FOCIS is not a crystal ball and cannot independently answer this question, but it does allow a host nation to rapidly assess various force structure options and their respective costs. By allowing a host nation to consider cost and capability simultaneously, FOCIS helps fit as much of the right capabilities as possible under a given budget limit.

B. Transparency, Accountability, and Civilian Control of the Military

FOCIS is a powerful tool for transparency and accountability. Corruption and malfeasance are informationally driven. They thrive when leaders cannot detect their presence or punish their perpetrators. FOCIS, which unifies data from across the entire defense establishment into an easily interpretable form, shines a management light onto previously dark corners.

Case Study: Transparency

In Philippines, the ability of FOCIS to match resource inputs with force outputs (and identify discrepancies in this area) uncovered suspicious spending patterns, eventually leading to the identification and prosecution of corrupt logistics officials.

Similarly, FOCIS assists in civilian control of the military. Funding is the most powerful lever by which a government or a defense ministry can enforce or induce compliance with its policies. FOCIS allows any nation to prepare a multi-year budget plan that specifies what forces will be resourced. It also aligns the force structure with specific budgetary inputs. Using FOCIS during annual planning or budget reviews, a defense ministry should be able to detect any drift from the multi-year plan. If detected, the defense ministry can reallocate or withhold funds to ensure compliance.

C. Engagement, Influence, and Access

The previous sections assumed that substantive change in defense management capacity or capability is the primary purpose of using FOCIS during a security cooperation effort. In some cases, however, engaging with the host-nation is of equal or greater importance to DOD. Access and influence are legitimate goals, and FOCIS is well suited to achieve them.

One, implementing FOCIS entails engagement with an unusually wide set of stakeholders. Defense engagement often is contained to functional silos, such as operators or logisticians. In contrast, because FOCIS models an entire defense force structure, FOCIS teams commonly work across the various departments of the defense ministry and headquarters of the armed forces, as well as with civilian budget agencies when necessary. FOCIS' interdisciplinary nature helps produce a visible and collaborative U.S. presence across an entire foreign defense establishment to include (sometimes) civilian agencies who are not part of the defense establishment but that have a defense oversight or defense budgeting role .

Two, FOCIS helps form a more durable and long-term relationship. Foreign defense engagements can be prone to "seminar-itis." There may be access and influence when the engagement team is physically present, but it is lost as soon as they leave. In contrast, a FOCIS work plan requires the partner nation staff to gather data and run analyses, even in the absence of the project team. This inevitably leads to questions that can be answered through voice calls or email exchange. Integration of FOCIS into the normal work pattern of the host-nation staff has led to periodic and consistent engagement (not just during trips). In some cases, the partner

nation continues to seek U.S. counsel even after the official end of the security cooperation project.

Three, if FOCIS implementation is successful, the U.S. government's engagement team has direct access to the highest levels of power, who have come to rely on FOCIS and its analytical output in some way. The number of countries where FOCIS has been totally implemented and integrated into national planning procedures is small. In countries where it has, however, the FOCIS team regularly interacts with the staff of the partner nation's ministerial and armed forces headquarters.

Case Study: Access

In Colombia, the process of overhauling defense budgeting procedures with FOCIS has led to regular meetings with the Vice Minister of Defense for Strategy and Planning.

4. Common FOCIS Pitfalls

This section describes common FOCIS errors. Most consist of using FOCIS for a purpose for which it was not designed. Doing so typically results in poor analysis, wasted effort, and diminishment of the perceived value in the eyes of the partner nation and U.S. government sponsor. The project team must be vigilant and resolute in avoiding the following:

A. Too Much Detail

FOCIS is a tool to assess the cost of defense management decisions. Thus, a heuristic for considering whether to include particular data items in FOCIS or not is the following: Does the item cost enough to affect decisions? If the answer is yes, the data should be included. If the answer is no, it should be excluded. Put differently, a nation should have aircraft and pensions represented in FOCIS, but probably not boots and beans. The former are cost drivers. The latter are consumables. The costs of consumables will be estimated according to cost factors related to training rate and operational tempo.

This heuristic is necessary to mitigate against the tendency of some nations to include too much data in FOCIS. The laudatory desire to gain an accurate picture of the defense establishment can lead to overzealousness. A model should be a useful abstraction of reality, not a literal picture of it. So, to provide another example, counting canteens both wastes scarce staff time on a relatively low-leverage analytical issue, and needlessly increases the size and complexity of the FOCIS database (and therefore the work required to maintain it). Whenever possible, seek to reduce the agreed upon minimum essential data entry requirements.

B. Using FOCIS as an Inventory Management Tool

For many countries, the initial data collection and entry stage of FOCIS implementation will be the first time the defense establishment takes a comprehensive survey of its equipment. Once all major assets are accounted for, a natural tendency is a desire to use FOCIS as an inventory management tool. For example, a host nation may want to track when various equipment items entered service; adherence to maintenance schedules; distribution of supplies from warehouses to forces; and so on.

Attempting to use FOCIS for this purpose is an error. FOCIS does not provide a sufficiently high level of detail to track individual items. FOCIS can show that a unit had one truck in 2015 and two trucks in 2016. It cannot show which is the new truck and which is the old truck. FOCIS can show the cost increases associated with increasing maintenance for an aerial squadron, but it cannot show which planes received which maintenance and when. FOCIS can track aggregate levels of operational activity (e.g., miles driven), but it cannot show which individual platforms accounted for this operational activity.

C. Using FOCIS as a Personnel Management Tool

Once exposed to the fully burdened cost of personnel, which often is the largest cost driver in the defense budget, a host nation's interest in personnel management typically rises. Common goals include assessing the availability of particular skills within the force (e.g., high-value military occupational specialties), measuring in- and out-flows of personnel, and measuring operational activity on an individual basis (e.g., who attended what training).

FOCIS is a poor tool for personnel management tasks because it tracks personnel on an aggregate basis by force element, not on an individual basis. FOCIS can show the number of each type of personnel in any given force element, but has no insight into their individual characteristics. FOCIS can show a military unit gaining or losing personnel over time, but it cannot model the recruitment, reassignment, or separation processes accounting for this change. FOCIS can measure unit-level operational activity, but cannot represent any combat or training-derived change to personnel characteristics.

Skills can be forced into FOCIS by creating a new personnel class for each combination of rank and occupational specialty. However, this practice carries a cost of exponential growth in the number of personnel classes and presents little analytical gain, since there often is no pay differential between military occupational specialties of the same rank (keeping in mind that FOCIS analysis is centered on the costs of management choices). The only time this practice should be done is if the occupational specialty of interest has a high cost differential, as may be the case for pilots, doctors, and the like.

D. Using FOCIS as an Operational Planning Tool

FOCIS tracks inputs to capability (personnel, equipment, and unit activities). This allows FOCIS users to analyze different readiness postures. For example, the model can reflect an increase in personnel and equipment fill rates for front-line units likely to see combat. The logical next step in the minds of some is to employ FOCIS as an operational planning tool. Why not use FOCIS to find highly ready units to send into the field?

This is not be feasible. FOCIS calculates personnel fill, equipment fill, etc., on an average or end-of-year basis. It cannot measure the natural fluctuations in end-strength that a military unit typically experiences within a year, particularly those subject to attrition and combat stress. FOCIS can be used to assess *planned* readiness (i.e., the ability of the total force to contribute to broad mission areas). It should not be used to assess *operational* readiness.

5. Country-Specific Factors

A number of country-specific factors must be taken into account when determining whether to use FOCIS for a particular engagement.

A. Project Scope, Resources, and Timeline

Fully implementing FOCIS is a significant effort. Defining taxonomies and categories, gathering and validating data, entering it into the database, conducting analysis, and institutionalizing it into force planning and budget practices is a multi-year effort. Therefore, if FOCIS is used as part of a defense institution building engagement, project teams must tailor its use to the scope of the particular engagement. If the engagement is pre-ordained to be short term or if it is a one-time country assessment to satisfy a Congressional mandate, then full-on implementation of FOCIS is unrealistic.

It is impossible to give a definitive methodology for deciding whether to use FOCIS. A middle ground of whether to use or not to use may be to demonstrate and inform the partner nation of its existence and general capabilities. This provides the nation an option to seek out further assistance if desired. Another way to use FOCIS is to demonstrate how it works in order to initiate general discussions of the trade-offs of forces' capability and their resultant costs. As already discussed, if the defense ministry has a problem with civilian control of the military, transparency, efficient planning, or understanding the total cost of its force structure, then FOCIS is a tool specifically developed to help in such circumstances assuming data is available to be collected. Furthermore, given the complexity of the defense sector, if the nation does not have a relational database to record and organize data, and run reports, it will have deficiencies in these areas that cannot be overcome with paper methods or flat databases. Multi-year force planning and budgeting requires a relational database.

B. Host-Nation Interest and Willingness

Having sufficient resources for FOCIS implementation and believing it to be a good idea are still not sufficient reasons to use FOCIS during any given engagement with a partner nation. The partner nation must be interested in solving a problem suited to FOCIS' capabilities, and be willing to adopt the practices needed to use FOCIS.

Not all partners will be interested in FOCIS, even if it is a tool that fits their specific need. The nation may be unwilling to pay the cost in time or money to adopt FOCIS. FOCIS requires serious work and cross-bureaucracy collaboration. A Ministry of Defense may be unable or unwilling to provide staff time in sufficient quantity, or to induce the various services to collaborate.

Case Study: Lack of Interest

In Argentina, the military services were highly interested in using FOCIS, until they learned that their information would be shared with the Ministry of Defense for budgeting purposes—at which point their interest evaporated and FOCIS implementation stalled.

However, an initial deficit of either interest or willingness may not mean FOCIS will not eventually be the right tool for a given engagement. Issues that do not initially appear to involve force-cost reconciliation in fact do. For example, a country seeking to improve its recruiting, training, and assignment processes—human resource management tasks for which FOCIS may not appear relevant—may have poor human resource management practices due to a lack of trained personnel officers. The lack of trained officers may point to a lack of training and education to prepare personnel officers for their duties. The deficiency in training and education may be due to an underinvestment in curriculum development, schoolhouse infrastructure, and an unwillingness on the part of the armed forces to assign people to personnel positions. Using FOCIS to model the force makes it possible to see where underinvestment in priority areas is occurring and to identify potential trade-offs to increase investment in those areas.

FOCIS can increase or decrease in prominence in accordance with the partner's appetite. For example, if a nation's staff capacity is limited, the project team may utilize FOCIS for a small, high-priority subset of the defense establishment, rather than attempting to tackle the entire institution.

Case Study: Varying Appetite

In Indonesia, FOCIS was used by the U.S. team as a teaching aid to illustrate general concepts of budgeting and data management. This allowed the Indonesian Ministry of Defense to understand the value of modeling force structure and costs without having to absorb the cost and effort of FOCIS implementation.

C. Host-Nation Physical Infrastructure and Human Capital

Partner nations that are the recipient of defense management capacity and capability building efforts may reside on the medium or low end of human-development indices. These are working environments with significantly less robust human and physical resources than the United States. Some minimum requirements include computers working on a Microsoft Windows operating system (FOCIS' software makes it incompatible with Linux and IOS). It follows that FOCIS users must be literate, numerate, and experienced with operating a desktop or laptop computer. If any these conditions cannot be met, the project team may not want to use FOCIS at all, or may want to increase the amount of demonstration to the host nation relative to independent work performed by the host nation.

6. Conclusion

This document described FOCIS, a relational database, its functionality, and its application to defense management. Using this knowledge, a project team should be able to assess the potential applicability of FOCIS for a particular capacity building engagement. A major theme of this document, however, is that optimal use of FOCIS requires integration with other aspects of defense management. The reader is therefore encouraged to consult other IDA methodology papers on defense management and assess how FOCIS can complement their lessons:

- NS-P 5350 “Defense Policy and Strategy Development for Foreign Defense Institutions”
- NS-P 5317 “Program Budgeting for Defense Institutions.”
- D-5729 "Defense Management Course, Office of Defense Cooperation, Jakarta 9-20 November, 2015"
- D-5665 "Scenarios – International Best Practice: An Analysis of Their Use by the United States, United Kingdom, and Republic of Korea”
- D-5434 “Defense Planning Scenarios: Best Practice and International Comparisons”
- D-5102 “Foreign Culture and its Effect on US DoD Efforts to Build Capacity of Foreign Defense Institutions”
- D-5044 “Observations on the Republic of Korea Force Requirements Verification System”
- P-4845 “Warsaw Initiative Fund Program Assessments, Phase 2 NATO Partnership for Peace Logistics Exercise 2011”
- D-4785 “The Defense System of Management (DSOM): Republic of the Philippines”
- D-4318 “Force Oriented Cost Information System (FOCIS) User’s Manual”
- D-4400 “References for Capability Assessment, Acquisition Planning, and Cost Estimation”
- D-4137 “"Best Practices in Defense Resource Management”
- D-4057 “Planning, Programming, and Budgeting System (PPBS)/Multi-year Programming Reading Guide”
- D-4021 “Defense Resource Management Studies: Introduction to Capability and Acquisition Planning Processes”
- P-2851 “Concepts for Implementing Multinational Logistics Within NATO”

- D-2817, “Defense Resource Management Assessment of the Albanian Ministry of Defense”
- D-2733, “Defense Resource Management Assessment of the Bulgarian Ministry of Defense”
- P-2508, “Improving Logistics Planning”
- D-2694, “Defense Resource Management Assessment of the Estonian Ministry of Defense”
- D-2651 “Defense Resource Management Assessment of the Ministry of Defense of the Slovak Republic”
- D-2619 “Defense Resource Management Assessment of the Lithuanian Ministry of National Defense”
- D-2569 “Defense Resource Management Assessment of the Romanian Ministry of National Defense”
- D-2372 “Why Nations Differ in Military Skill and Why That Should Affect Defense Planning”

Appendix A.Using FOCIS for Readiness

Using FOCIS for Analyzing Unit Readiness:
A Technical Guide

Institute for Defense Analyses

IDA

Introduction

- Some factors of readiness and thus capability can be tracked in FOCIS
- This document is a technical guide for using FOCIS to measure and monitor planned readiness at the unit level
- This seminar is applicable to users who already have established FOCIS as a database of record for their nation's force structure and are trained and experienced in its use
- Some screenshots included in this seminar are from a database position used in Colombia which show the dual language features of the software

IDA

Agenda

- Review capability and readiness
- Review FOCIS
- Demonstrate how FOCIS may be used to measure some aspects of readiness
- Time: 120 minutes

IDA

What is Defense Capability?

Definition: C*apability is the wherewithal to complete a task or produce an effect within a set of specified performance standards and environmental conditions.*

Capability is embodied in *force elements* with a balance of capability inputs

A force element is a doctrinally organized, distinguishable collection of people, materiel and equipment, and facilities at a specified level of preparation (readiness) required to accomplish tasks and produce effects within a given time period.

IDA

The Inputs to Defense Capability

- There are slight variations among nations on how they describe capability's inputs; however, the following are common to nations that utilize capability planning
  - Doctrine and Concepts
  - Organization
  - Personnel
  - Equipment
  - Training
  - Infrastructure
  - Logistics
- At the force element, or unit, level, the last five are costs to the individual unit.

These elements are common to Canada, the United States, the United Kingdom, Australia, and Colombia

IDA

Measuring Readiness

- These five inputs to capability:
  - People
  - Equipment (durable items)
  - Training
  - Infrastructure
  - Logistics (supply – consumables)
- Also correspond to standard armed forces readiness indicators

IDA

What is Readiness?

- Most generic possible answer: ability of force element to perform a specific task
- How "ability" and "task" are defined and measured lead to different kinds of readiness; understanding these differences is critically important**!**
- Distinction we'll make: **planned** vs. **operational** readiness

IDA

Planned Readiness

- A force element must be resourced to accomplish specific tasks for which it is purposefully **designed;** its primary function(s)
  - Unit design = how much and what type of people, equipment, training, maintenance, etc.
  - Informed by national strategy, defense policy, concepts and doctrine, and capability planning
  - "Unit design" may be found within a "Table of Organization and Equipment" (TOE) or in a unit "Designed Operational Capability" (DOC) statement
- Planned readiness = resources *assigned in the program of record/designed (required to fulfill its primary function(s)*

IDA

Operational Readiness

- Of course, armed forces will be called upon to perform tasks for reasons other than their primary function
  - Infantry Brigade designed to defeat 500 insurgents may be faced with 1,000
  - Helicopter unit designed for emergency response may be called upon for fire suppression
  - Bottom line: does unit have enough people, equipment, training, etc., to immediately do what the military commander needs it to do?
- Operational readiness = what resources are *available* to the unit, divided by the resources *required* for the mission in question (not necessarily its design)

IDA

Operational vs. Planned Readiness

- **Operational** readiness
  - **Definition:** ability of unit to fulfill particular task or mission (may not be what it is designed for)
  - **Purpose:** inform current operations (i.e., within this budget execution year)
  - **Timeframe**: near-term
  - Data: needs real-time data (but not historic data, future projections, or cost)
- **Planned** readiness
  - **Definition:** ability of unit to fulfill primary, planned mission (its design)
  - **Purpose:** inform strategy and budget planning (i.e., future years)
  - **Timeframe:** multi-year planning period
  - **Measurement:** needs historic data, future projections, and cost (but not real-time data)

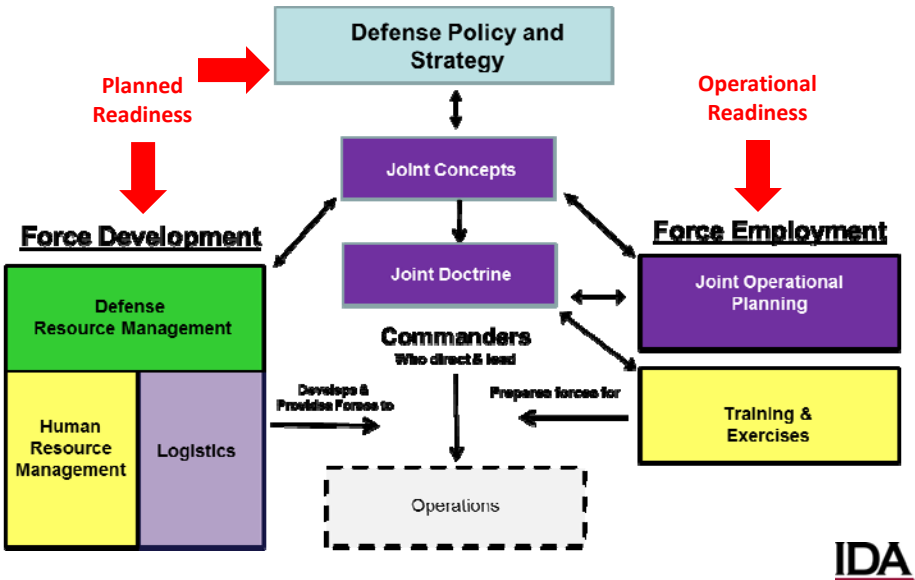
IDA

Operational vs. Planned Readiness

- **Operational** readiness
  - **Definition:** ability of unit to fulfill particular task or mission
  - **Purpose:** informs current operations (i.e., within this budget execution year)
  - **Timeframe**: near-term
  - Data: needs real-time data (but not historic data, future projections, or cost)
- **Planned** readiness
  - **Definition:** ability of unit to fulfill primary, planned mission
  - **Purpose:** inform defense strategy and force planning (i.e., future years)
  - **Timeframe:** multi-year planning period
  - **Measurement:** needs historic data, future projections, and cost (but not real-time data)

IDA

Force Development vs. Force Employment



IDA

Operational vs. Planned Readiness

- **Operational** readiness
  - **Definition:** ability of unit to fulfill particular task or mission
  - **Purpose:** inform current operations (i.e., within this budget execution year)
  - **Timeframe**: point in time, near-term
  - Data: needs real-time data (but not historic data, future projections, or cost)
- **Planned** readiness
  - **Definition:** ability of unit to fulfill primary, planned mission
  - **Purpose:** inform strategy and budget planning (i.e., future years)
  - **Timeframe:** multi-year planning period
  - **Measurement:** needs historic data, future projections, and cost (but not real-time data)

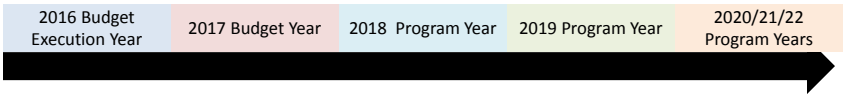
IDA

Timeframe

Operational Readiness

Is a given infantry unit ready to perform mine-clearing operations tonight (or within the next month, or the next year)?

Planned Readiness



Is that same infantry unit properly resourced to perform its designed role over the program budget planning period?

IDA

Operational vs. Planned Readiness

- **Operational** readiness
  - **Definition:** ability of unit to fulfill particular task or mission
  - **Purpose:** inform current operations (i.e., within this budget execution year)
  - **Timeframe**: near-term
  - **Data:** needs real-time data (but not historic data, future projections, or cost)
- **Planned** readiness
  - **Definition:** ability of unit to fulfill primary, planned mission
  - **Purpose:** inform strategy and budget planning (i.e., future years)
  - **Timeframe:** multi-year planning period
  - **Data:** needs historic data, future projections, and cost (but not real-time data)

IDA

Operational vs. Planned Readiness

- **Operational** readiness
  - **Definition:** ability of unit to fulfill particular task or mission
  - **Purpose:** inform current operations (i.e., within this budget execution year)
  - **Timeframe**: near-term
  - **Data:** needs real-time data (but not historic data, future projections, or cost)
  - **Users:** planners of operations
- **Planned** readiness
  - **Definition:** ability of unit to fulfill primary, planned mission
  - **Purpose:** inform strategy and budget planning (i.e., future years)
  - **Timeframe:** multi-year planning period
  - **Data:** needs historic data, future projections, and cost (but not real-time data)
  - **Users:** force planners

IDA

Task at Hand

- Some system of planned readiness is required to plan and budget on the basis of capability
- Why? Because planned readiness is how you track & adjust the funding for different capabilities over time
- FOCIS has some ability to measure planned readiness
- Two Important Points
  - Capability is a function of its resource inputs
  - Since we're interested in planning, not auditing, we will assume changes in funding will be realized (i.e., if we plan to pay for more people in a unit, more people will be in that unit)

IDA

Agenda

- Review capability and readiness
- Review FOCIS
- Demonstrate how FOCIS may be used to measure some aspects of readiness

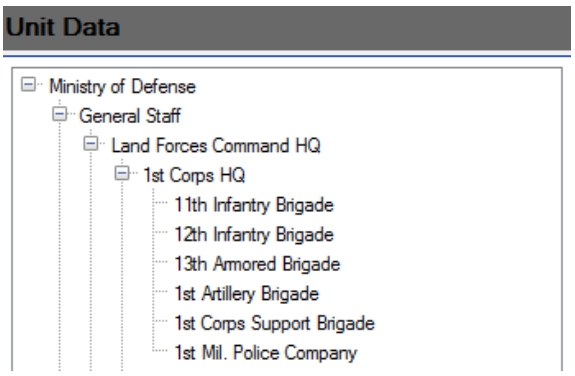
IDA

FOCIS

- **F**orces **O**riented **C**ost **I**nformation **S**ystem
- A brief overview before demonstrating how it can specifically be used for measuring **planned** readiness

IDA

Unit Tree



IDA

Personnel

PRIMERA DIVISIÓN (Ejército Nacional\División)

Personal

			2010	2011	2012	2013	2014
Ejército Nacional	**Activo Mayor Gen/VALM**	**Real**		**0**	**0**	**0**	**1**
		Autorizado			1	0	1
		%			0		100
Ejército Nacional	**Activo Brig Gen/CALM**	**Real**		**0**	**1**	**0**	**0**
		Autorizado			0	0	0
		%					
Ejército Nacional	**Activo Coronel/CN**	**Real**		**0**	**4**	**2**	**2**
		Autorizado			4	0	4
		%			100		50
Ejército Nacional	**Activo TC/CF**	**Real**		**0**	**8**	**9**	**7**
		Autorizado			5	0	5
		%			160		140
Ejército Nacional	**Activo MY/CC**	**Real**		**0**	**1**	**2**	**2**
		Autorizado			8	0	8
		%			13		25

IDA

Equipment

Comando Aéreo de Combate No. 1 (Fuerza Aérea\Brigada)

Personal

Equipo

			2010	2011	2012	2013	2014
FAC-Aeronaves-Entto	**T-37 (FAC)**	**Real**	**17**	**17**	**17**	**17**	**17**
		Autorizado		17	17	17	17
		Almacenamiento		0	0	0	0
		%		100	100	100	100
		Tasa de CM (Ca		0	0	0	0
FAC-Ala Fija-Combate	**AC-47T (FAC)**	**Real**	**1**	**1**	**1**	**2**	**2**
		Autorizado		0	1	2	2
		Almacenamiento		0	0	0	0
		%			100	100	100
		Tasa de CM (Ca		0	0	0	0
FAC-Ala Fija-Combate	**M-5 (FAC)**	**Real**	**4**	**4**	**0**	**0**	**0**
		Autorizado		0	0	0	0
		Almacenamiento		0	0	0	0
		%					
		Tasa de CM (Ca		0	0	0	0

IDA

Activities

Uso del Equipo

			2010	2011	2012	2013
A-29 (FAC)	Horas de vuelo	Real	1,650	1,599	1,578	1,330
		Deseado		1,600	1,570	1,330
		%		100	101	100

IDA

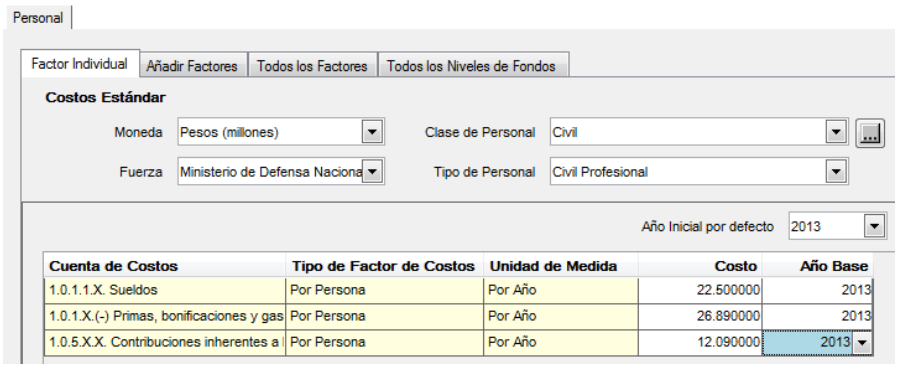
Cost

- During initial set up, a FOCIS user also defines **cost factors** for personnel, equipment, and activities, e.g.
  - yearly salary for an Army Colonel
  - per-flight-hour operating cost of an F-16 airplane

- You won't need to directly work with these, but do need to understand how they work

IDA

Cost Factors



IDA

FOCIS Data

- Data must be fed into FOCIS
- Data collection and entry must be a standardized, validated process documented and approved by the Defense Ministry and applicable to all users or customers of the data
  - The Defense Ministry because the data affects decision making about resource allocation and budget planning….which is the purview of the Civilian leadership
- Data needs to be updated at least once every fiscal year, but not all the time; FOCIS is not an operational planning tool!

IDA

Reports

- Reports are where *analysis* happens in FOCIS
- Reports allow the user to quickly analyze readiness for any **unit** or **collection of units**
- FOCIS allows the user to define custom reports if the standard reports do not satisfy the user's needs

IDA

Agenda

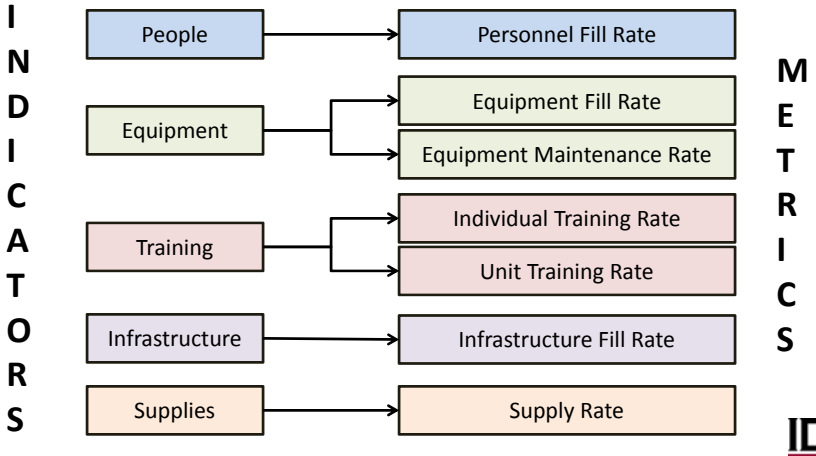
- Review capability and readiness
- Review FOCIS
- Demonstrate how FOCIS may be used to measure some aspects of readiness

IDA

Metrics for Readiness

(are equal to the cost drivers of unit capability)

Indicators can be measured and tracked via metrics



IDA

Defining Metrics

- These metrics can be thought of as assigned/required
  - **Required** = unit design as specified in a Table of Organization and Equipment (TOE); based on *public*, *joint* planning by the armed forces (e.g., to accomplish task X, unit needs 20 trucks, 100 soldiers…)
  - **Assigned** = resources assigned to the unit by the program of record
- Following slides detail how FOCIS defines and measures readiness indicators
- The measures are not indicators of operational readiness – they compare the planned level of input to a unit as captured in the Program of Record to the unit's intended design
  - NOTE: A unique FOCIS position could be established to compare planned levels of readiness to the assumed requirements for a specific mission; however, this brief refers to comparing unit design (what is captured in a TOE or DOC statement) to its planned resource levels as documented in the Program of Record
- The Program of Record is = to a Multi-Year Resource Allocation and Budget Plan
- If a formal Program of Record does not exist, then the Program of Record is assumed to equal currently assigned unit resources and budgets extended over a multi-year period

IDA

PERSONNEL FILL RATE
&
EQUIPMENT FILL RATE

IDA

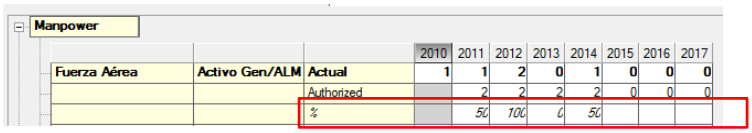
Definition

- Personnel Fill Rate (PFR) and Equipment Fill Rate (EFR) have similar definitions and usage in FOCIS. In the software's input fields:
  - PFR = actual personnel/authorized personnel
  - EFR = actual equipment/authorized equipment
- In FOCIS, the software labels the input field as "authorized" – not "required"
- For any year beyond the current year, actual is assumed = assigned in the Program of Record
- Authorized implies a legal limit; this may not be based on requirements of any kind
  - Users must know what authorizes implies in any given nation or establish business rules and/or alternate FOCIS positions to ensure the "authorized" input field reflects a requirement that is useful for calculating planned unit readiness

IDA

In FOCIS

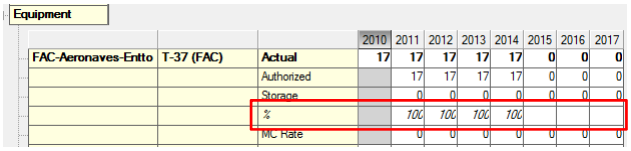
- FOCIS will automatically calculate EFR and PFR if both actual and authorized data are entered



Manpower

			2010	2011	2012	2013	2014	2015	2016	2017
Fuerza Aérea	Activo Gen/ALM	Actual	1	1	2	0	1	0	0	0
		Authorized		2	2	2	2	0	0	0
		%		50	100	0	50			

Personnel Fill Rate
Broken down by personnel type (general, private, etc.)



Equipment

			2010	2011	2012	2013	2014	2015	2016	2017
FAC-Aeronaves-Entto	T-37 (FAC)	Actual	17	17	17	17	17	0	0	0
		Authorized		17	17	17	17	0	0	0
		Storage		0	0	0	0	0	0	0
		%		100	100	100	100			
		MC Rate		0	0	0	0	0	0	0

Equipment Fill Rate
Broken down by equipment type (T-37, 9 mm pistol, etc.)

IDA

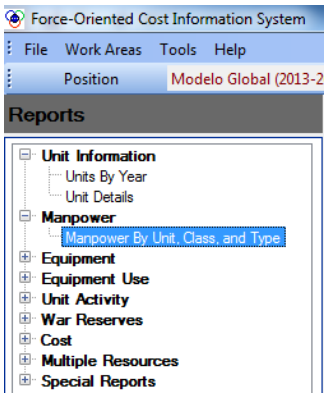
Running Reports

- What if we want to see PFR or EFR for the whole unit (not broken down by type of people or equipment)? Or for a whole mission area regardless of unit or service?
- For PFR:
  - Manpower By Unit Class and Type Report (edit "Data" and "Layout" to include units and Analysis Models you want)
- For EFR:
  - Equipment Inventory By Category Report (edit "Data" and "Layout" to include units and Analysis Models you want)

IDA

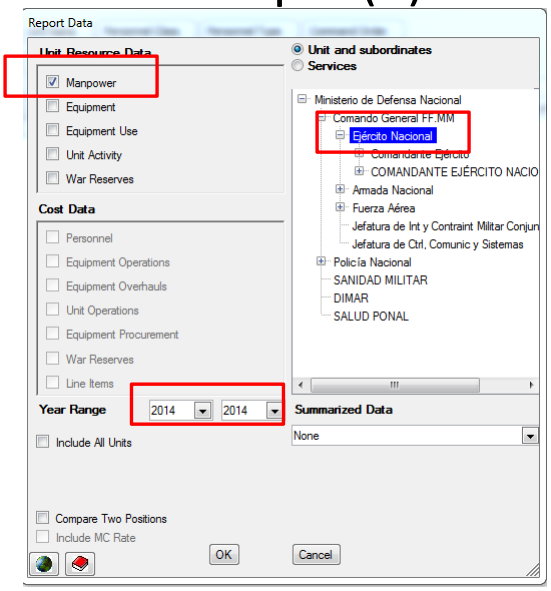
Example (1)

- PFR for entire Army in 2014?



IDA

Example (2)



IDA

Example (3)

Unit Service	2014		
	Actual	Authorized	% Fill
Ejército Nacional	237,016	273,352	87

IDA

Authorized

- If authorized numbers are derived from strategic policy guidance and joint force planning – e.g., the authorized number is X because our plans require that number to accomplish policy's objectives – then EFR and PFR **are** valid indicators of a unit planned readiness level
- If authorized numbers are based on a legal requirement – e.g., the authorized number is X because that's what the law says – then EFR and PFR are **less** valid indicators

IDA

EQUIPMENT MAINTENANCE RATE

IDA

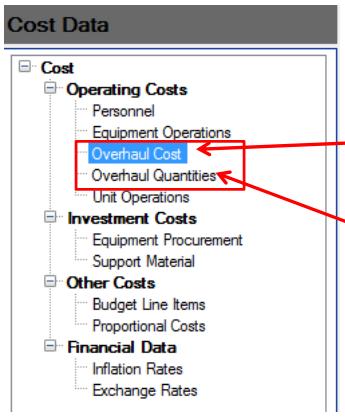
Introduction

- FOCIS calls regularly scheduled equipment maintenance “Overhauls” and divides into 3 categories:
  - Major Overhaul (e.g., totally renovate truck)
  - Minor Overhaul (e.g., general tune-up)
  - Component Overhaul (e.g., replace tires)
  - Maintenance that does not requiring scheduling is not tracked (e.g., clean windshield)

IDA

Implementing Overhauls

- Overhaul data is input via the Cost work area



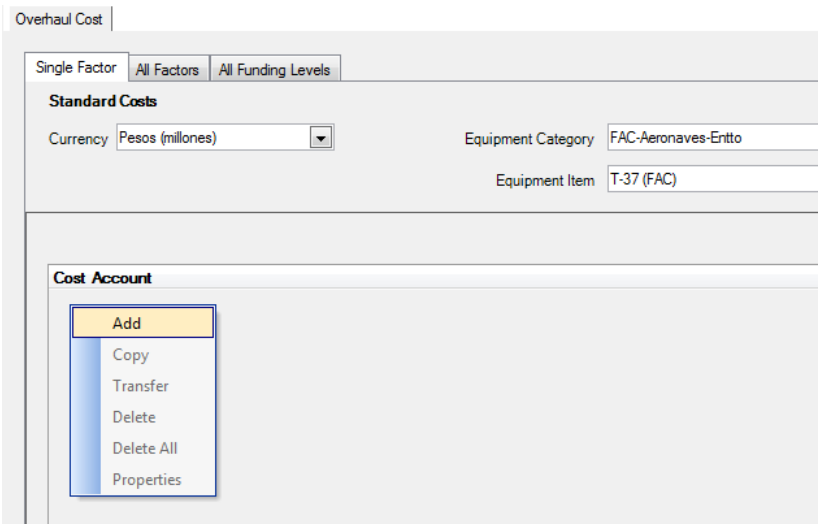
- The user specifies Overhaul as a **cost factor**, and then assigns the desired **quantity** of overhauls to each piece of equipment

IDA

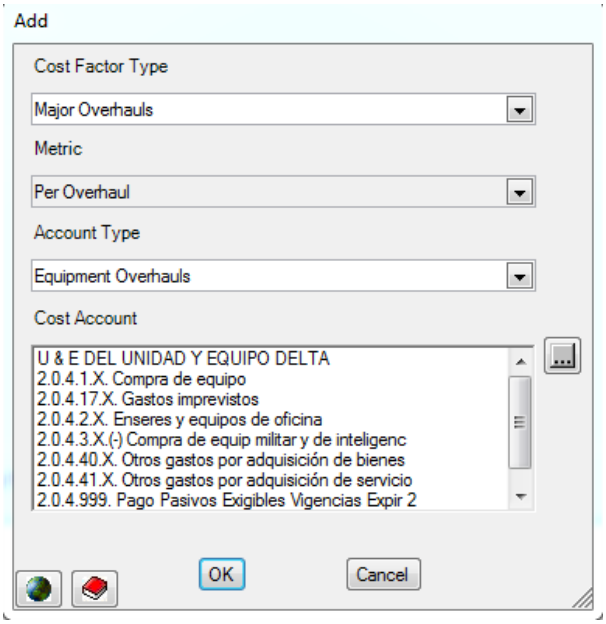
Overhaul Cost Data

- First, the user must specify and create a cost factor for Overhauls
- The user must specify:
  - Currency (e.g., dollars or pesos)
  - Equipment category (e.g., Air Force – Fixed Wing Aircraft)
  - Equipment type (e.g., T-37)
  - Cost Factor type (Major, Minor, or Component Overhaul)
  - Budget account
- The following slides show an example of adding cost factor for Major Overhaul to a T-37 aircraft

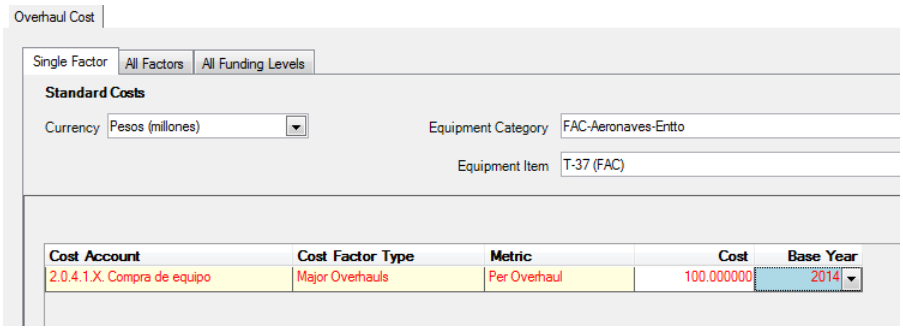
IDA


Overhaul Cost
Single Factor
All Factors
All Funding Levels
Standard Costs
Currency
Pesos (millones)
Equipment Category
FAC-Aeronaves-Entto
Equipment Item
T-37 (FAC)
Cost Account
Add
Copy
Transfer
Delete
Delete All
Properties

IDA


Add
Cost Factor Type
Major Overhauls
Metric
Per Overhaul
Account Type
Equipment Overhauls
Cost Account
U & E DEL UNIDAD Y EQUIPO DELTA
2.0.4.1.X. Compra de equipo
2.0.4.17.X. Gastos imprevistos
2.0.4.2.X. Enseres y equipos de oficina
2.0.4.3.X.(-) Compra de equip militar y de inteligenc
2.0.4.40.X. Otros gastos por adquisición de bienes
2.0.4.41.X. Otros gastos por adquisición de servicio
2.0.4.999. Pago Pasivos Exigibles Vigencias Expir 2
OK
Cancel

IDA

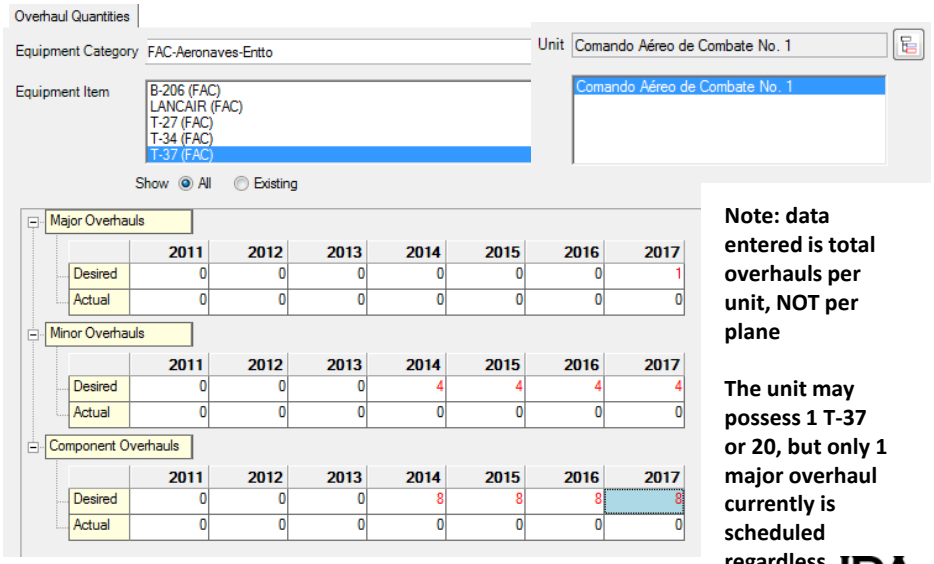


IDA

Adding Quantity

- Once the user has created the Overhaul cost factor, then they assign the *desired* and *actual* quantities of Overhauls per equipment type per year per unit
- The following slide shows example of adding Overhauls for T-37s in the Comando Aero de Combate No. 1

IDA



Note: data entered is total overhauls per unit, NOT per plane

The unit may possess 1 T-37 or 20, but only 1 major overhaul currently is scheduled regardless

IDA

Cross-Unit and Cross-Equipment Variation

- Equipment Maintenance Rate (EMR) can vary across units and equipment types in line with policy priorities
  - A 100% EMR for all equipment in all units may be unaffordable and is probably not reflective of policy priorities
- Example:
  - Suppose political instability in a neighboring country causes large numbers of people to locate near the border
  - The assessed risk to security due to this instability is predicted to persist for the next three to four years
  - The Defense Minister or the Chief of Defense may choose to *reduce* EMR for naval ships in order to *increase* EMR (and hence, capability) for Army, Police, and Air Force Units that have security responsibilities in the border area under strain
- Such tradeoffs are at the core of force planning efforts

IDA

Using the Data

- Overhaul data should be entered for all major equipment items and units (it's okay to omit smaller items to save time)
  - If this data doesn't exist, it may mean there is no maintenance schedule…
  - …which means the cost of maintenance, which often exceeds procurement cost, are not included in future spending projections…
  - …which means maintenance will not be properly resourced, reducing equipment lifespan and lowering unit capability
- To measure equipment maintenance fill rate, the user must export the actual and desired Overhauls to Excel (or a similar program) and manually calculate EMR
- The following slide shows an example of calculating EMR for a fictional Air Force unit operating A-10 aircraft

IDA

1 / 2

4 / 6

4 / 6

Overhaul Quantities

Equipment Category: Combat Aircraft

Equipment Item: A-10, F-15, F-15 Upgrade, F-16, F-16 Upgrade

Show: All / Existing

Major Overhauls

	2007	2008	2009	2010	2011	2012	2013
Desired	2	2	2	2	2	2	2
Actual	1	1	1	1	2	2	2

Minor Overhauls

	2007	2008	2009	2010	2011	2012	2013
Desired	6	6	6	6	6	6	6
Actual	4	5	5	5	6	6	6

Component Overhauls

	2007	2008	2009	2010	2011	2012	2013
Desired	6	6	6	6	6	6	6
Actual	4	6	6	6	6	6	6

= 9/14
= 64% Maintenance Rate

IDA

Algorithms

- Note that on the previous slide, EMR was calculated as the simple sum of Major, Minor, and Component Overhauls
- Is this accurate? Shouldn't Major Overhauls "count" more than the Minor ones?
- Answer: Exact specificity does not equal utility. The goal of metrics is not to replace judgment, it is to reduce the number of circumstances where judgment is all you have.
  - Does equipment with 1 Major Overhaul provide more capability than equipment with 2 Minor Overhauls? That is hard to judge. Is equipment with 95% EMR more capable than equipment with 50% EMR? Almost certainly.
- This same principle applies for all metrics covered in this brief

IDA

INDIVIDUAL TRAINING RATE
&
UNIT TRAINING RATE

IDA

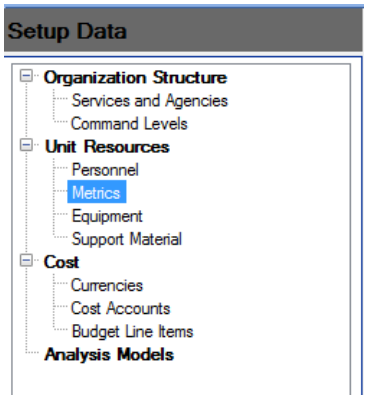
Introduction

- Unit training is relatively straightforward to implement in FOCIS
- Individual Training is more difficult, but possible

IDA

Unit Training

- Unit Training is tracked in FOCIS as a metric of unit activity; the following slides show how to set up Unit Training metrics
- In the Set-Up work area, the user can specify metrics for unit resources



IDA

Unit Training

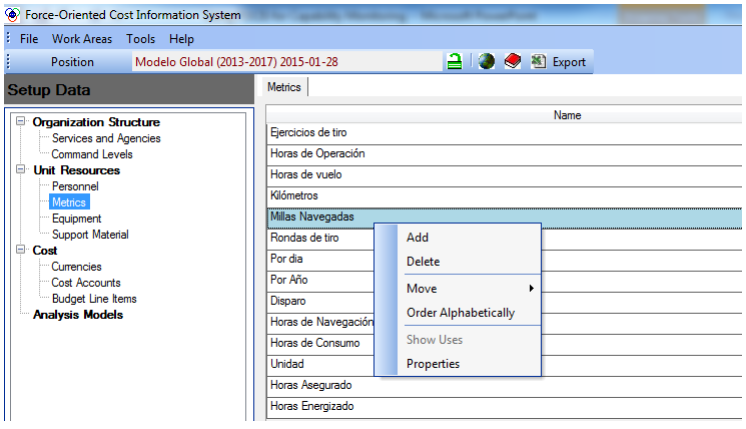
- The user defines a metric, and specifies whether it applies to unit activities, equipment, or material

Name	Unit Activity	Equipment	Material
Ejercicios de tiro	☑	☑	☐
Horas de Operación	☐	☑	☐
Horas de vuelo	☐	☑	☐
Kilómetros	☐	☑	☐
Millas Navegadas	☐	☑	☐
Rondas de tiro	☐	☑	☑
Por dia	☐	☑	☐
Por Año	☐	☑	☐
Disparo	☐	☑	☐
Horas de Navegación	☐	☑	☐
Horas de Consumo	☐	☑	☐
Unidad	☐	☑	☐
Horas Asegurado	☐	☑	☐
Horas Energizado	☐	☑	☐

IDA

Unit Training

- To add a metric for unit activity, the user *"right clicks"* in the Metrics area and chooses "*add*"



IDA

Unit Training

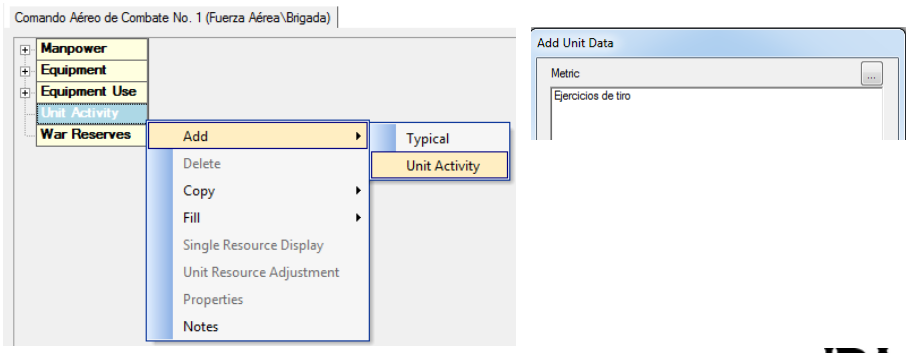
- The user then defines the activity (in this case, some kind of training) and checks the box for unit activity

Name	Abbreviation	Unit Activity
Horas de ejercicios de entrenasmiento	Horas de e	☑

IDA

Unit Training

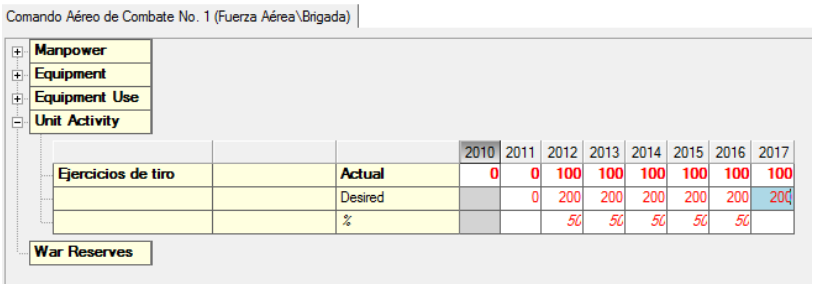
- Once a unit training metric is created, the user then can enter Actual and Authorized amounts for each unit in the Unit Data work area



IDA

Unit Training

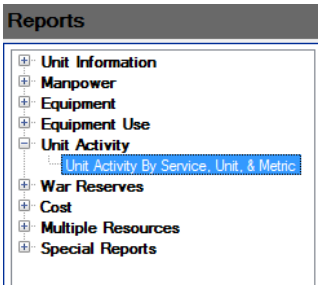
- Unit Training Rate is automatically calculated if data has been entered into the model



IDA

Unit Training

- The *Unit Activity by Service, Unit & Metric* report can be used to calculated Unit Training Rate for each service, unit, or mission area
  - User defined analytic models allow even more detailed calculations



IDA

Unit Training Report

Unit Activity By Service, Unit, & Metric

Include Data for: Ministry of Defense

Drop Filter Fields Here

Actual | Authorized | % Fill | Year | Data Item

Unit Service	..	Unit Name	Metric Name	2007 Actual	2007 Authorize	2007 % Fill
General Staff		Military Band	Training Exercises			
			Deployed Days			
		Military Band Total				
Land Forces		11th Infantry Brigade	Training Exercises	2	2	100
			Deployed Days	60	60	100
		11th Infantry Brigade Total		62	62	100
		12th Infantry Brigade	Training Exercises	1	1	100
		13th Armored Brigade	Firing Exercises	2	4	50
		1st Artillery Brigade	Training Exercises	0	0	0
		22nd Infantry Brigade	Training Exercises	1	1	100
		23rd Armored Brigade	Training Exercises	0	0	0
		2nd Artillery Brigade	Training Exercises	0	0	0

IDA

Unit Training

- Note that the user can declare as few or many training metrics as desired
- The user could just have one metric for training
  - Days of training
- Or could have many
  - For a fictional tank brigade:
    - Days of movement and maneuver exercises
    - Days of firing exercises
    - Days of joint drills with Air Force
- Our recommendation is to start with simple measures to make sure the host nation understands the utility of the measures and users understand how to properly use the software

IDA

Unit Training

- If a unit has multiple training metrics, FOCIS will automatically calculate Unit Training Rate as the average of those metrics
- For example, this fictional Air Force unit has three metrics at different fill rates, but the total Unit Training Rate is the average of the three

Unit Service | Command Order

Actual | Authorized | % Fill | Year | Data Item

Unit Name	Metric Name	2007 Actual	2007 Authorized	2007 % Fill
Comando Aero de Combate	Horas de vuelo de entrenamiento basico	80	100	80
	Horas de... para combate terrestre	60	100	60
	Horas de... para combate aereo	40	100	40
Comando Aero de Combate Total		180	300	60

IDA

Individual Training

- FOCIS is not designed to track Individual Training…
- …but some aspects of Individual Training can be captured in FOCIS
  - For example, individual weapon training could be modeled using Equipment Use: multiply number of soldiers in unit by desired number of rounds fired per soldier
- But many important aspects of Individual Training or Education cannot be modeled in FOCIS
  - Training certifications obtained at a technical training institution or issued by completing a required course of instruction
  - Professional military education
- Personnel management software is designed for these functions

IDA

INFRASTRUCTURE FILL RATE

IDA

Infrastructure

- FOCIS is not designed to do this but….
- …a way to measure infrastructure fill rate would be to build an analysis model with all the infrastructure that needs to be accounted for and assign units and budget line items (if necessary) to that infrastructure.

IDA

SUPPLY(MATERIEL) FILL RATE

IDA

War Reserves

- War Reserves is a variable in FOCIS that allows an aspect of this indicator to be measured
- If data for War Reserves is added to the unit resource data then the calculation of readiness is the same as personnel and equipment fill rate
- The nation must have a written, agreed-to definition of what constitutes war material and the data entered must comply with the definition for the metric to be useful

IDA

Summary

- The inputs to capability which are cost drivers at the unit level and the indicators of unit readiness are the same
- FOCIS is a good tool to calculate Personnel, Equipment, Equipment Maintenance (Overhauls), and Unit Training Activity Fill Rates as part of unit readiness metrics – it is part of what FOCIS was designed to
- These fill rates correspond to a planned level of readiness and should be consistent with unit design — a unit's primary function(s)
- Reports can be run to view these fill rates by Service, Unit, Personnel or Equipment, or Training Activity type. FOCIS will also calculate the fiscal costs of these fill rates (meaning, an analyst can calculate how much is being spent to achieve a certain Fill Rate), which enables tradeoff analysis
- Calculating the fill rate for individual training, infrastructure, and supplies is possible with some creativity in using analysis models, agreed-upon definitions, and tight observance of rules of data collection and integrity

IDA

This page is intentionally blank.

Appendix B.
References

Dubin, Rachel, et al. “Planning, Programming, and Budgeting System (PPBS)/Multi-year Programming Reading Guide.” Alexandria, VA: Institute for Defense Analyses, Document D-4057, September 2010.

Dubin, Rachel, Wade Hinkle, and Milton Tulkoff. “References for Capability Assessment, Acquisition Planning, and Cost Estimation.” Alexandria, VA: Institute for Defense Analyses, Document NS D-4400, August 2011.

Dubin, Rachel, Wade Hinkle, and Milton Tulkoff. “User Manual for IDA Reading Guide Website Visitors.” Alexandria, VA: Institute for Defense Analyses, Document D-4426, January 2012.

Fasana, Kenton, et al. “Force Oriented Cost Information System (FOCIS) User’s Manual.” Alexandria, VA: Institute for Defense Analyses, Document D-4318, January 2013.

Fedorochko, William, et al. “The Defense System of Management (DSOM): Republic of the Philippines.” Alexandria, VA: Institute for Defense Analyses, Document D-4785, February 2013.

Fedorochko, William, and Stanley Horowitz. “Defense Resource Management Assessment of the Estonian Ministry of Defense.” Alexandria, VA: Institute for Defense Analyses, Document D-2694, March 2002.

Fedorochko, William, Frank Tapparo, and James Wilson. “Defense Resource Management Assessment of the Lithuanian Ministry of National Defense.” Alexandria, VA: Institute for Defense Analyses, Document D-2619, November 2001.

Fedorochko, William, and Frank Tapparo. “Defense Resource Management Assessment of the Bulgarian Ministry of Defense.” Alexandria, VA: Institute for Defense Analyses, Document D-2733, July 2002.

Fletcher, Charles, et al. “Defense Resource Management Studies: Introduction to Capability and Acquisition Planning Processes.” Alexandria, VA: Institute for Defense Analyses, Document D-4021, August 2010.

Gallo, Alexander, Wade Hinkle, and Aaron Taliaferro. “Foreign Culture and its Effect on US DoD Efforts to Build Capacity of Foreign Defense Institutions.” Alexandria, VA: Institute for Defense Analyses, Document D-5102, October 2013.

Goodman, Patrick, et al. “Observations on the Republic of Korea Force Requirements Verification System.” Alexandria, VA: Institute for Defense Analyses, Document D-5044, October 2013.

Goodman, Patrick, et al. “Defense Management Course, Office of Defense Cooperation, Jakarta 9-20 November, 2015.” Alexandria, VA: Institute for Defense Analyses, Document NS D-5729, March 2016.

Gordon, C. Vance, and Wade Hinkle. “Best Practices in Defense Resource Management.” Alexandria, VA: Institute for Defense Analyses, Document D-4137, January 2011.

Hassig, Kongdan Oh, et al. “Defense Planning Scenarios: Best Practice and International Comparisons.” Alexandria, VA: Institute for Defense Analyses, Document D-5434, April 2015.

Hinkle, Wade, Gary Morgan, and Martin Neill. “Scenarios – International Best Practice: An Analysis of Their Use by the United States, United Kingdom, and Republic of Korea.” Alexandria, VA: Institute for Defense Analyses, Document D-5665, February 2016.

Hinkle, Wade, Frank Tapparo, and James Wilson. “Defense Resource Management Assessment of the Romanian Ministry of National Defense.” Alexandria, VA: Institute for Defense Analyses, Document D-2569, March 2001.

Hinkle, Wade, James Wilson, and Arthur Yengling. “Defense Resource Management Assessment of the Ministry of Defense of the Slovak Republic.” Alexandria, VA: Institute for Defense Analyses, Document D-2651, November 2001.

Morgan, Gary, et al. “Defense Governance and Management: Improving the Defense Management Capabilities of Foreign Defense Institutions.” Alexandria, VA: Institute for Defense Analyses, Paper NS P-5317, April 2016.

Tapparo, Frank, and James Wilson. “Defense Resource Management Assessment of the Albanian Ministry of Defense.” Alexandria, VA: Institute for Defense Analyses, Document D-2817, March 2003.

Appendix C.
Acronyms

CRMS	Capability and Readiness Monitoring System
DOD	Department of Defense
DSOM	Defense System of Management
EFR	Equipment Fill Rate
FOCIS	Force Oriented Cost Information System
IDA	Institute for Defense Analyses
IFV	Infantry Fighting Vehicles
PFR	Personnel Fill Rate
PPBS	Planning, Programming, and Budgeting System
SQL	Structured Query Language
U.S.	United States
USG	U.S. government

This page is intentionally blank.

REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From – To)
XX-03-2017	Final	

4. TITLE AND SUBTITLE

Defense Governance & Management Improving the Defense Management Capabilities of Foreign Defense Institutions
Using a Relational Database (FOCIS) to Improve Defense Force Planning and Budgeting
An Overview for Project Leaders

5a. CONTRACT NO. HQ0034-14-D-0001

5b. GRANT NO.

5c. PROGRAM ELEMENT NO(S).

6. AUTHOR(S)

Thomas J. Wallace
Aaron C. Taliaferro
Wade P. Hinkle, Project Leader

5d. PROJECT NO. DF-6-3870

5e. TASK NO.

5f. WORK UNIT NO.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Institute for Defense Analyses
Strategy, Forces and Resources Division
4850 Mark Center Drive
Alexandria, VA 22311-1882

8. PERFORMING ORGANIZATION REPORT NO.

IDA Paper P-5361
Log: H 16-000645

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Office of the Secretary of Defense
OUSDP (SPC/SC)
2200 Defense Pentagon, Room 5D414
Washington, DC 20301-2200

10. SPONSOR'S / MONITOR'S ACRONYM(S) OUSDP (SPC/SC)

11. SPONSOR'S / MONITOR'S REPORT NO(S).

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Force Oriented Cost Information System (FOCIS) is a computer program developed by the Institute Defense Analyses (IDA) to assist partner nations in improving their defense management. FOCIS allows a user to rapidly and accurately analyze various force structures and their fully burdened cost, and as such, is a valuable tool for host-nations seeking to improve the effectiveness and sustainability of their defense sector. This document is a non-technical guide intended to bring new task leaders up to speed on what FOCIS is, how it works, how FOCIS can be integrated into a work plan, the benefits of using FOCIS, and common pitfalls to avoid.

15. SUBJECT TERMS Defense resource management, Defense institution building, DIRI, DIB, Budgeting, Defense management, Databases, Security cooperation

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NO. OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			David Cate
U	U	U	Same as Report	72	19b. TELEPHONE NUMBER (Include Area Code) (703) 692-7000

This page is intentionally blank.