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Contingency Contractor Optimization

Phase 3 Extension, Training Examples – Contingency Contractor Optimization Engineering Prototype – Release 2.3

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Abstract

This document provides training examples to provide users practice in using the tool. Detailed instructions on how to use the tool can be found in the User Manual (SAND2015-6028).

Contents

FIGURES

TABLES

1. INTRODUCTION

1.1. Project Overview

The Contingency Contractor Optimization project is intended to address former Secretary Gates' mandate in a January 2011 memo [1] and DoDI 3020.41 [2] by delivering a centralized strategic planning tool that allows senior decision makers to quickly and accurately assess the impacts, risks, and mitigation strategies associated with utilizing contract support.

Based on an electronic storyboard prototype developed in Phase 2, the CCOT-P engineering prototype was refined in Phase 3 of the OSD ATL Contingency Contractor Optimization project to support strategic planning for contingency contractors. CCOT-P uses a model to optimize the total workforce mix by minimizing the combined total costs for the selected mission scenarios. The model will optimize the match of personnel groups (military, DoD civilian, and contractors) and capabilities to meet the mission requirements as effectively as possible, based on risk, cost, and other requirements.

1.2. Mission Scenarios, Planning Baselines, and Preset Baseline Values

The Contingency Contractor Optimization Tool determines the optimal workforce mix (military, DoD civilians, contractors) that minimizes total cost for selected mission scenarios. Before analysis can begin, a planning baseline must be created, and mission scenarios must be added to this planning baseline.

Mission Scenarios - A mission scenario represents a single mission, ranging from disaster relief and humanitarian assistance to a major combat operation. The mission scenario in the tool is focused on the manpower requirements by phase needed to implement the mission. Using the manpower requirements, policies, and risk settings, the tool will calculate an optimized workforce mix to support the mission.

Planning Baseline - A planning baseline is a group of mission scenarios that analysts must consider in their planning.

Preset Baseline Values - The preset baseline values are values that should remain constant across all planning baselines and mission scenarios.

1.3. User Roles

Administrator - The administrator sets high-level parameters that are constant across all analyses. These are high-level, static parameters that should not change with every new planning baseline.

- Annual Costs for:
  - Military – Active
  - Military – Reserve
  - DoD Civilians
  - US Contractors
- Manpower Substitution Rules (performance compared to military) for:
  - Military – Active
  - Military – Reserve
  - DoD Civilians
  - US Contractors
- Manpower Business Rules: whether or not a personnel group is allowed to perform a Joint Capability Area (JCA) capability

The administrator also helps to maintain the tool and to manage user access to the tool.

Planning Manager - The planning manager is in charge of creating new planning baselines and adding the relevant mission scenarios. The planning manager is expected to have enough knowledge about the mission scenarios to be able to set reasonable default values. Planners at the combatant command (CCMD) or service level, who are very familiar with the mission scenarios, are good candidates for planning manager. More than one person can be planning manager.

Analyst - The analyst is a planner who will be using the tool to perform "what-if" analyses. Through these analyses, the analyst will be able to provide estimates on the number of contractors needed, what capabilities they will need to have, and when they will be needed.

There are two types of planning that can be performed. First, the analyst can perform planning limited to scenarios within a CCMD or service, which is how contractor planning is currently performed. Second, the analyst can perform an integrated, centralized analysis using scenarios across all CCMDs and all services. The second type of planning is the intended use of CCOT-P.

2. ADMINISTRATOR ACTIVITIES

2.1. Tool Management

Detailed instructions provided in CCOT-P User Manual, Section 4.

The administrator helps to maintain the tool and to manage user access to the tool.

2.1.1. Manage User Access

User access is managed through the Login Roles page. Here, new users are granted access to the tool. Roles (administrator, planning manager, and analyst) are assigned and modified. Users must already have a user account on your system (i.e., an active DoD account) before they can be granted access to the tool. When adding users to the tool, you will need

When the user accesses the tool URL, your system will authenticate their credentials. Depending how your system handles authentication, they may need to enter their username and password. The next step is to login to the tool using the same username and password.

When users are deleted from the tool, their account isn't actually removed from the tool; it is hidden. To view deleted accounts, click on the "Include deleted login roles". This will display all deleted accounts. These accounts can be restored by clicking "Un-Delete".

2.1.1.1. Activity: System Administrator Pre-work

Detailed instructions provided in CCOT-P User Manual, Section 4.1.1.

First, your system administrator will need to add the new user to the *tomcat-users.xml* file and restart Tomcat/the application. This must be done first, otherwise the "add user" function in the tool will not actually grant access to the tool.

For training purposes, the system administrator can create dummy accounts for practice and remove them after the training session. Be sure to get a list of all dummy usernames and their corresponding passwords. Each user who performs the administrator training will require their real CCOT-P account and their own practice, "dummy" account.

2.1.1.2. Activity: Manage User Access

Detailed instructions provided in CCOT-P User Manual, Section 4.1.2.

1. Go to your CCOT Training webpage.
2. Login using your real username and password provided by the system administrator.
3. Go to the **Login Roles** tab.
4. This table displays all active users for the tool and the roles to which they are assigned.
5. Click "Add User".
6. Enter a dummy account created by the system administrator. The login will be the username for the dummy account.
7. Assign all three roles.
8. Click "Save Changes".
9. Log off from the tool.
10. Close the browser.

11. Reopen the FireFox browser.
12. Go to your CCOT Training webpage.
13. Login as
    a. username: dummy username
    b. password: dummy password
14. You will see all three user roles presented for login.
15. Select Administrator and click "Continue".
16. Go to the **Login Roles** tab.
17. Find the account in the table.
18. Uncheck the Analyst role.
19. Click "Save Changes".
20. Log off.
21. You will now see that you may only login as either Administrator or Planning Manager.
22. Select Administrator and click "Continue".
23. Go to the **Login Roles** tab.
24. Find the account in the table.
25. Add the Analyst role back to the account.
26. Click "Save Changes".
27. Log off.
28. You can now login as all three roles again.

2.1.1.3. Activity: Remove and Restore User Access

Detailed instructions provided in CCOT-P User Manual, Section 4.1.3-4.1.4.

1. Go to your CCOT Training webpage.
2. Login as Administrator using your real account.
3. Find the dummy account.
4. Delete this user.
5. Click "Save Changes".
6. The dummy account should no longer appear in the table.
7. Click on "Include deleted login roles".
8. Click "OK" for the warning message.
9. To restore this user's account, click "Un-Delete".
10. Click "Save Changes".
11. Click "OK" for the warning message.

2.1.2. Tool Clean Up

Detailed instructions provided in CCOT-P User Manual, Section 4.2.4.

When an Analyst deletes and analysis, the analysis is flagged in the database so that it will no longer appear on the Analyses Manager table. However, the analysis is not actually deleted from the database.

To clean up the database by deleting the flagged analyses, click the button on the administrator page. It is recommended to clean up the database every 6 months.

2.2. Preset Baseline Values

Detailed instructions provided in CCOT-P User Manual, Section 4.2.

The administrator sets high-level parameters that are constant across all analyses. These are high-level, static parameters (referred to as preset baseline values in CCOT-P) that should not change with every new planning baseline. New planning baselines, which are created by the planning manager, will use the current preset baseline values. Modifying preset baseline values will not change these values in existing planning baselines (changes are not retroactive). Only planning baselines created after modification will include the modified values.

The preset baseline values are:

- Annual Costs for:
  - Military – Active
  - Military – Reserve
  - DoD Civilians
  - US Contractors
- Manpower Substitution Rules (performance compared to military) for:
  - Military – Active
  - Military – Reserve
  - DoD Civilians
  - US Contractors
- Manpower Business Rules: whether or not a personnel group is allowed to perform a Joint Capability Area (JCA) capability

2.2.1. Modifying Annual Costs

Detailed instructions provided in CCOT-P User Manual, Section 4.2.1.

This table displays the annual cost in thousands ($10 = $10,000) for all personnel groups. The Planning Manager and Analyst will be able to modify the cost for 3rd-Country and Local Nation Contractors. The remaining values can only be modified by the Administrator.

2.2.2. Modifying Manpower Substitution Rules

Detailed instructions provided in CCOT-P User Manual, Section 4.2.2.

This table shows the manpower substitution rules for all personnel groups. Only non-military groups are modifiable. The Planning Manager and Analyst will be able to modify the rules for 3rd-Country and Local Nation Contractors. The remaining values can only be modified by the Administrator.

The manpower substitution rules are presented as a comparison to military efficiency. Military will always be 100% efficient in performing each capability. For example, 50% efficiency means half as efficient as the Military (2 FTEs to replace one Military FTE).

2.2.3. Modifying Manpower Business Rules

Detailed instructions provided in CCOT-P User Manual, Section 4.2.3.

Derived from DODI 1100.22 “Policy and Procedures for Determining Workforce Mix”, this table shows whether each personnel group is allowed to perform each capability. These values can only be modified by the Administrator.

The DoDI 1100.22 defines policy and procedures for determining those positions which are inherently governmental and those that can be performed by the private sector. It also outlines manpower mix criteria and guidance to identify which functions must be performed by government employees and restrictions on their use. Laws, executive orders, and treaties are required by DoDI 1100.22 to detail what work is exempted from the private sector.

3. PLANNING MANAGER ACTIVITIES

The planning manager is in charge of creating new planning baselines and adding the relevant mission scenarios. The planning manager is expected to have enough knowledge about the mission scenarios to be able to set reasonable default values. Planners at the combatant command (CCMD) or service level, who are very familiar with the mission scenarios, are good candidates for planning manager. More than one person can be planning manager.

3.1. Planning Baselines

A planning baseline is a group of mission scenarios that analysts must consider in their planning. The analyst doesn't have to include all mission scenarios in an analysis; he can select a subset of the mission scenarios.

3.1.1. Creating a New Planning Baseline

Detailed instructions provided in CCOT-P User Manual, Section 2.1.

The preset baseline values are values that should remain constant across all planning baselines and mission scenarios. It is important to review these values before creating a new planning baseline. They can only be modified by the administrator. If any values need to be updated, contact the administrator BEFORE creating a new planning baseline. These values cannot be modified after a planning baseline is created.

For the remaining baseline values, you will be setting default values for the analysts to use to make their analysis easier. Setting default values also helps to ensure some consistency across analysis values.

- Mission Scenarios
    - Add existing mission scenario
    - Create new mission scenario
- Budget & Costs
    - Set budget constraints, if necessary
    - Set annual costs for Local Nation (LN) and Third Country National (TCN) contractors
- Manpower Substitutions
    - Set manpower substitution rules (comparison to military efficiency) for Local Nation (LN) and Third Country National (TCN) contractors
- Manpower Requirements
    - View manpower requirements
    - Add additional support needs, if needed
- Manpower Availability & Phase Durations
    - Set manpower availability limits for the personnel groups by capability
    - Set phase start dates and durations
- Policies & Guidance
    - Set policies (as needed) on which personnel groups may or may not be used
- Risk in Using Non-Military Personnel
    - Set the level of acceptable operational risk in using non-military personnel

3.1.1.1. Activity: Creating a New Planning Baseline

Detailed instructions provided in CCOT-P User Manual, Section 2.1.1.

All scenarios and data are notional and for training purposes only.

1. Login as Planning Manager.
2. On the Planning Baselines tab, click "Create New Planning Baseline".
3. **Mission Scenarios**
    a. Set the baseline title as "[your name] Test Baseline 1".
    b. Add scenarios Prussia - Developed and Prussia – Austere.
    c. Set the note as "Creating a new baseline using existing scenarios for training."
    d. Click "Continue".
4. **Budget & Costs**
    a. Budget table: Enter the following values:

Fiscal Year	Annual Budget (in millions)
FY2020	$1,000
FY2021	$1,000
FY2022	$1,000
FY2023	$1,300
FY2024	$1,300

    b. Personnel Costs table:
        i. Set the following values for the scenarios:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
Prussia – Austere (War)	$68	$36
Prussia – Developed (War)	$68	$36

    c. Click "Continue".
5. **Manpower Substitutions**
    a. Manpower Substitution Rules table:
        i. Set the following values for the scenarios:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
Prussia – Austere (War)	90%	90%
Prussia – Developed (War)	90%	90%

    b. Click "Continue".

6. **Manpower Requirements**

Summary View is a view only table. Close and expand the folders to view the bases in each mission scenario.

a. Prussia – Developed : Carroll AFB and Ft. Hope
b. Prussia – Austere: Tazir AFB, Ft. Mitchell, Ft. Hope

Summary View

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt	Scenario Total Requirements
Prussia - Austere (War	**489**	**2,720**	**53,696**	**16,866**	**59**	**1,075**	**1,788**	**505**	**332**	**77,530**
Tazir AFB	105	612	13,792	4,086	15	240	371	115	97	**19,433**
Ft. Mitchell	135	667	12,995	4,818	15	258	515	155	72	**19,630**
Ft. Hope	249	1,441	26,909	7,962	29	577	902	235	163	**38,467**
Prussia - Developed (W	**490**	**2,720**	**53,696**	**16,866**	**58**	**1,074**	**1,788**	**505**	**332**	**77,529**
Carroll AFB	256	1,293	30,937	9,086	33	586	762	271	174	**43,398**
Ft. Hope	234	1,427	22,759	7,780	25	488	1,026	234	158	**34,131**
	979	**5,440**	**107,392**	**33,732**	**117**	**2,149**	**3,576**	**1,010**	**664**	**155,059**

View Requirements by Phase is a view only table that displays manpower requirements by phase for each mission scenario and base. Use the dropdown menu to select a scenario or base.

View Requirements By Phase

Select a scenario and base:

Prussia - Austere (War)

Phase	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt	Total Requirements
Phase 0	0	1,267	1,373	53	0	0	211	0	0	2,904
Phase 1	106	2,186	24,982	2,770	0	0	423	158	6	30,631
Phase 2	326	2,301	41,887	8,484	0	0	680	443	10	54,131
Phase 3	438	2,720	53,180	16,474	16	1,075	1,688	443	38	76,072
Phase 4	489	2,720	53,696	16,866	16	1,075	1,788	505	332	77,487
Phase 5	489	2,720	53,696	16,866	59	1,075	1,788	505	332	77,530

Additional Support Needs table: Set all Planning Factors values to the percentages listed below for each base. Check that the values in the table underneath update.

Carroll AFB - Prussia – Developed:

Carroll AFB - Prussia - Developed (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	10%	0%	0%	30%	5%	0%	0%	5%	20%

Ft. Hope - Prussia – Developed:

Ft. Hope - Prussia - Developed (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	15%	5%	0%	20%	5%	0%	0%	5%	10%

Tazir AFB - Prussia – Austere:

Tazir AFB - Prussia - Austere (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	30%	10%	0%	180%	10%	0%	0%	5%	20%

Ft. Mitchell – Prussia – Austere:

Ft. Mitchell - Prussia - Austere (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	40%	10%	0%	160%	10%	0%	0%	5%	20%

Ft.Hope – Prussia – Austere:

Ft. Hope - Prussia - Austere (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	15%	5%	0%	20%	5%	0%	0%	5%	10%

7. **Manpower Availability & Phase Durations**
    a. Manpower Availability table:
        i. Uncheck the "Set Contractor Limits" box. The two contractor columns should disappear.
        ii. Enter the following values in the table.
        iii. Ensure the totals are correct.

☐ Set Contractor Limits

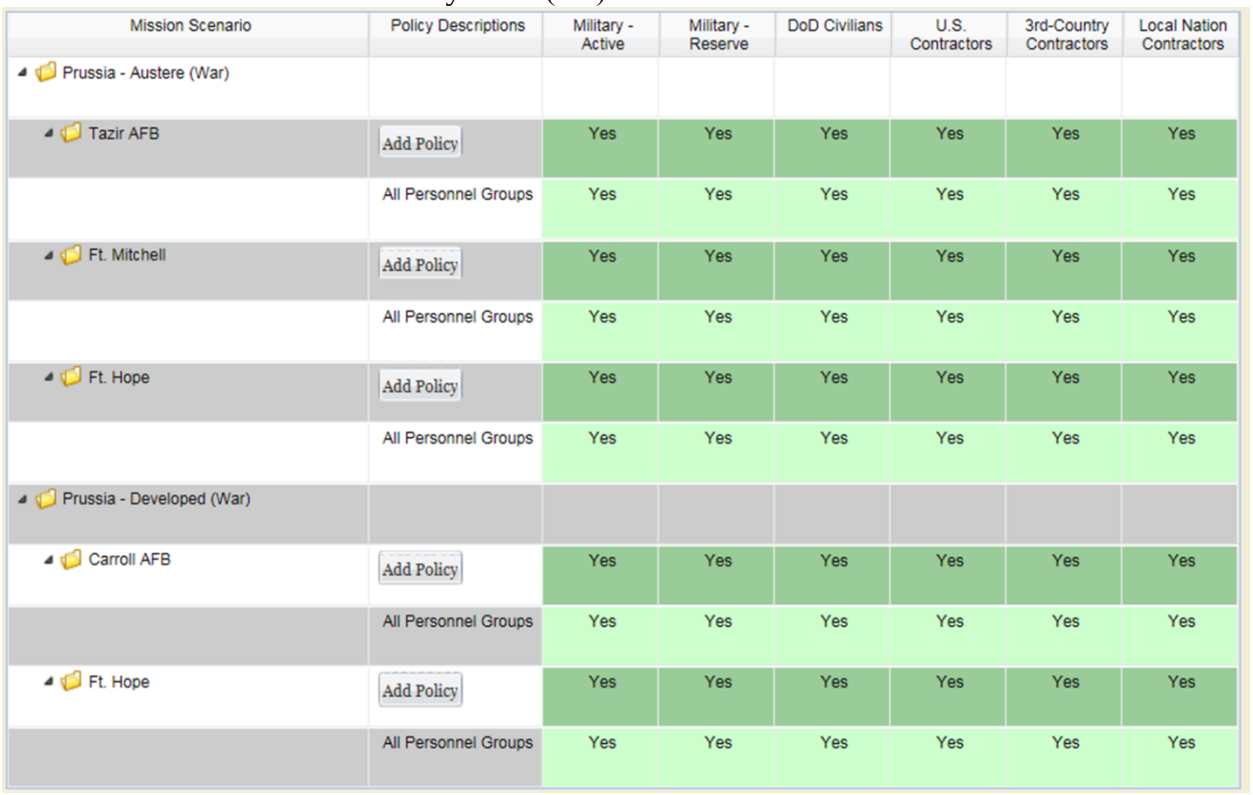
	Personnel (in FTEs)			
JCA - Tier 1	Military - Active	Military - Reserve	DoD Civilians	JCA Totals
Force Support	350	100	50	**500**
Battlespace Awareness	2,000	500	100	**2,600**
Force Application	50,000	50,000	0	**100,000**
Logistics	10,000	7,500	900	**18,400**
Command and Control	500	500	100	**1,100**
Net-Centric	500	400	75	**975**
Protection	10,000	5,000	0	**15,000**
Building Partnerships	500	0	50	**550**
Corporate Mgmt & Spt	750	250	100	**1,100**
	74,600	**64,250**	**1,375**	**140,225**

    b. Phase Durations table:
        i. Set the start date and phase durations to the following values.

		Phase Duration (Weeks)					
Scenario	Start Date / FY	0	1	2	3	4	5
Prussia - Austere (War)	2018-01-07 2018	4	8	12	8	8	20
Prussia - Developed (War)	2018-01-07 2018	4	4	4	8	8	20

    c. Click "Continue".

8. **Policies & Guidance**
    a. Policy Selection:
        i. Expand the scenario folders in the table. All bases for each mission scenario should have policy "All Personnel Groups" applied. There should be not be any "No" (red) fields.



Mission Scenario	Policy Descriptions	Military - Active	Military - Reserve	DoD Civilians	U.S. Contractors	3rd-Country Contractors	Local Nation Contractors
Prussia - Austere (War)							
Tazir AFB	Add Policy	Yes	Yes	Yes	Yes	Yes	Yes
	All Personnel Groups	Yes	Yes	Yes	Yes	Yes	Yes
Ft. Mitchell	Add Policy	Yes	Yes	Yes	Yes	Yes	Yes
	All Personnel Groups	Yes	Yes	Yes	Yes	Yes	Yes
Ft. Hope	Add Policy	Yes	Yes	Yes	Yes	Yes	Yes
	All Personnel Groups	Yes	Yes	Yes	Yes	Yes	Yes
Prussia - Developed (War)							
Carroll AFB	Add Policy	Yes	Yes	Yes	Yes	Yes	Yes
	All Personnel Groups	Yes	Yes	Yes	Yes	Yes	Yes
Ft. Hope	Add Policy	Yes	Yes	Yes	Yes	Yes	Yes
	All Personnel Groups	Yes	Yes	Yes	Yes	Yes	Yes

    b. Available Policies: This is a view only table.
    c. Manpower Business Rules: This is a view only table.
    d. Click "Continue".

9. **Risk in Using Non-Military Personnel**
    a. Risk in Using Non-Military Personnel table:
        i. Expand the scenario folders in the table.
        ii. Set each base to the following values:

Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Prussia - Austere (War						
Tazir AFB	Low	High	High	Extreme	Medium	Low
Ft. Mitchell	Low	Extreme	High	Extreme	Medium	Low
Ft. Hope	Low	High	Medium	Medium	Medium	Low
Prussia - Developed (W						
Carroll AFB	Medium	Medium	High	High	Medium	Low
Ft. Hope	Low	Medium	Medium	High	Low	Low

    a. Click “Continue”.
10. This is the page to complete the planning baseline.
    a. Click “Save as Draft & Quit”.
    b. You should now be back on the Planning Baselines tab.
11. Click the “Log Off” link. Click “OK” for the warning.
12. Login as Analyst.
13. Your planning baseline should not appear in the table because it is not marked as completed.
14. Click the “Log Off” link. Click “OK” for the warning.

3.1.1.2. Activity: Modifying an Existing Planning Baseline

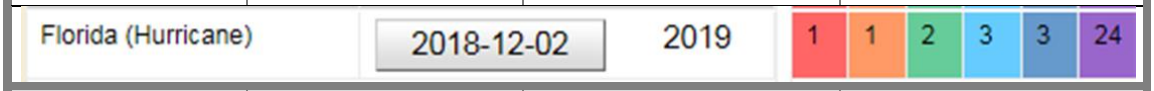
Detailed instructions provided in CCOT-P User Manual, Section 2.1.3.

All scenarios and data are notional and for training purposes only.

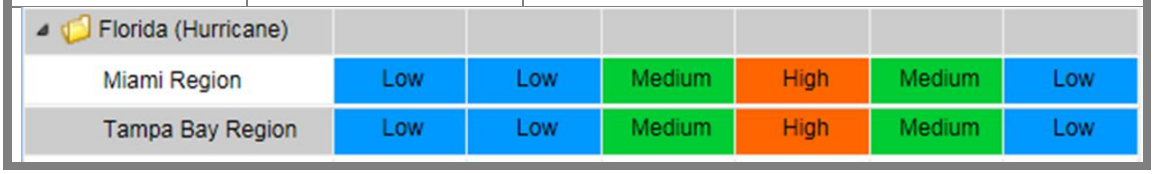
1. Login as Planning Manager.
2. Click on your new baseline to open it.
3. Go to the **Mission Scenarios** tab.
4. Click “Add Mission Scenario”.
5. Add “Florida (Hurricane)”.
6. Click “Done”.

7. Make the following changes to Florida (Hurricane) scenario:

Tab	Table	Field	Change to value
Budget & Costs	Personnel Costs	3rd-Country Contractors	$80
		Local Nation Contractors	$232
Manpower Substitutions	Substitution Rules	3rd-Country Contractors	90%
		Local Nation Contractors	100%
Manpower Requirements	Additional Support Needs	Miami Region	Add 30% Planning Factor to all JCAs
		Tampa Bay Region	Add 25% Planning Factor to all JCAs
Manpower Availability & Phase Durations	Phase Durations	Start Date/FY	2018-12-02 FY: 2019
		Phase Durations	1 1 2 3 3 24



Policies & Guidance	Policy Selection	Miami Region and Tampa Bay Region should have "U.S. Personnel Only" applied.	Remove this policy so that they both allow all personnel groups.
Risk in Using Non-Military Personnel	Risk in Using Non-Military Personnel	Make the risk values match the settings below.	



8. Click "Save as draft & Quit".

3.1.2. Completing a Planning Baseline

Setting the planning baseline to complete means:

- The baseline title cannot be changed.
- Mission scenarios cannot be removed.
- Existing policies cannot be removed, and new policies cannot be added.
- The planning baseline will be set to Public mode which means analysts can begin using it to run analyses.
- Additional mission scenarios can still be added.

3.1.2.1. Activity: Completing a Planning Baseline

Detailed instructions provided in CCOT-P User Manual, Sections 2.1.2.

All scenarios and data are notional and for training purposes only.

1. Login as Planning Manager.
2. Go to **Finish** tab of your planning baseline.
3. Click "Complete: Make this baseline available".
    - Note: Once a baseline is public, the policies of mission scenarios can no longer be modified. Even if adding a new mission scenario, you will not be able to modify its policy settings. However, the Analyst role will be able to add additional policies.
4. Return to the Main page, either by clicking "Main" or the banner image.
5. Check that your baseline has status Public.
6. Check that Prussia – Austere, Prussia – Developed, and Florida (Hurricane) are listed for your baseline.
7. Click in the "Display?" checkbox so that it is checked.
8. Click the "Log Off" link. Click "OK" for the warning.
9. Login as Analyst.
10. Your planning baseline should appear in the table. Click the "Start New Analysis" button next to it.
11. Set the title to "[Your name] test analysis for new baseline".
12. Your four mission scenarios should appear in the Mission Scenarios list.
13. Click "Save changes".
14. Click the "Log Off" link. Click "OK" for the warning.
15. Login as Planning Manager.
16. Find your planning baseline in the table.
17. Click in the "Display?" checkbox so that it is unchecked.
18. Click "Save changes".
19. Click the "Log Off" link. Click "OK" for the warning.
20. Login as Analyst.
21. Your planning baseline should no longer appear in the table.
22. Click the "Log Off" link. Click "OK" for the warning.
23. Login as Planning Manager.
24. Find your planning baseline in the table.
25. Click in the "Display?" checkbox so that it is checked again.

3.2. Mission Scenarios

A mission scenario represents a single mission, ranging from disaster relief and humanitarian assistance to a major combat operation. The mission scenario in the tool is focused on the manpower requirements by phase needed to implement the mission. Using the manpower requirements, policies, and risk settings, the tool will calculate an optimized workforce mix to support the mission.

3.2.1. Creating a New Mission Scenario

Detailed instructions provided in CCOT-P User Manual, Section 2.1.5.

In this engineering prototype, you must create a new mission scenario in one session. You cannot quit and return to finish later. Gather the following information about your mission scenario before beginning:

- Scenario title
- Type of operation (Humanitarian assistance/disaster relief (HA/DR), major combat operations (MCO), etc.)
- Scenario summary description
- Annual cost of Third Country National and Local Nation Contractors (default values provided)
- Phase duration (in days) from the Base Plan (level 2 plan)
- Related TPFDD or TPFDD-like data set
    - If importing a file, it must be in Excel
- Planning factors for additional support needs
- Manpower policies (who can/cannot be used at each base)
- Operational risk in using non-military personnel at each base for every war phase

Set the default values for the new mission scenario.

- Scenario Creation
    - Set descriptive information about the mission scenario so that others will understand its purpose.
- Budget & Costs
    - Set annual costs for Local Nation (LN) and Third Country National (TCN) contractors
- Manpower Substitutions & Requirements
    - Set manpower substitution rules (comparison to military efficiency) for Local Nation (LN) and Third Country National (TCN) contractors
    - Set manpower requirements by importing an Excel-based TPFDD or by manually entering values
    - Add additional support needs, if needed
- Phase Durations
    - Set phase start dates and durations
- Policies & Guidance
    - Set policies (as needed) on which personnel groups may or may not be used
- Risk in Using Non-Military Personnel
    - Set the level of acceptable operational risk in using non-military personnel

- Finish
    - Complete the mission scenario, which means:
        - The mission scenario's title, description, and TPFDD/manpower requirements data cannot be changed.
        - All other values remain modifiable.
        - It will be set to Public mode, which means it can be viewed and used by analysts once the planning baseline is also set to Public mode.

3.2.2. Time-Phased Force and Deployment Data (TPFFDs) and Joint Capability Areas (JCAs)

- Time-Phased Force and Deployment Data (TPFDD) specify when, where, and which military units will be deployed to support an operation. TPFDDs do not specify when military units will leave (i.e., return home) an operation.
    - TPFDDs only specify military force demands and do not include support service requirements.
- Joint Capability Areas (JCAs) are nine categories that describe functionally similar DoD activities.
    - JCAs are used because the tool needs a capability coding scheme that is universal across the services. Each service has its own coding scheme, and JCAs were the only universal code available.
    - The tool translates TPFDD Unit Type Codes (UTC) to JCAs using the translation rules in the Contractor Estimator Tool (CET) (developed by Matt DiFiore).

The Support for Strategic Analysis (SSA) process provides an iterative, triple-spiral approach to strategic planning[1] and for the development of concepts of operations (CONOPS)[2]. Each spiral produces increasingly detailed strategic plans, starting with the summary view and moving through to the detailed view. The SSA process produces the Integrated Security Construct (ISC) which consists of a set of mission scenarios and associated military operations arrayed across a multi-year timeline. Within the ISC are specifications of mission overlaps as well as military force elements (FEs) required during each mission phase. FEs are an aggregation of key unit types from each of the services and the CCMDs. As such, at the most detailed level, the ISC output contains fully or partially developed time-phased force and deployment data (TPFDD).

[1] "Support for Strategic Analysis: SSA 101 – An Overview", OSD CAPE, Sept. 2011.

[2] "Contingency Contractor Optimization Project: Functional Requirement Document and Roadmap Report", ICF Incorporated, Lewandowski, L. and Patterson, J., May 31, 2011.

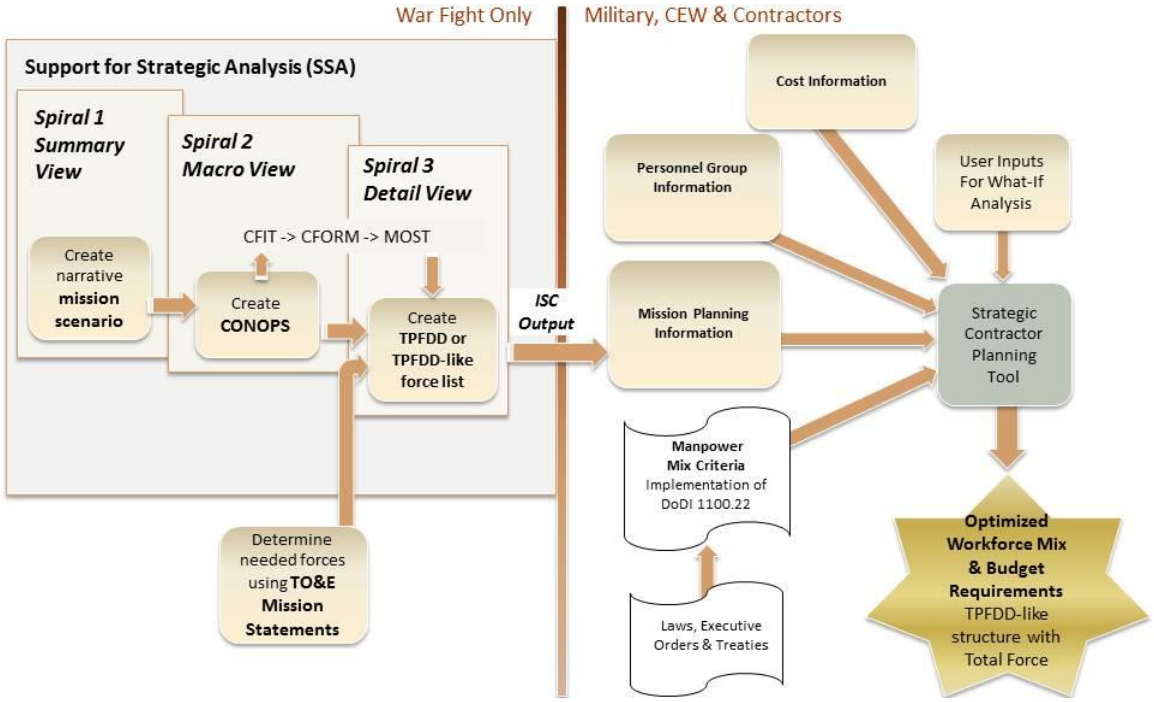


Figure 1. High-Level Strategic Contractor Planning Tool Architecture.

The diagram in Figure 1 indicates an ISC output data translation step. Translation and integration is necessary to make the output from the SSA detail-level strategic planning usable by the planning tool[3]. The planning tool requires support capability requirements to be specified, in addition to the FEs. This is information that is currently not part of the SSA planning process. These support capability requirements can be communicated through a coding scheme, such as the military Unit Type Code (UTC) or the Joint Capability Area (JCA). Ideally, the coding scheme would be one that is common across the services and across personnel group types (military, contractor and DoD civilian). The developed prototype planning tool supports the Contractor Estimator Tool (CET) (developed by Matt DiFiore) approach for translating from UTC to JCA for coding support capability requirements. If the support and FE codes available as input are not the same, authoritative data on the capability definitions for each personnel group is required so that capabilities can be consistently mapped across the personnel groups and services. Without this standardized capability mapping, personnel use rules will be impossible to implement. Furthermore, the ISC output may require translation from FE level planning data, for example, to the common support capability requirement level data. The joint service and/or the CCMD planners are the group likely to perform this translation step. Planners at the joint services and the CCMDS use the ISC mission information to further develop the strategic plans to a greater level of detail, often resulting in TPFDD-level information containing UTCs or JCAs.

[3] "Contingency Contractor Optimization Project: Functional Requirement Document and Roadmap Report", ICF Incorporated, Lewandowski, L. and Patterson, J., May 31, 2011.

3.2.2.1. Activity: Creating a New Mission Scenario using an Excel TPFDD

Detailed instructions provided in CCOT-P User Manual, Sections 2.1.5.

All scenarios and data are notional and for training purposes only.

You will be creating a mission scenario for a major combat operation (MCO) which will have two bases. You will be provided with a TPFDD file for the manpower requirements. Please use the name of the mission scenario in the TPFDD file, which will be one of the following:

- Demo 1: Parador
- Demo 2: Tsunkeido
- Demo 3: Freedonia
- Demo 4: Carpathia

1. Login as Planning Manager.
2. Click on your new baseline to open it.
3. Go to the **Mission Scenarios** tab.
4. Click "Add Mission Scenario".
5. Click "Create New Scenario".
6. **Scenario Creation**
    a. Set the title to "<your initials> <scenario name> MCO".
    b. Set the Operation Type as "Major Combat Operations".
    c. Set the description to "This test scenario was created from within the <your name> Test Baseline 1."
    d. Click "Continue".
7. **Personnel Costs**
    a. Set the following cost values:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
MCO	$68	$44

    b. Click "Continue".

8. **Manpower Substitutions & Requirements**
    a. Set the following substitution percentages:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
MCO	90%	90%

    b. Phase Durations: Set the following end days for each phase:

Phase	Start Day	End Day	Duration
Phase 0	0	2	3
Phase 1	3	18	16
Phase 2	19	35	17
Phase 3	36	90	55
Phase 4	91	120	30
Phase 5	121	245	125

    c. Manpower Requirements
        i. Click “Browse”.
        ii. Locate the provided Excel file.
        iii. Click “Import”.
        iv. Select the TPFDD tab from the menu and click “Select”.
        v. Select the corresponding column name from each menu.
        vi. Click “OK”.
        vii. Summary View table should look like

Summary View

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comma... and Control	Net-Centric	Protection	Building Partnerships	Corporate Mgmt & Spt	Scenario Total Requirements
MCO	475	2,576	40,994	15,971	54	1,017	1,693	418	314	63,512
Base 1	293	1,575	25,557	9,693	35	590	903	226	189	39,061
Base 2	182	1,001	15,437	6,278	19	427	790	192	125	24,451
	475	2,576	40,994	15,971	54	1,017	1,693	418	314	63,512

d. View Requirements by Phase shows the requirements by phase for the scenario and for each base. The phases show the running total for requirements.

MCO

View Requirements By Phase

Select a scenario and base:

MCO

Phase	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt	Total Requirements
Phase 0	0	1,200	0	0	0	0	0	0	0	1,200
Phase 1	100	2,070	18,925	2,623	0	0	200	150	5	24,073
Phase 2	100	2,070	18,925	2,623	0	0	400	150	5	24,273
Phase 3	414	2,576	40,288	15,601	15	1,017	1,599	418	37	61,965
Phase 4	414	2,576	40,288	15,601	15	1,017	1,599	418	37	61,965
Phase 5	475	2,576	40,994	15,971	54	1,017	1,693	418	314	63,512

MCO – Base 1

View Requirements By Phase

Select a scenario and base:

MCO – Base 1

Phase	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt	Total Requirements
Phase 0	0	734	0	0	0	0	0	0	0	734
Phase 1	62	1,266	11,798	1,592	0	0	107	81	3	14,909
Phase 2	62	1,266	11,798	1,592	0	0	213	81	3	15,015
Phase 3	256	1,575	25,117	9,469	10	590	853	226	22	38,118
Phase 4	256	1,575	25,117	9,469	10	590	853	226	22	38,118
Phase 5	293	1,575	25,557	9,693	35	590	903	226	189	39,061

MCO – Base 2

View Requirements By Phase

Select a scenario and base:

MCO – Base 2

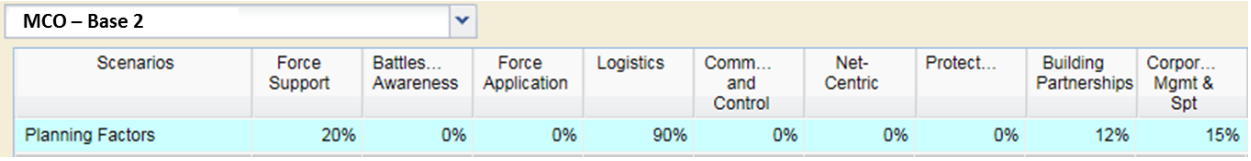
Phase	Force Support	Battles... Awaren...	Force Applica...	Logistics	Comm... and Control	Net-Ce...	Protecti...	Building Partner...	Corpor... Mgmt & Spt	Total Requirements
Phase 0	0	466	392	20	0	0	93	0	0	971
Phase 1	38	804	7,127	1,031	0	0	187	69	2	9,258
Phase 2	118	847	11,949	3,158	0	0	301	192	4	16,569
Phase 3	158	1,001	15,171	6,132	5	427	746	192	15	23,847
Phase 4	177	1,001	15,285	6,278	5	427	790	192	125	24,280
Phase 5	182	1,001	15,437	6,278	19	427	790	192	125	24,451

e. Additional Support Needs: Set the planning factors for each base to the values shown below. Use the dropdown menu to select the base.

MCO – Base 1

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	20%	5%	0%	80%	5%	0%	0%	10%	20%

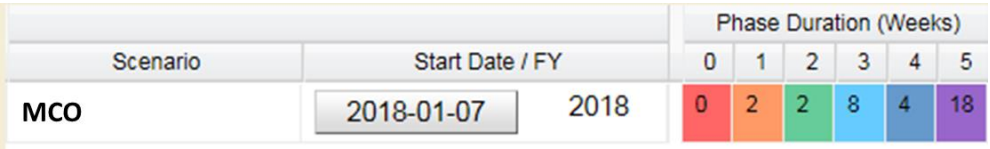
MCO – Base 2



Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	20%	0%	0%	90%	0%	0%	0%	12%	15%

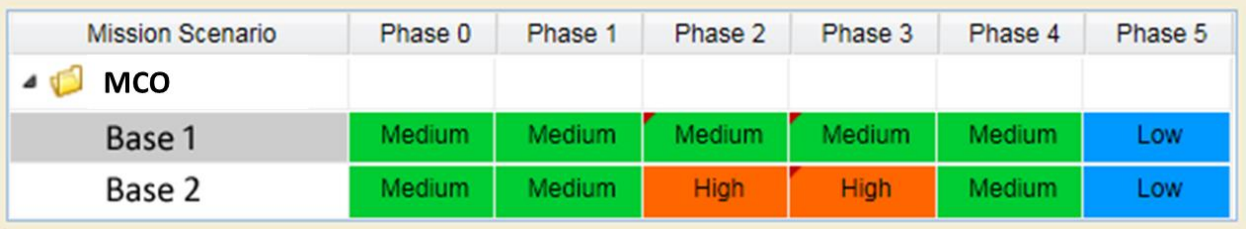
f. Click “Continue”.

9. **Phase Durations**
   a. Set the start date to 2018-01-07.
   b. Do not change the phase durations. These are calculated from the phase durations table on the previous page.



c. Click “Continue”.

10. **Policies & Guidance**
    a. Expand the scenario folder to view the bases.
    b. Do not assign policies to either base. Leave them as is.
    c. Click “Continue”.
11. **Risk in Using Non-Military Personnel**
    a. Expand the scenario folders in the table.
    b. Set each base to the following values:



Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
MCO						
Base 1	Medium	Medium	Medium	Medium	Medium	Low
Base 2	Medium	Medium	High	High	Medium	Low

c. Click “Continue”.

12. **Finish**
    a. Click “Complete”.
13. Click the “Log Off” link. Click “OK” for the warning.

14. Login as Analyst.
15. Find your planning baseline in the table.
16. Find your analysis "[Your name] test analysis for new baseline".
17. Your new Test Scenario A should appear in the Mission Scenarios list.
18. Click the "Log Off" link. Click "OK" for the warning.

3.2.2.2. Activity: Creating a New Mission Scenario using Manual TPFDD Entry

Detailed instructions provided in CCOT-P User Manual, Sections 2.1.5.

All scenarios and data are notional and for training purposes only.

You will be creating a mission scenario for a humanitarian assistance mission scenario response to a civil war. This scenario assumes that the U.S. will be assisting 50,000 evacuees at one base. For this mission scenario, use the name based on which demo you are assigned:

- Demo 1: Samavia
- Demo 2: Republica
- Demo 3: Genovia
- Demo 4: Nambutu

1. Login as Planning Manager.
1. Click on your new baseline to open it.
2. Go to the **Mission Scenarios** tab.
3. Click "Add Mission Scenario".
4. Click "Create New Scenario".
5. **Scenario Creation**
    a. Set the title to "<your initials> <scenario name> 50K Evac".
    b. Set the Operation Type as "Humanitarian Assistance/Disaster Relief".
    c. Set the description to "This test scenario was created from within the <your name> Test Baseline 1. Creating a scenario with manual TPFDD entry."
    d. Click "Continue".
6. **Personnel Costs**
    a. Set the following cost values:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
50K Evac Scenario	$68	$32

    b. Click "Continue".
7. **Manpower Substitutions & Requirements**
    a. Set the following substitution percentages:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
50K Evac Scenario	90%	90%

b. Phase Durations: Set the following end days for each phase:

Phase	Start Day	End Day	Duration
Phase 0	0	5	6
Phase 1	6	20	15
Phase 2	21	55	35
Phase 3	56	125	70
Phase 4	126	190	65
Phase 5	191	256	66

c. Manpower Requirements
   i. Click "Manually Enter Requirements".
   ii. You will be prompted to create a base.
   iii. Set the name to "Base 1".
   iv. Click "Create".
   v. Base 1 should appear in the dropdown menu.
   vi. Create a second base: Set the name based on which demo you are assigned:
      1. Demo 1: Ft. Melzarr
      2. Demo 2: Ft. Charlie
      3. Demo 3: Ft. Bravo
      4. Demo 4: Ft. Echo
   vii. Click "Create".
   viii. The second base should appear in the dropdown menu.
   ix. Select "Base 1" in the dropdown menu.
   x. Click "Remove selected base".
   xi. Base 1 should no longer appear in the dropdown menu.
   xii. With the second base selected, enter the following values into the table. Remember that these values represent the running total of FTE requirements for each phase.

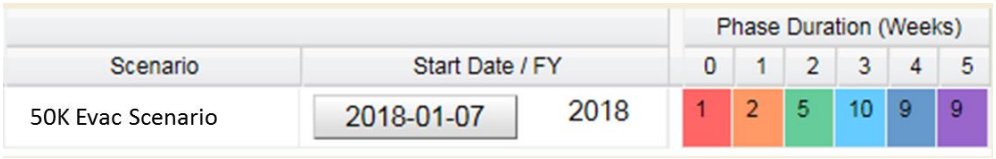
Phase	Force Support	Battlespace Awareness	Force Application	Logistics	Command and Control	Net-Centric	Protection	Building Partnerships	Corporate Mgmt & Spt	Total Requirements
Phase 0	0	180	195	3,249	20	0	164	0	0	3,808
Phase 1	56	311	1,239	8,572	45	54	378	23	1	10,679
Phase 2	143	327	1,541	17,494	185	76	798	156	2	20,722
Phase 3	268	386	1,541	18,946	213	153	1,066	198	6	22,777
Phase 4	341	386	1,541	19,402	213	153	1,066	278	47	23,427
Phase 5	420	386	1,541	21,750	213	153	1,066	278	47	25,854

xiii. The phase totals will update.
xiv. Click “Done”.
xv. The base will appear in the Manpower Requirements table.
xvi. Base totals and scenario totals will be displayed in the table.
1. Note: At this time it is not possible to modify the base values after “Done” is selected. If values are entered incorrectly, click “Cancel Creation” and restart the creation of this mission scenario.

Scenario	Force Support	Battlespace Awareness	Force Application	Logistics	Command and Control	Net-Centric	Protection	Building Partnerships	Corporate Mgmt & Spt	Total
50K Evac	420	386	1,541	21,750	213	153	1,066	278	47	25,854
Base	420	386	1,541	21,750	213	153	1,066	278	47	25,854
	420	386	1,541	21,750	213	153	1,066	278	47	25,854

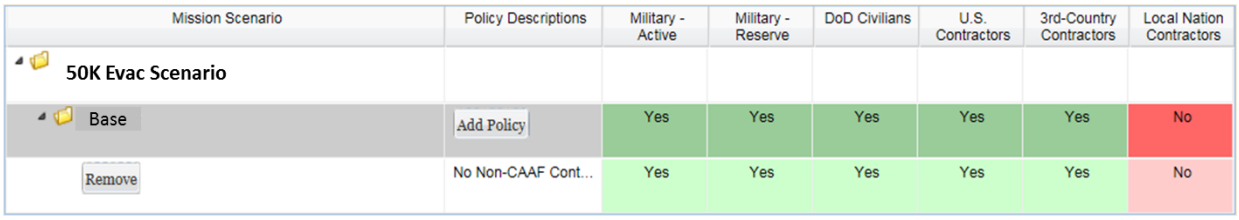
d. Additional Support Needs: Do not add any planning factors. They should all be set to 0%.

8. **Phase Durations**
b. Set the start date to the following value. Do not change the phase durations. These are calculated from the phase durations table on the previous page.



a. Click “Continue”.

9. **Policies & Guidance**
a. Policy Selection
i. Expand the scenario folder to view the bases.
ii. Base: add policy “No Non-CAAF Contractors”.



b. Click “Continue”.

10. **Risk in Using Non-Military Personnel**
    a. Expand the scenario folders in the table.
    b. Set each base to the following values:

Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
50K Evac Scenario						
Base	Low	Low	Medium	Medium	Medium	Low

    c. Click “Continue”.
11. **Finish**
    a. Click “Complete”.
12. Click the “Log Off” link. Click “OK” for the warning.
13. Login as Analyst.
14. Find your planning baseline in the table.
15. Find your analysis “[Your name] test analysis for new baseline”.
16. Your new scenario should appear in the Mission Scenarios list.
17. Click the “Log Off” link. Click “OK” for the warning.

3.2.2.3. Activity: Creating Another New Mission Scenario using an Excel TPFDD

Detailed instructions provided in CCOT-P User Manual, Sections 2.1.5.

All scenarios and data are notional and for training purposes only.

You will be creating a mission scenario for a humanitarian assistance mission scenario response to a civil war. This is the same scenario as the one from the prior section (it has the same TPFDD values), but this one assumes that the U.S. will be assisting 100,000 evacuees at one base. Since the difference in the number of evacuees impacts additional support needed at the base (especially in terms of logistics), you are creating two different mission scenarios.

You will be provided with a TPFDD file. Please use the name of the mission scenario in the TPFDD file, which will be one of the following:

- Demo 1: Samavia
- Demo 2: Republica
- Demo 3: Genovia
- Demo 4: Nambutu

1. Login as Planning Manager.
2. Click on your new baseline to open it.
3. Go to the **Mission Scenarios** tab.
4. Click "Add Mission Scenario".
5. Click "Create New Scenario".
6. **Scenario Creation**
    a. Set the title to "<your initials> <scenario name> 100K".
    b. Set the Operation Type as "Humanitarian Assistance/Disaster Relief".
    c. Set the description to "This test scenario was created from within the <your name> Test Baseline 1."
    d. Click "Continue".
7. **Personnel Costs**
    e. Set the following cost values:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
100K Evac Scenario	$68	$32

    f. Click "Continue".
8. **Manpower Substitutions & Requirements**
    g. Set the following substitution percentages:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
100K Evac Scenario	90%	90%

h. Phase Durations: Set the following end days for each phase:

Phase	Start Day	End Day	Duration
Phase 0	0	5	6
Phase 1	6	20	15
Phase 2	21	55	35
Phase 3	56	125	70
Phase 4	126	190	65
Phase 5	191	256	66

i. Manpower Requirements
   i. Click "Browse".
   ii. Locate the provided Excel file.
   iii. Click "Import".
   iv. Select the TPFDD tab from the menu and click "Select".
   v. Select the corresponding column name from each menu.
   vi. Click "OK".
   vii. Summary View table should look like

Scenario	Force Support	Battlespace Awareness	Force Application	Logistics	Command and Control	Net-Centric	Protection	Building Partnerships	Corporate Mgmt & Spt	Total
100K Evac	420	386	1,541	21,750	213	153	1,066	278	47	25,854
Base	420	386	1,541	21,750	213	153	1,066	278	47	25,854
	420	386	1,541	21,750	213	153	1,066	278	47	25,854

   viii. View Requirements by Phase should look like

Phase	Force Support	Battlespace Awareness	Force Application	Logistics	Command and Control	Net-Centric	Protection	Building Partnerships	Corporate Mgmt & Spt	Total Requirements
Phase 0	0	180	195	3,249	20	0	164	0	0	3,808
Phase 1	56	311	1,239	8,572	45	54	378	23	1	10,679
Phase 2	143	327	1,541	17,494	185	76	798	156	2	20,722
Phase 3	268	386	1,541	18,946	213	153	1,066	198	6	22,777
Phase 4	341	386	1,541	19,402	213	153	1,066	278	47	23,427
Phase 5	420	386	1,541	21,750	213	153	1,066	278	47	25,854

ix. Additional Support Needs: The 50K evacuee scenario had no planning factors. Since this scenario assumes 100K evacuees, the difference in the number of evacuees impacts additional support needed at the base (especially in terms of logistics). Set the planning factors for the single base to the values below.

Base - 100K Evac Scenario

Scenarios	Force Support	Battles... Awaren...	Force Applica...	Logistics	Comm... and Control	Net-Ce...	Protecti...	Building Partner...	Corpor... Mgmt & Spt
Planning Factors	40%	70%	50%	100%	30%	30%	80%	20%	0%

x. Click "Continue".

18. **Phase Durations**
    a. Set the start date to the following value. Do not change the phase durations. These are calculated from the phase durations table on the previous page.

Scenario	Start Date / FY	Phase Duration (Weeks) 0	1	2	3	4	5
100K Evac Scenario	2018-01-07 2018	1	2	5	10	9	9

    b. Click "Continue".
19. **Policies & Guidance**
    a. Policy Selection
        iii. Expand the scenario folder to view the bases.
        iv. Base: add policy "No Non-CAAF Contractors".

Mission Scenario	Policy Descriptions	Military - Active	Military - Reserve	DoD Civilians	U.S. Contractors	3rd-Country Contractors	Local Nation Contractors
100K Evac Scenario							
Base	Add Policy	Yes	Yes	Yes	Yes	Yes	No
Remove	No Non-CAAF Cont...	Yes	Yes	Yes	Yes	Yes	No

    b. Click "Continue".
20. **Risk in Using Non-Military Personnel**
    a. Expand the scenario folders in the table.
    b. Set each base to the following values:

Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
100K Evac Scenario						
Base	Low	Low	Medium	Medium	Medium	Low

    c. Click "Continue".

21. **Finish**
    a. Click “Complete”.
22. Click the “Log Off” link. Click “OK” for the warning.
23. Login as Analyst.
24. Find your planning baseline in the table.
25. Find your analysis “[Your name] test analysis for new baseline”.
26. Your new scenario should appear in the Mission Scenarios list.
27. Click the “Log Off” link. Click “OK” for the warning.

4. ANALYST ACTIVITIES

The analyst is a planner who will be using the tool to perform "what-if" analyses. Through these analyses, the analyst will be able to provide estimates on the number of contractors needed, what capabilities they will need to have, and when they will be needed.

4.1. Overview

4.1.1. Understanding the Analysis Manager

Additional information provided in CCOT-P User Manual, Section 3.1.

The analysis manager is used to create a new analysis and view results from old analyses.

The analyses manager is designed like a file browser. Planning baselines are the top level directories, and model runs are organized beneath them. Analyses that are children of other analyses are called "branches". Each analysis has a unique Analysis ID (first column) to simplify locating and referencing analyses.

Analyses have two status modes:

1. Initial or Ready means that the analysis has not been run. It is a work in progress.
2. Solved means that the analysis has been run. It has results. Its input values can no longer be modified.

4.1.2. Parts of the Analysis

An analysis has three main sections.

Overview – The Overview page shows what tasks can be performed on each of the Analysis Inputs pages. It also includes links to Analysis Inputs sub-pages. If the analysis has been solved, the Overview page will display links to the Analysis Results pages.

Analysis Inputs – The Analysis Inputs page is where the analyst will modify input values for the "what if" analysis.

Analysis Results – The Analysis Results page contains all of the graph results. These results can only be viewed when the analysis is solved. Otherwise, this page appears blank.
There are two types of analysis that can be created in CCOT-P.

Normal – Deterministic analysis that includes no uncertainty. Most of your analyses will probably be normal.

Uncertainty of Phases 3-5 Durations – The optimization model is also capable of assessing how uncertainty impacts contingency contractor decisions. This is important because most analysis uses predetermined profiles and start dates for each mission scenario. In reality, the exact requirements for executing mission scenarios are uncertain. In this version of CCOT, the user is able specify a range of possible durations for phases 3, 4 and 5 of each mission scenario.

Additional insight can be gained when uncertainty is added to an analysis. Without uncertainty, all of the outputs are a single estimate resulting in one possible outcome for the mission scenarios. Uncertainty introduces a range of situations that can occur, and this in turn introduces a range of outcomes. For example, instead of a single estimate of cost, the minimum, maximum, most likely, and average costs can be understood.

4.2. Analysis

4.2.1. Starting or Branching a New Analysis

Detailed instructions provided in CCOT-P User Manual, Sections 3.2.2- 3.2.3.

Starting a new analysis will populate it with the default values entered by the planning manager. If you want to start with the values in an existing analysis, you need to branch. In both cases, you will be able to modify some of the existing input values to perform your analysis.

- Scenario Selections
    - Describe the purpose of this analysis
    - Select which mission scenarios to include in this analysis
- Budget & Costs
    - Set budget constraints, if necessary
    - Set annual costs for Local Nation (LN) and Third Country National (TCN) contractors
- Manpower Substitutions
    - Set manpower substitution rules (comparison to military efficiency) for Local Nation (LN) and Third Country National (TCN) contractors
- Manpower Requirements
    - View manpower requirements
    - Add additional support needs, if needed
- Manpower Availability & Phase Durations
    - Set manpower availability limits for the personnel groups by capability
    - Set phase start dates and durations
- Policies & Guidance
    - Set policies (as needed) on which personnel groups may or may not be used. Some policies may have been added by the planning manager, and these cannot be removed.
- Risk in Using Non-Military Personnel
    - Set the level of acceptable operational risk in using non-military personnel
- Running the Analysis
    - Once you run the analysis, you can no longer modify the input values for this analysis.
    - The optimization model will now compute the optimal total workforce mix. This may take a few minutes. Analyses with uncertainty will take longer to run.

4.2.1.1. Activity: Starting a New Analysis (Normal Analysis)

Detailed instructions provided in CCOT-P User Manual, Sections 3.2.2.

All scenarios and data are notional and for training purposes only.

The analyses in this section all examine the occurrence of two wars, Prussia and the MCO created earlier. First, we will create an analysis to understand the manpower mix and cost when these two missions do not overlap.

1. Login as Analyst.
2. Find your planning baseline in the table.
3. Click the "Start New Analysis" button next to it.
4. **Scenario Selection**
    a. Set the title to "<your name> Prussia - Developed and MCO, no overlap".
    b. Add to the description, "Prussia - Developed and MCO baseline analysis with no mission overlap
    c. Set the analysis type to "Normal".
    d. The following mission scenarios should be listed in the table:
        i. Prussia – Austere
        ii. Prussia – Developed
        iii. Florida (Hurricane)
        iv. MCO scenario
        v. 50K evacuee scenario
        vi. 100K evacuee scenario
    e. Add the MCO and Prussia – Developed scenarios to the analysis.
5. Click "Continue".
6. **Budget & Cost**
    a. Budget table: Make sure that the "No budget constraints" box .
    b. Personnel Costs table:
        i. Use the default values entered in the planning baseline:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
Prussia – Developed	$68	$36
MCO	$68	$44

7. Click "Continue".

8. **Manpower Substitutions**
    a. Use the default values entered in the planning baseline:

Mission Scenario	3rd-Country Contractors	Local Nation Contractors
Prussia – Developed	90%	90%
MCO	90%	90%

9. Click "Continue".
10. **Manpower Requirements**
    a. Manpower Requirements table:
        i. This is a view only table.
        ii. Expand the folders to view the bases.
            1. Prussia – Developed: Carroll AFB and Ft. Hope
            2. MCO: two bases
    b. Additional Support Needs table:
        i. Use the default values entered in the planning baseline:

Carroll AFB - Prussia - Developed (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	10%	0%	0%	30%	5%	0%	0%	5%	20%

Ft. Hope - Prussia - Developed (War)

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	15%	5%	0%	20%	5%	0%	0%	5%	10%

MCO – Base 1

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	20%	5%	0%	80%	5%	0%	0%	10%	20%

MCO – Base 2

Scenarios	Force Support	Battles... Awareness	Force Application	Logistics	Comm... and Control	Net-Centric	Protect...	Building Partnerships	Corpor... Mgmt & Spt
Planning Factors	20%	0%	0%	90%	0%	0%	0%	12%	15%

11. Click "Continue".

12. **Manpower Availability & Phase Durations**
    a. Manpower Availability table: use the default values.
    b. Phase Durations table:
        i. Set the start date and phase durations to the following values.

Scenario	Start Date	FY	0	1	2	3	4	5
Prussia – Developed	2022-01-02	2022	4	4	4	8	8	20
MCO	2023-01-08	2023	0	2	2	8	4	18

    c. Click "Save Changes".
    d. Click on Graph: Total Personnel Requirements by Scenario. This graph shows the total manpower requirements by mission scenario. It does not include Additional Support Need values. Check that the graph looks like Figure 2:
        ii. Note: This graph can take about a minute to load.

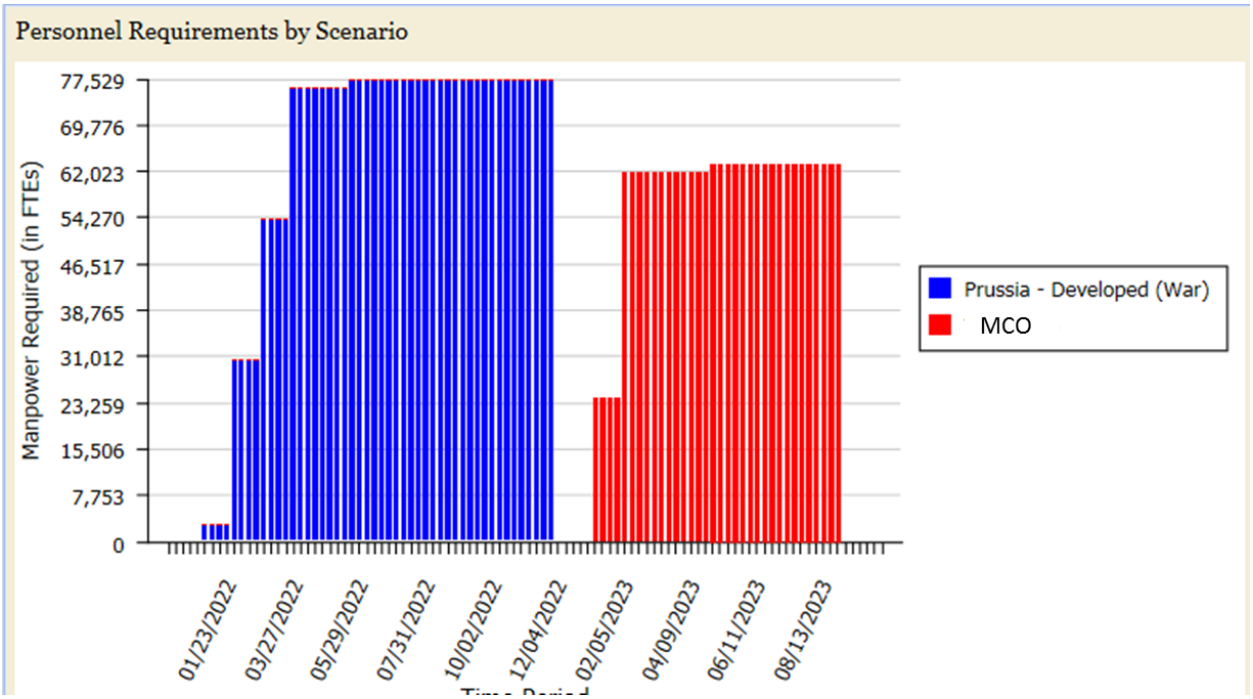


Figure 2. Personnel Requirements by Scenario for no overlap analysis.

    e. Close the graph window.

f. Click on Graph: Required vs Available Personnel by Capability. This graph shows the manpower requirements by capability. The red line shows the military personnel available (active + reserve) for the selected capability. Check that the graph looks like Figure 3 when Battlespace Awareness is selected and like Figure 4 when Logistics is selected. There are not enough military personnel to meet the Battlespace Awareness requirements, but there is sufficient military personnel to meet the Logistics requirements.

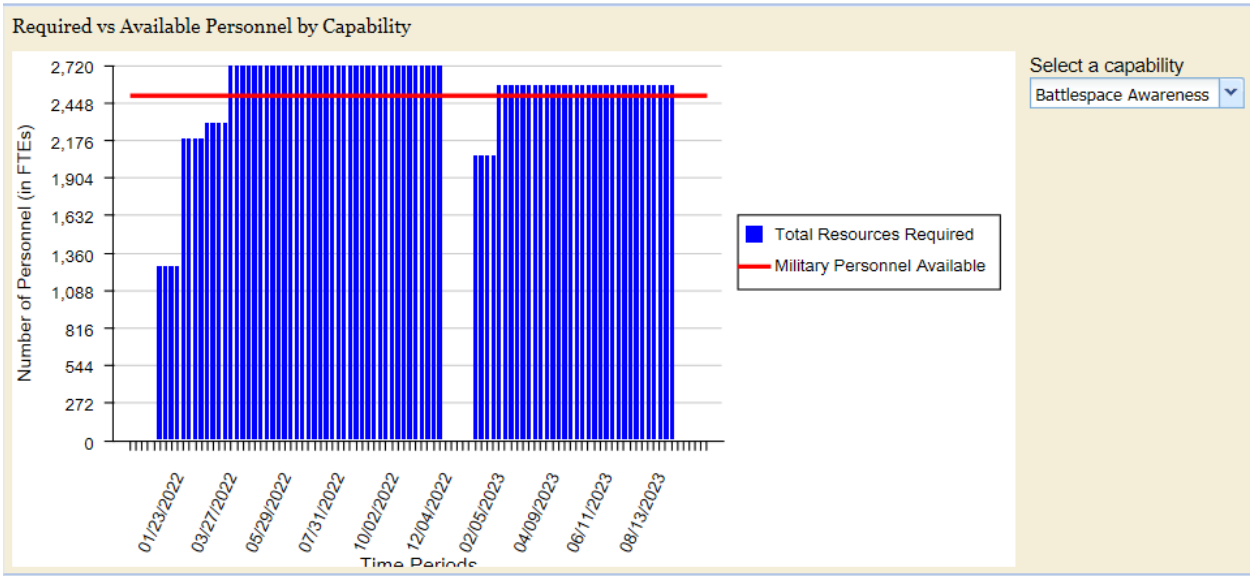


Figure 3. Required vs. Available Personnel for Battlespace Awareness.

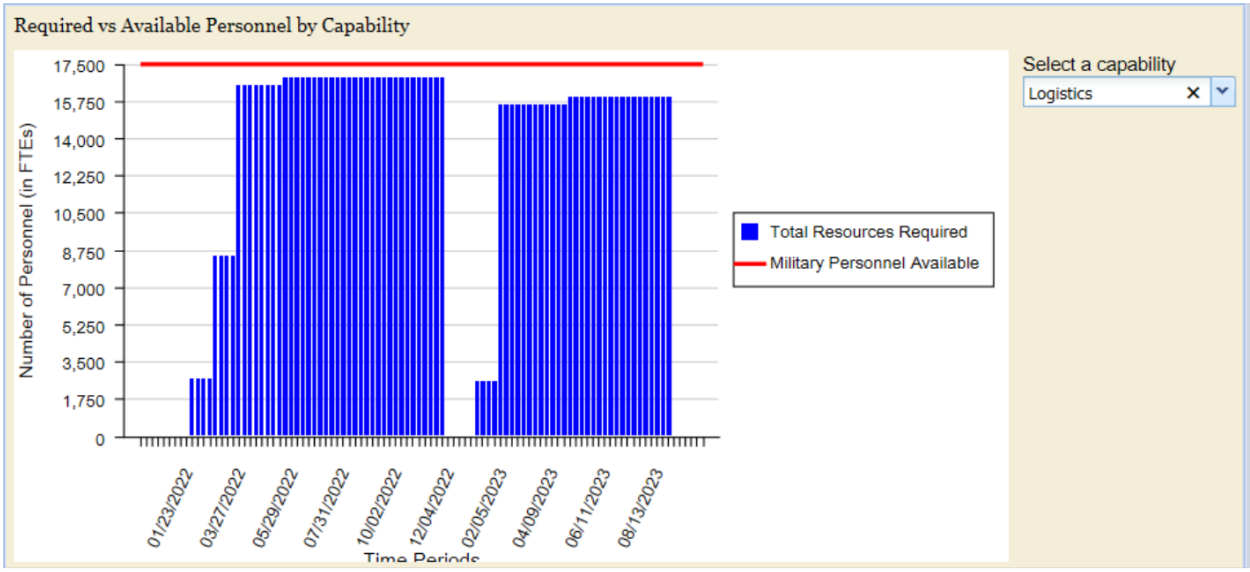


Figure 4. Required vs. Available Personnel for Logistics.

g. Close the graph window.

13. Click “Continue”.

14. **Policies & Guidance**
    a. Policy Selection:
        i. Expand the scenario folders in the table.
        ii. All bases should have policy "All Personnel Groups".
        iii. Do not assign policies to either base. Leave them as is.
15. Click "Continue".
16. **Risk in Using Non-Military Personnel**
    a. Risk in Using Non-Military Personnel table:
        i. Expand the scenario folders in the table.
        ii. Use the default values:

Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Prussia - Developed (W						
Carroll AFB	Medium	Medium	High	Extreme	Medium	Low
Ft. Hope	Medium	Medium	High	Extreme	Medium	Low
MCO						
Base 1	Medium	Medium	Medium	Medium	Medium	Low
Base 2	Medium	Medium	High	High	Medium	Low

17. Click "Continue: Run Analysis"
18. Click "Run Analysis".
    a. Once an analysis is run, none of the input values may be changed.
    b. The Analysis Results tab will become active when the model run completes.
19. **Analysis Results**
20. **Manpower Mix**:
    a. This pie chart displays the optimized workforce mix aggregated over all time periods. By default, all scenarios and all capabilities (Joint Capability Areas) are shown. This graph can be limited to a specific scenario or capability by using the dropdown menus.
    b. Annex W can be downloaded from this page by clicking the "Create Annex W" button. The Excel file contains tables with estimated contractor needs (organized by mission scenario, phase, JCA and contractor type) based on the optimized workforce mix.
21. **Budget Summary:**
    a. This graph displays the total cost (sum of all mission scenarios) by fiscal year for the optimized workforce.
    b. While Prussia – Developed (which occurs in 2022) had a higher manpower requirement, the MCO (which occurs in 2023) ended up costing more.
22. **Assignments:**
    a. This graph displays the number of personnel assigned or short by capability and personnel group versus the availability over time. Assignments are displayed as the number of FTEs from a single personnel group used to perform a single

capability. The personnel group and capability (Joint Capability Area) must be selected from the dropdown menus.

i. Note: The graphs for each personnel group + capability are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.

b. An overage is an inability to meet demand (staff shortfall). Even though it is not possible to meet the demand, the model tries to identify the cheapest personnel group as if it were possible. The model will always assign the overage to the cheapest personnel group that is allowed to complete the work. Since we did not assign a contractor limit, the cheapest group for this analysis is Military-Active.

c. Overages occur for Military – Active in April-May 2022:

iii. Force Support: 24 FTEs

iv. Battlespace Awareness: 291 FTEs

v. Logistics: 3,156 FTEs

vi. Net-Centric: 174 FTEs

d. The overages only occur during Prussia (the first scenario). This might explain why it has a lower total cost even though it has higher manpower requirements.

23. **Assignments by Personnel Group:**

a. This graph displays how a single capability has been assigned across the personnel groups over all time periods. This graph displays how the need for a specific capability (Joint Capability Area) has been distributed across the personnel groups. The capability must be selected from the dropdown menu. By default, the workforce mix is shown over all scenarios and all capabilities are shown. This graph can be limited to a specific capability and/or scenario using the dropdown menu.

i. Note: The graphs for each personnel group are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.

b. Military-Active is the most heavily used personnel group in both scenarios, followed by Local Nation Contractors.

c. Filtering by scenario is useful when the scenarios overlap.

24. **Assignments by Capability**:

a. This graph displays how a single personnel group has been assigned across the capabilities (Joint Capability Areas). The personnel group must be selected from the dropdown menu.

i. Note: The graphs for each capability are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.

25. **Assignments by Scenario**:

a. This graph displays the number of personnel from a single personnel group for a single capability assigned to each mission scenario over all time periods. The personnel group and capability (Joint Capability Area) must be selected from the dropdown menus.

i. Note: The graphs for each personnel group + capability are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.

26. **Analyses Comparison:**
    a. This graph allows you to compare the manpower mix and the use cost of two analyses. Since we have only created one analysis under this planning baseline, this feature is not active.

Despite having an unlimited budget, all of the manpower requirements could not be met. We know this based on the overages for Military-Active on the *Assignments* graph.

Go to the *Assignments by Personnel Group* chart and select capabilities Force Support, Battlespace Awareness, and Net-Centric. In April-May 2022, there are only two personnel groups assigned: Military-Active and Military-Reserve.

Why weren't the other personnel groups, especially the unlimited contractor groups, assigned to prevent overages?

1. Go to the Analysis Inputs section.
2. Go to the Policies & Guidance page.
3. No policies preventing the use of contractors were assigned to Prussia - Developed, so policy selection isn't preventing the use of contractors.
4. Manpower Business Rules at the bottom of the page show the following rules:
    a. Force Support: all groups can be used
    b. Battlespace Awareness: TCN and LN cannot be used
    c. Logistics: all groups can be used
    d. Net-Centric: LN cannot be used
5. Manpower Business Rules limitations help to explain that some contractor groups cannot be used for Battlespace Awareness and Net-Centric.
6. Using Figure 5, we see that April-May 2022 occurs during phase 3 of Prussia - Developed.
7. Go to the Risk in Using Non-Military Personnel page.
8. For Phase 3, both of Prussia's bases are set to risk level Extreme. Extreme prevents the use of any non-military personnel (0% of the workforce can be non-military), which explains why none of the other personnel groups were assigned and why there are overages.
9. In order to prevent the overages, the risk level for phase 3 must be decreased to allow the use of non-military personnel OR the availability of Military-Active and Military-Reserve must be increased (on the Manpower Availability & Phase Durations page).

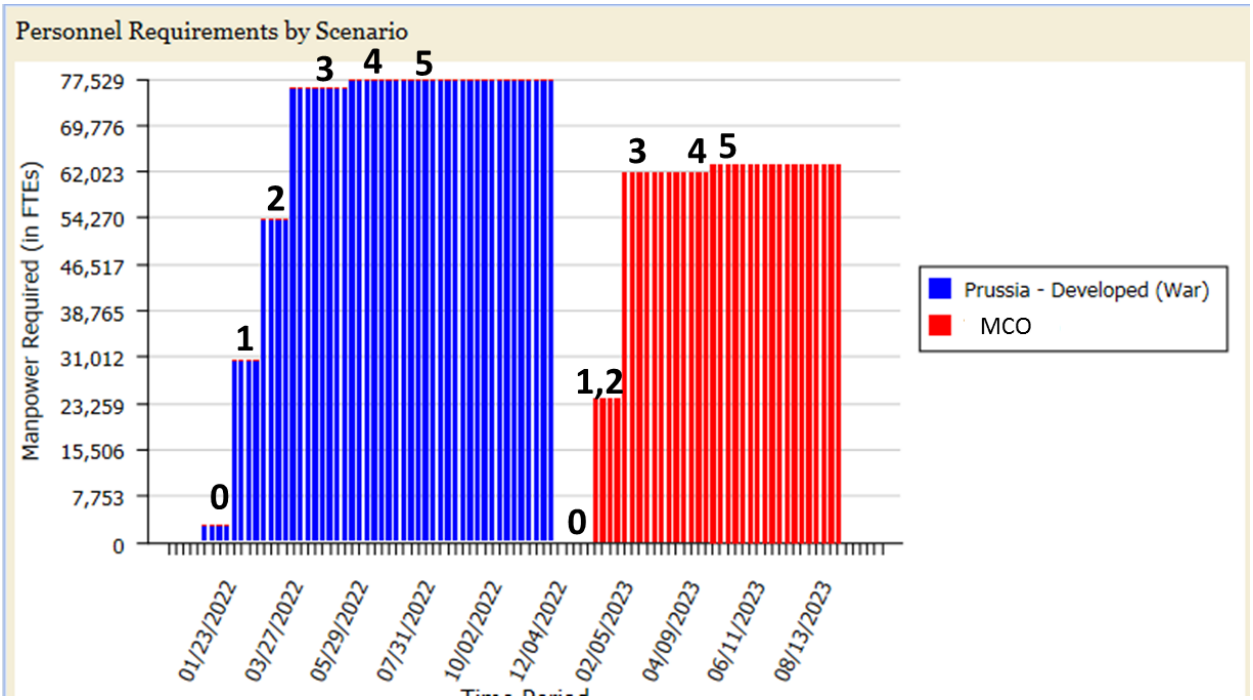


Figure 5. Phases for mission scenarios.

4.2.1.2. Activity: Branching a New Analysis (Normal Analysis)

Detailed instructions provided in CCOT-P User Manual, Sections 3.2.3.

All scenarios and data are notional and for training purposes only.

This analysis will use the same parameters as the parent analysis, except that Prussia and MCO will overlap by 16 weeks, and Prussia's phase 3 risk level will be decreased to High.

1. From the Analysis Manager, find the analysis you just created.
2. Click "Branch".
3. **Scenario Selection**
    a. Set the title as "<your name> Prussia and MCO, 16 week overlap".
    b. Set the description as "Prussia and MCO overlap for 16 weeks. Prussia's phase 3 risk level decreased to High."
    c. Under Analysis Type, select "Normal".
4. Click "Continue".
5. **Manpower Availability & Phase Durations**
    a. Manpower Availability table: Use the same values as the original analysis.
    b. Phase Durations table:
        a. Change Prussia's phase 3 duration to 29 weeks.

Scenario	Start Date	FY	0	1	2	3	4	5
Prussia – Developed	2022-01-02	2022	4	4	4	29	8	20
MCO	2023-01-08	2023	0	2	2	8	4	18

    c. Click "Save Changes".
    d. Click on Graph: Total Personnel Requirements by Scenario. This graph shows the total manpower requirements by mission scenario. It does not include Additional Support Need values. Check that the graph looks like Figure 6:
        i. Note: This graph can take about a minute to load.

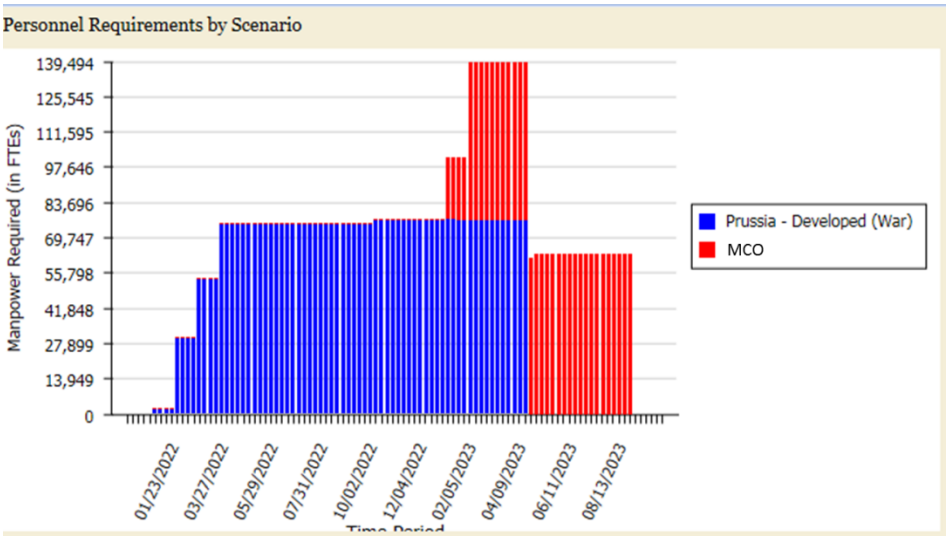


Figure 6. Personnel Requirements by Scenario for the 16-week overlap analysis.

e. We see that the overlap occurs during January – April 2023, which corresponds to phase 5 of Prussia and phases 0-4 of MCO.
f. Close the graph window.

6. Click "Continue".
7. Go to the **Risk in Using Non-Military Personnel** page.
    a. Change phase 3 risk to High for both of Prussia's bases.

Mission Scenario	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Prussia - Developed (W						
Carroll AFB	Medium	Medium	High	High	Medium	Low
Ft. Hope	Medium	Medium	High	High	Medium	Low
MCO						
Base 1	Medium	Medium	Medium	Medium	Medium	Low
Base 2	Medium	Medium	High	High	Medium	Low

8. Click "Continue: Run Analysis"
9. Click "Run Analysis".
    a. Once an analysis is run, none of the input values may be changed.
    b. The Analysis Results tab will become active when the model run completes.

First, let's see if decreasing the risk level helped remove the overages. Go to the Assignments graph and set personnel group to Military-Active. View the capabilities that had overages during phase 3 (April-May 2022) of Prussia:

a. Force Support
b. Battlespace Awareness
c. Logistics
d. Net-Centric

We see that decreasing the risk level did help to remove the overages from the previous analysis. However, we now find that a Logistics overage occurs in February – April 2023, which is during the overlap period. What is the cause of this overage?

Go to Assignments by Personnel Group. Select Logistics from the capability menu. Three personnel groups are used during the overage period: Military-Active, Military-Reserve, and Local Nation Contractors. We know:

1. There is no budget constraint.
2. Since we did not add any policies, we know that policy selection isn't preventing the use of contractors.
3. We know that the Manpower Business Rules allow any personnel group to perform Logistics work.

This leaves risk level as the only input that could impact the number of contractors hired.

1. Go to the Analysis Inputs section.
2. Go to Risk in Using Non-Military Personnel.

3. We know that the overlap period corresponds to phase 5 of Prussia and phases 0-4 of MCO
4. Both bases of Prussia have phase 5 set to risk level Low, which allows up to 75% non-military personnel to be used.
5. MCO Base 1 has phases 0-4 set to risk level Medium, which allows up to 50% non-military personnel to be used.
6. MCO Base 2 has phases 0, 1 and 4 set to risk level Medium.
7. MCO Base 2 has phases 2-3 set to risk level High, which allows up to 25% non-military personnel to be used.
8. Since the Assignments by Personnel Group shows that a lot of LN are hired during the overage period, this suggests that the MCO Base 2 High risk level is limiting additional contractors to be hired, which causes the overage.

Now that we have a second analysis, we can use the Analyses Comparison feature.

1. Return to the Analysis Results section.
2. Go to the Analyses Comparison page.
3. For "Select a Model to Compare", select your previous analysis.
4. This graph allows you to compare the manpower mix and the use cost of two analyses.
5. The pie charts allow you to compare the manpower mix of the two analyses. These pie charts can be filtered to show the manpower mix by a specific capability (dropdown menu 2) and/or mission scenario (dropdown menus 3 and 4).
6. The table at the bottom of the page allows you to compare total costs and costs per personnel group.
7. The current analysis costs $4B more than the previous one.
    a. The majority of the cost increase is caused by extending Prussia's phase 3 by 21 weeks.
    b. Reducing the risk level allowed more contractors to be hired and reduced the percentage of military forces in the total manpower mix.

4.2.1.3. Activity: Creating an Uncertainty Analysis

Discussion on understanding uncertainty analysis results provided in CCOT-P User Manual, Sections 3.2.6.

All scenarios and data are notional and for training purposes only.

The first analysis had no mission overlap. The second analysis had a 16-week overlap, caused by increasing Prussia's phase 3 duration. What happens if Prussia's phase 3 duration could last anywhere from 8-29 weeks? If phase 3 lasts 8 to13 weeks, then there will be no overlap. If phase 3 lasts 14 to 29 weeks, then Prussia and MCO will overlap.

You could run six analyses, increasing the duration of phase 3 by 4 weeks in each subsequent analysis (Table 1). This situation is not so bad, but if uncertainty is added to two or more phases, then an analysis would have to be created for every combination of phase durations. That's a lot of analyses.

Table 1. Multiple analyses to understand the impact of increasing Prussia's phase 3 duration.

	Phase 3 duration (in weeks)	Mission overlap?
1	8	no overlap
2	13	no overlap – 5 weeks longer
3	17	4-week overlap
4	21	8-week overlap
5	25	12-week overlap
6	29	16-week overlap

CCOT-P allows you to enter a range for the durations of phases 3, 4, and 5. In this analysis, you will be creating an analysis with uncertainty for Prussia's phase 3 duration.

1. From the Analysis Manager, find the second analysis you created, "<your name> Prussia - Developed and MCO, 16-week overlap".
2. Click "Branch".
3. **Scenario Selection**
    a. Set the title as "<your name> Prussia and MCO, 0-16 week overlap".
    b. Set the description as "Prussia and MCO overlap uncertainty for 0-16 weeks. Prussia's phase 3 risk level decreased to High."
    c. Under Analysis Type, select "Uncertainty of the duration of Phases 3,4, & 5".
4. Click "Continue".
5. Go to the **Manpower Availability & Phase Durations** page.
    a. Manpower Availability table: Use the same values as the original analysis.

b. Phase Durations table:
    i. Change Prussia's phase 3 duration to have the range 8 to 29 weeks.

Scenario	Start Date	FY	0	1	2	3-	3+	4-	4+	5-	5+
Prussia – Developed	2022-01-02	2022	4	4	4	8	29	8	8	20	20
MCO	2023-01-08	2023	0	2	2	8	8	4	4	18	18

c. Click "Save Changes".
d. Click on Graph: Total Personnel Requirements by Scenario. This graph shows the total manpower requirements by mission scenario. It will only display the minimum values for phases 3, 4, and 5, so it will have the same graph as the original analysis.
e. Check that the graph looks like Figure 7:
    i. Note: This graph can take about a minute to load.

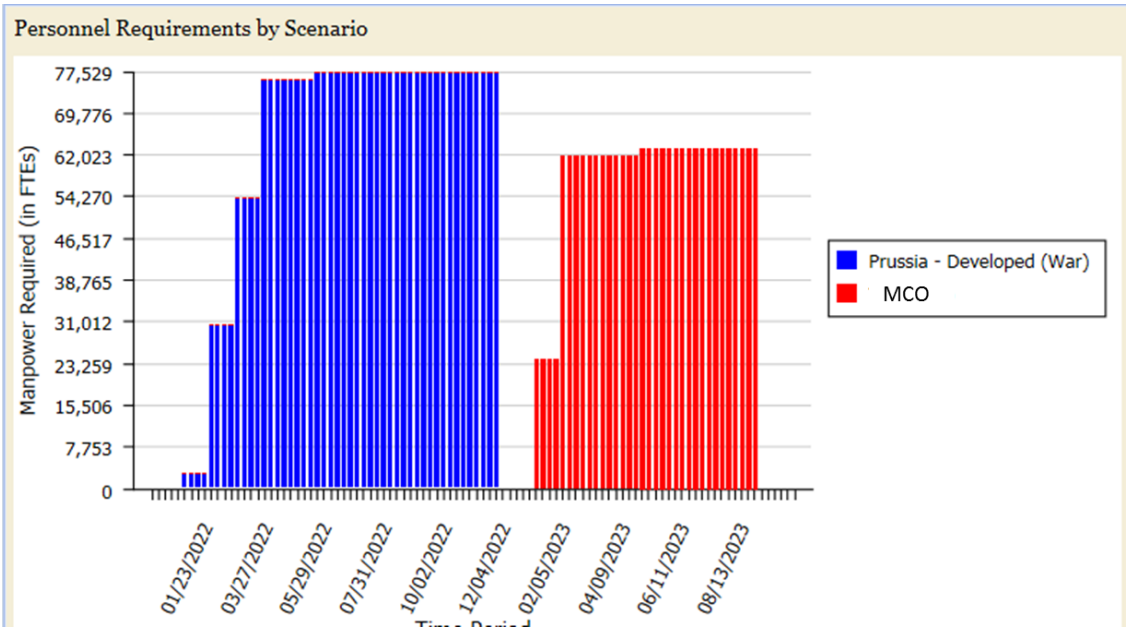


Figure 7. Personnel Requirements by Scenario for uncertainty analysis.

f. Close the graph window.

6. Go to tab **Risk in Using Non-Military Personnel**.
7. Click "Continue: Run Analysis".
8. Click "Run Analysis". An uncertainty analysis will take longer to run than a normal analysis as the model must consider the permutations of the phase 3 duration.
9. **Analysis Results**
    a. Different graphs are presented for an uncertainty analysis. Since these results capture uncertainty in the demand for resources, the total number of assigned personnel is shown for the 25th, 50th and 75th percentiles. A percentile is a measurement that is used to capture the value at which a given percentage of

observations will fall below. When the three percentile results have the same values or are close, this is an indication that impacts of uncertainty are minimal. When there are differences between the three percentiles, this allows the analyst to understand how the total demand might vary.

10. **Total Assignments**:
    a. This graph displays the total number of personnel assigned to all mission scenarios over all time periods.
    b. There are two places in the graph with uncertainty:
        i. June-August 2022 which are variations on when phase 4 begins due to phase 3 duration uncertainty.
            1. In 75% of the cases, FTE requirements increase to ~83,000 at the beginning of June. This includes results from the 50^{th} and 25^{th} percentile conditions.
            2. In 50% of the cases, the increase occurs in August. This includes results from the 25^{th} percentile condition.
            3. In 25% of the cases, the increase occurs in September
        ii. January –March 2023 which are variations on the mission overlap period.
            1. In 75% of the cases, FTE requirements start increasing at the beginning of January with a prolonged spike in February. This includes results from the 50^{th} and 25^{th} percentile conditions.
            2. In 50% of the cases, the increase follows the same pattern as the 75% percentile, but has a very brief spike in February. This includes results from the 25^{th} percentile condition.
            3. In 25% of the cases, there is no increase. FTE requirements decrease at the beginning of January and then starts to increase again in February.

11. **Assignments over all Capabilities**:
    a. This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by personnel group.
        i. Note: The graphs for each personnel group are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.
    b. Set the personnel group to "Military – Active". This shows the total FTEs assigned to active military over time, across all capabilities. The uncertainty periods are different from the previous graph.
        i. While Total Assignments had uncertainty June-August 2022, Military-Active uncertainty occurs later in August-October 2022 and shows the reverse trend to the Total Assignments graph. In Total Assignments, FTE requirements increase over the uncertainty period. For Military – Active, FTE requirements stay steady and then decrease.
        ii. Military-Active shows a similar trend to Total Assignments over the January-March overlap period. Its FTE requirements don't increase as much for the 75^{th} and 50^{th} percentile or have as big of a decrease, but the overall graph shape is similar.

c. View the graph for DoD Civilians. This group experiences minimal impact from the phase 3 duration uncertainty. The biggest uncertainty is caused by whether or not the missions overlap (the big dip in the 25th percentile).

12. **Assignments by Capability**:
    a. This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by capability.
        i. Note: The graphs for each capability are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.
    b. Click through the capabilities to see the varying degrees of impact of uncertainty on the FTE requirements.
13. **Assignments by Personnel Group and Capability**:
    a. This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by personnel group and capability. It provides detailed information on how each personnel group by capability is impacted by the uncertainty.
        i. Note: The graphs for each personnel group + capability are not displayed with the same magnitude levels. Be sure to check the max value on the y-axis when making comparisons across graphs.
    b. Uncertainty doesn't always have an impact on FTE requirements. For example, there is no effect on Military – Active: Battlespace Awareness.
14. **Budget Summary**:
    a. This graph displays the total cost (sum over all mission scenarios) by fiscal year for the optimized workforce. It shows the costs by the expected value (average) and percentile. The stacked bar charts show the expected costs by personnel group.
    b. Since there is a range of durations for phase 3, this will cause a range of budgets. The graph shows the most volatility in cost is in 2023, when the two mission scenarios would overlap. The percentiles help you to understand how much coverage different budget levels will buy (e.g., $8B will cover 50% of the cases; $7B will cover 25% of the cases). The longer the total mission scenario duration, the longer people will be employed, which increases total cost.
        i. In 75% of the cases, the total budget would be ~$9B.
        ii. In 50% of the cases, the total budget would be ~$8.2B.
        iii. In 25% of the cases, the total budget would be ~ $7.3B
15. **Overages**:
    a. This graph displays the likelihood of an overage (shortfall) and the expected size of the overage over time by capability. An overage occurs when more personnel are required than are available. Two separate vertical axes are used to display these results. The first axis (left) shows the likelihood that an overage occurs for the selected capability in a given week. The second axis (right) shows the expected value (average) of the overage when it occurs.
    b. Overages are most likely to occur for Logistics during the mission overlap period. A Logistics overage is 54.5% likely to occur at the very beginning of the overlap period in January 2023. The average overage will be 5,047 FTEs (in terms of

Military-Active). The likelihood of an overage decreases to 21.8% in March for the longer overlap durations. The average overage will be 2,134 FTEs.

4.2.2. Viewing Results for a Normal Analysis

Additional information is provided in CCOT-P User Manual, Section 3.2.5.

Analysis results are only available after the analysis has run and has a status of Solved. For a "normal" analysis run (no uncertainty), the following graph results will be displayed.

(1) Manpower Mix - This pie chart displays the optimized workforce mix aggregated over all time periods. Annex W can be downloaded from this page. The Excel file contains tables with estimated contractor needs (organized by mission scenario, phase, JCA and contractor type) based on the optimized workforce mix.

(2) Budget Summary - This graph displays the total cost (sum of all mission scenarios) by personnel group and fiscal year for the optimized workforce.

(3) Assignments - This graph displays the number of personnel assigned or short by capability and personnel group versus the availability over time.

(4) Assignments by Personnel Group - This graph displays the optimized workforce mix over all time periods. This graph displays how the need for a specific capability (Joint Capability Area) has been distributed across the personnel groups.

(5) Assignments by Capability - This graph displays how a specific personnel group has been assigned across the capabilities (Joint Capability Areas).

(6) Assignments by Scenario - This graph displays the number of personnel from a specific personnel group with a specific capability assigned to each mission scenario over all time periods.

(7) Model Run Comparison - This graph allows you to compare the manpower mix and the use cost of two model runs. This comparison quantifies how changes to the parameters (change in policy, mission overlap, manpower business rules, etc.) impact the optimal manpower mix and total cost.

4.2.3. Viewing Results for an Uncertainty Analysis

Additional information is provided in CCOT-P User Manual, Section 3.2.6.

For an analysis run with uncertainty, slightly different graph results will be displayed.

(1) Total Assignments - This graph displays the total number of personnel assigned to all mission scenarios over all time periods. Since these results capture uncertainty in the demand for resources, the total number of assigned personnel is shown for the 25th, 50th and 75th percentiles. A percentile is a measurement that is used to capture the value at which a given percentage of observations will fall below.
This output provides insights into the impacts of uncertainty with respect to demand for personnel. When the three percentile results have the same values or are close, this is an indication that impacts of uncertainty are minimal. When there are differences between the three percentiles, this allows the analyst to understand how the total demand might vary.

(2) Assignments by Personnel Group - This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by personnel group.

(3) Assignments by Capability - This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by capability.

(4) Assignments by Personnel Group and Capability - This graph displays the same information as the graph on the Total Assignments tab, except that it displays assignments by personnel group and capability.

(5) Budget Summary - This graph displays the total cost (sum over all mission scenarios) by fiscal year for the optimized workforce. It shows the costs by the expected value (average) and percentile. The stacked bar charts show the expected costs by personnel group.

(6) Overages - This graph displays the likelihood of an overage and the expected size of the overage over time by capability. An overage occurs when more personnel are required than are available.

Two separate vertical axes are used to display these results. The first axis (left) shows the likelihood that an overage occurs for the selected capability in a given week. The second axis (right) shows the expected value (average) of the overage when it occurs. The size of the overage is given in terms of active military personnel (recall that more personnel from a given personnel group may be required due to efficiency factors).

REFERENCES

[1] *Secretary of Defense Memorandum, Strategic and operational planning for operation contract support (OCS) and Workforce Mix*, 2011.

[2] *Department of Defense Instruction (DODI) 3020.31, "Contractors Authorized to Accompany the U.S. Armed Forces"*, 2011.

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