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Contingency Contractor Optimization
Phase 3, Quick Start Guide
Contingency Contractor Optimization Tool
Engineering Prototype – Release 2.2

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Unlimited Release

Quick Start Guide
Contingency Contractor Optimization Tool
Engineering Prototype – Release 2.2

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Abstract

This Quick Start Guide is an abbreviated version of the Contingency Contractor Optimization Phase 3, User Manual for the Contingency Contractor Optimization Tool engineering prototype. It focuses on providing quick access instructions to the core activities of the two main user roles: Planning Manager and Analyst.

Based on an electronic storyboard prototype developed in Phase 2, the Contingency Contractor Optimization Tool engineering prototype was refined in Phase 3 of the OSD ATL Contingency Contractor Optimization to support strategic planning for contingency contractors. The tool 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 types (military, DoD civilian, and contractors) and capabilities to meet the mission requirements as effectively as possible, based on risk, cost, and other requirements.

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NOMENCLATURE

ATL	Acquisitions, Technology and Logistics
CCOT-P	Contingency Contractor Optimization Tool Prototype
COCOM	Combatant Command
DOD	Department of Defense
DoDI	Department of Defense Instructions
DOE	Department of Energy
FTE	Full Time Equivalent
HA/DR	Humanitarian Assistance/Disaster Relief
JCA	Joint Capability Area
MCO	Major Combat Operations
OCS	Operational Contract Support
OSD	Office of the Secretary of Defense
LN	Local Nation Contractor
SNL	Sandia National Laboratories
SSA	Support for Strategic Analysis
TCN	Third-Country National Contractor
TPFDD	Time-Phased Force & Deployment Data
U.S.	United States
UTC	Unit Type Code

1. INTRODUCTION

This Quick Start Guide is an abbreviated version of the Contingency Contractor Optimization Phase 3, User Manual for the Contingency Contractor Optimization Tool (CCOT-P) engineering prototype [1]. It focuses on providing quick access instructions to the core activities of the two main user roles.

- Planning Manager
  - Creating a New Planning Baseline (section 2.1)
  - Adding an Existing Mission Scenario (section 2.2)
  - Creating a New Mission Scenario (section 2.4)
- Analyst
  - Starting a New Analysis (section 3.3)
  - Branching a New Analysis (section 3.3)
  - Viewing Results of an Existing Analysis (section 3.4)

1.1. Logging In

These login instructions are for the CCOT-P engineering prototype available on the DoD network as a production pilot. You must have access to the DoD network in order to access the tool.

Note: CCOT-P works best in Firefox. IE (Internet Explorer) may degrade the visual quality of the interface.

First, the administrator must grant you access to the tool. Please contact Anna L. Carter (anna.l.carter10.civ@mail.mil) for access. The administrator will provide you with a username and password for the tool.

1. Go to the CCOT-P website.
2. Enter your CCOT-P username and password.
3. Select a role (defined in section **Error! Reference source not found.**).
4. Click “Continue”.

1.2. Accessing Help

This Quick Start Guide and the longer user manual are accessible through the CCOT-P interface. The links for these help guides are available at the top of every page, above the CCOT-P banner image (Figure 1).

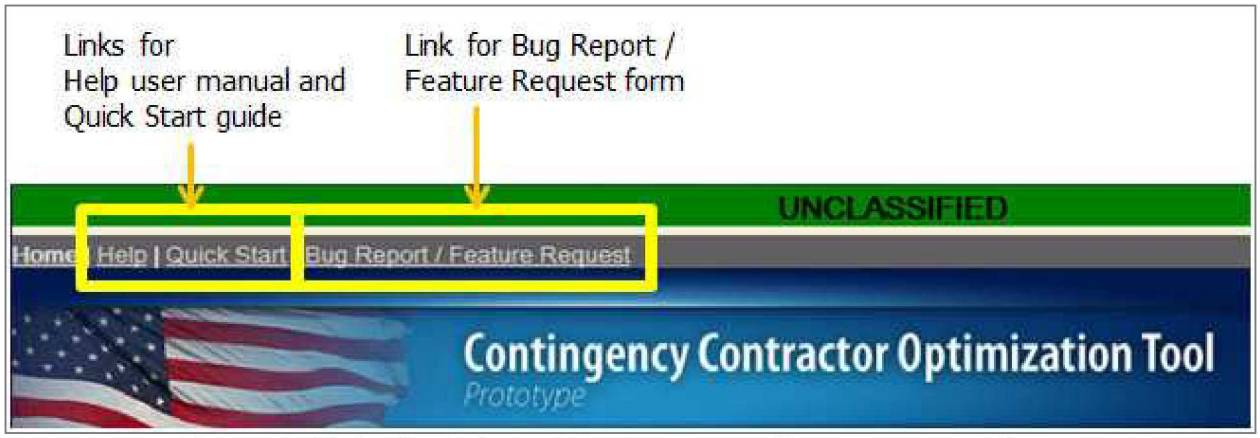

Figure 1. Links for help and the bug report/feature request form.

1.3. Reporting a Bug or Requesting a Feature

1. To report a bug or request a feature, click on the "Bug Report/ Feature Request" link available at the top of every page, above the CCOT-P banner image (Figure 1).
2. A new browser window will open with a form to fill out.
3. Please fill out all fields of the form.
4. Please note that Sandia National Laboratories does not have access to the version of CCOT-P residing on the DoD network. If reporting a bug, please provide sufficient details so that we may attempt to recreate your issue. Attach any data, screen shots, or supporting documents to the email.
5. When the form is complete, click the "Send" button at the bottom of the form.
6. The form will be translated into text that must be pasted into an email.
7. Please send the email to
   abandlo@sandia.gov;crfrazi@sandia.gov;jdurfee@sandia.gov
8. After the email is sent, close the form's browser window.

1.4. Tool Requirements

Operating System: Windows XP or Windows 7

Internet Browser: Firefox is recommended, but CCOT-P should work in all browsers. Testing has shown JavaScript issues in IE8, and this issue may occur in earlier versions of IE as well. When JavaScript takes too long to generate a graph, IE8 displays the error message, "Stop running this script?" If you receive this message in any browser while trying to view a graph, then that graph will probably never appear. This only affects graphs with "assignments" in their title (see User Manual section 3.2.5 Analysis Results & Graphs).

Additional Requirements: Java Runtime Environment 6, Apache Tomcat, .NET Framework 4.0, MySQL

Instructions for installing the Contingency Contractor Optimization Tool engineering prototype and the additional requirements are available in the installation instructions provided with the prototype software.

1.5. Project Overview

The Contingency Contractor Optimization project is intended to address former Secretary Gates' mandate in a January 2011 memo [2] and DoDI 3020.41 [3] 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.

The Contingency Contractor Optimization Tool prototype was developed in Phase 2 of the OSD ATL Contingency Contractor Optimization to support strategic planning for contingency contractors. The tool 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 types (military, DoD civilian, and contractors) and capabilities to meet the mission requirements as effectively as possible, based on risk, cost, and other requirements.

1.6. Mission Scenarios and Planning Baselines

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 (defined below in section 1.4) must consider in their planning.

1.7. 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. 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 (COCOM) 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 COCOM or service. Second, the analyst can perform an integrated, centralized analysis using scenarios across all COCOMs and all services.

1.8. Permissions Overview

Table 1 provides a summary of which actions can be performed and which values can be modified by each user role.

Table 1. User role permissions overview.

	Actions & Input Values	Admin	Planning Manager	Analyst
	Modify **preset baseline values**	X		
	Create/modify **planning baselines** (modify title, add/remove mission scenarios, modify notes/comments/guidance)		X	
	Create/modify **mission scenarios**		X	
	Start a **new analysis**			X
Budgets & Costs	Modify **budgets**		X	X
	Modify **annual cost**: all personnel groups	X		
	Modify **annual cost**: 3rd Country and Local Nation Contractors	X	X	X
Manpower Substitutions & Requirements	Modify **manpower substitution rules**: all personnel groups	X		
	Modify **manpower substitution rules**: 3rd Country and Local Nation Contractors	X	X	X
	Modify **manpower requirements** (import TPFDD or TPFDD-like data during mission scenario creation)		X	
	Modify **additional support needs**		X	X
Manpower Availability & Phase Durations	Modify **manpower availability**		X	X
	Modify **phase durations**		X	X
Policies & Guidance	Modify **policies** assigned to missions (*Analysts cannot remove policies added by the planning manager*)		X	X
	Modify **manpower business rules**	X		
Risk in Using Non-Military Personnel	Modify **risk in using non-military personnel**		X	X

2. 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 COCOM 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.

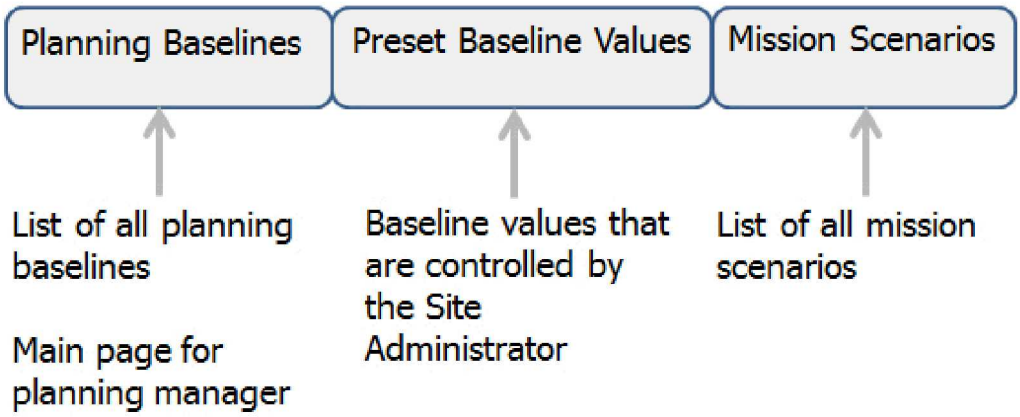

Figure 2. Pages on the Planning Manager main page.

Figure 2 shows the pages (displayed as tabs in the interface) found on the planning manager main page. They are described below.

Planning Baselines - This page lists all of the existing planning baselines, their status (draft or public mode), included mission scenarios, and creation date. This is the main page for managing planning baselines. From here, the planning manager can create, view and modify baselines and hide public baselines from analysts

Preset Baseline Values - 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.

Mission Scenarios - This page lists all of the existing mission scenarios, their status (draft or public mode), and operation type. Mission Scenarios may be created from this page.

Planning baselines and mission scenarios are defined in section 1.6. Mission Scenarios and Planning Baselines.

Differences between draft and public planning baselines are shown in Figure 3. Some values cannot be modified once a planning baseline is made public.

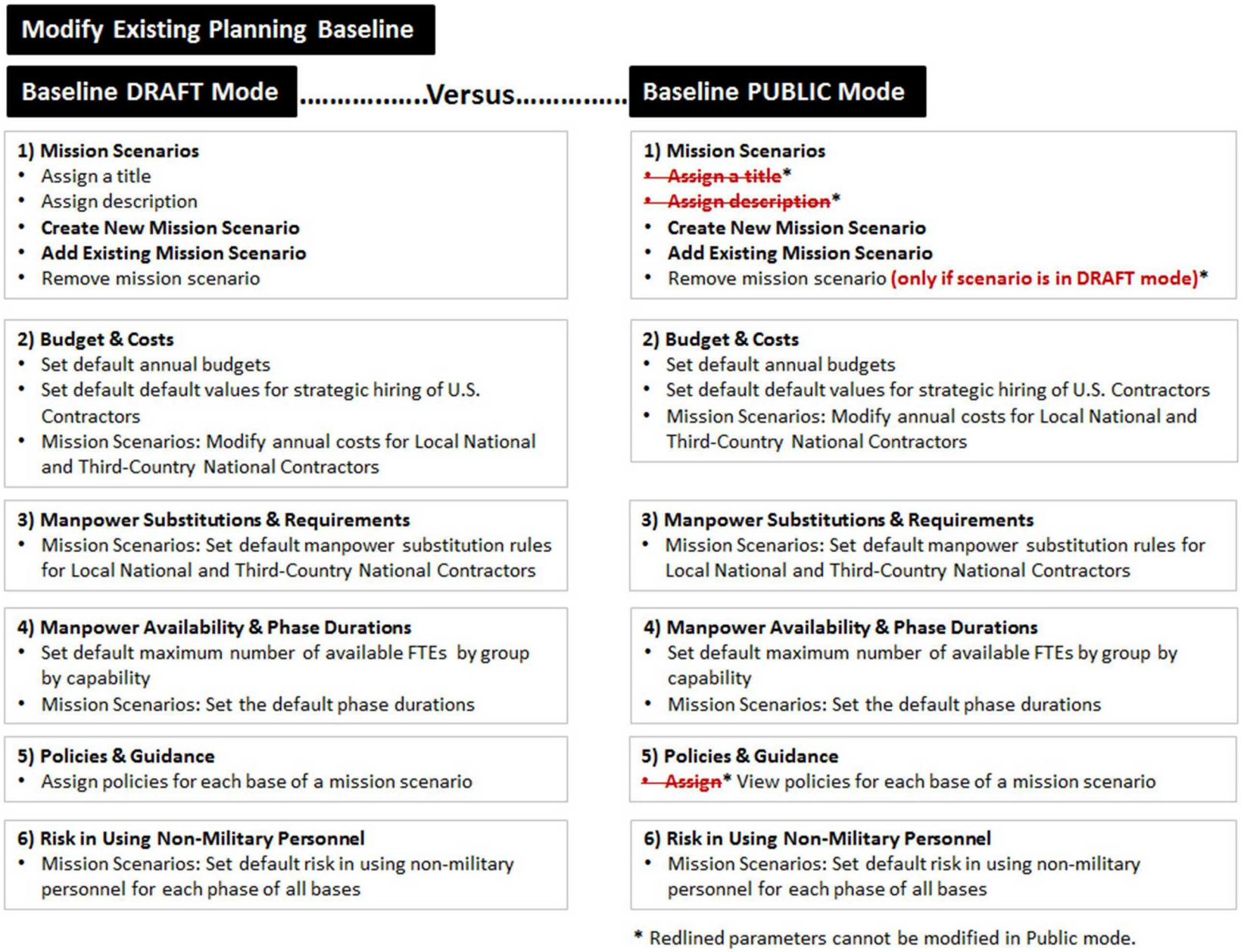

Figure 3. Differences between Draft and Public modes for planning baselines.

2.1. Creating a New Planning Baseline

This section presents a high-level overview of how to create a new planning baseline (Figure 4).

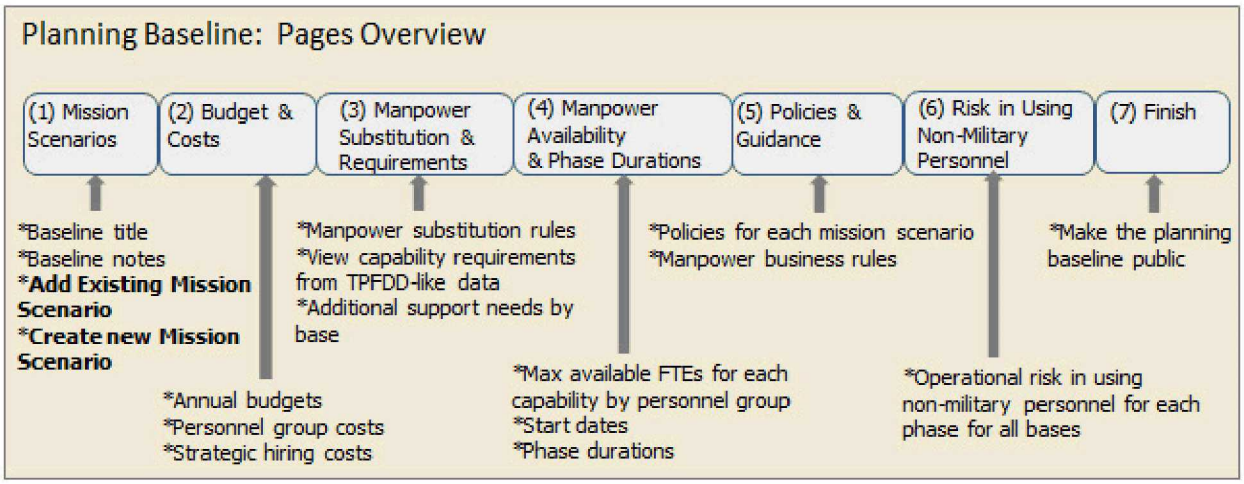

Figure 4. Pages within a planning baseline/existing mission scenario.

1. Preview the values on the *Preset Baseline Values* tab (step A in Figure 5). If the values need to be updated, contact the administrator.
2. On the *Planning Baselines* tab (step B in Figure 5), click the "Create New Planning Baseline" button (step C in Figure 5).

Figure 5. Creating a new planning baseline.

See Figure 19 to understand the differences in using an existing scenario versus creating a new one.

- Continue on to section 2.2 to add an existing mission scenario to your planning baseline.
- Continue to section 2.4 to create a new mission scenario for your planning baseline.

2.2. Adding an Existing Mission Scenario

This section presents a high-level overview of how to add an existing mission scenario to a planning baseline (Figure 6). See User Manual [1] section 2.1.2 Adding an Existing Mission Scenario for detailed instructions.

Page: Mission Scenarios
A planning baseline requires at least one mission scenario. The initial screen *Mission Scenarios* is displayed. On this page, you will name the planning baseline, add additional notes, comments or guidance, and add or create a mission scenario.

1. On the *Mission Scenarios* tab of a planning baseline, click the "Add Mission Scenario" button (step A in Figure 6).
2. Select scenarios from the list on the left. Click on a scenario's title (step B in Figure 7).
3. Click the "Include" button (step C in Figure 7).
4. Click the "Done" button when you are finished adding scenarios (step D in Figure 7).
5. Click the "Continue" button when you are finished with this page.

Figure 6. Adding mission scenarios to a planning baseline.

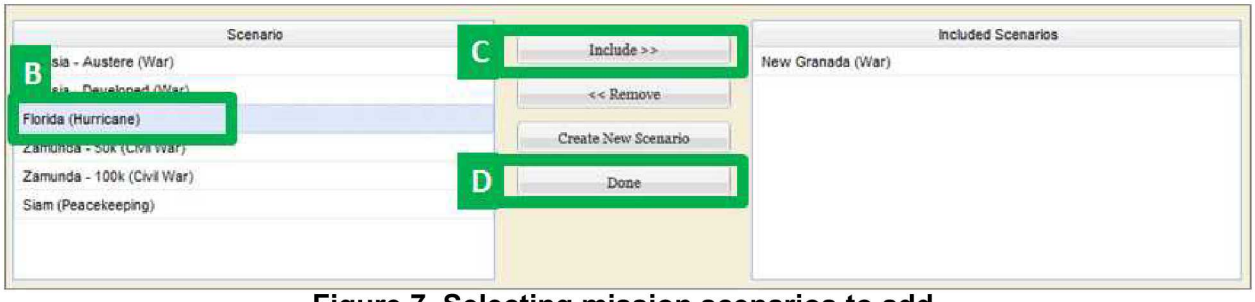

Figure 7. Selecting mission scenarios to add.

Continue on to section 2.3 to set default values for the planning baseline and added mission scenario(s).

2.3. Setting Default Values for the Planning Baseline and Mission Scenario

Set the default values on each of the remaining pages (Figure 8). Click the "Continue" button on each screen to advance to the next page.

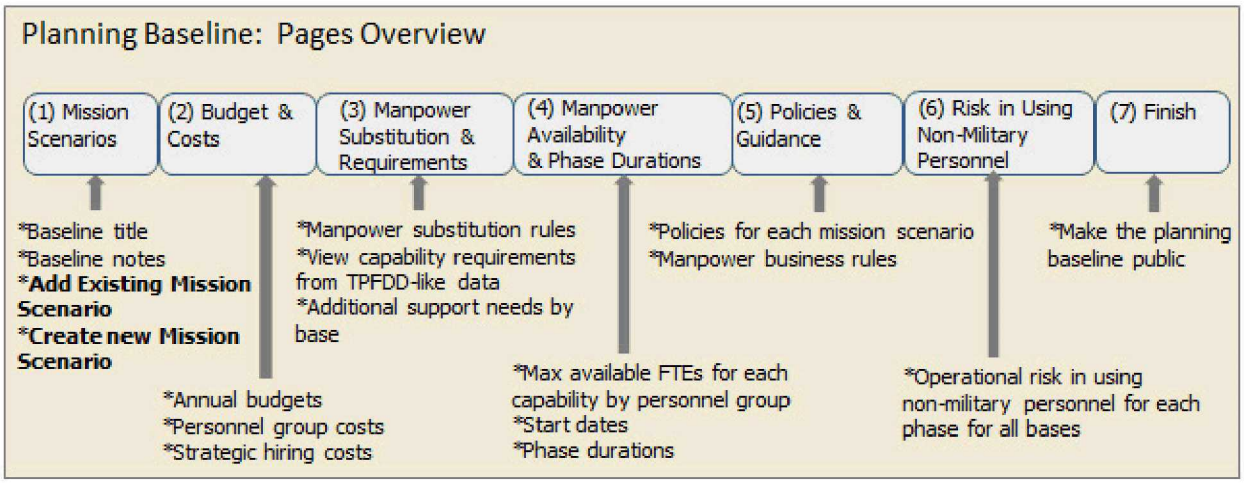

Figure 8. Pages overview for a planning baseline.

Page: Budget & Costs
On this page, you will set budget constraints and annual costs for Local Nation and Third Country National contractors.

Page: Manpower Substitutions & Requirements
On this page, you will set the manpower substitution rules, view previously entered manpower requirements, and add additional support needs to the pre-existing manpower requirements.

The Additional Support Needs table will be at the bottom of the page. This table allows the addition of additional support requirements (in FTEs) by base.

1. Select a base from the dropdown menu. Bases from all mission scenarios added will be listed.
2. The first row is the support planning factors (additional FTE needs or percent "plus up"). Enter the percent additional support needed for each capability. Use the Tab key to move to the next cell.
3. Additional support is calculated as shown in Figure 9.
    - The force requirements by capability (JCA) are taken from the Manpower Requirements table.
    - The calculated additional support needed values are shown by phase in the table below the planning factors row.

Figure 9. Equation for calculating additional support needs.

Page: Manpower Availability & Phase Durations
On this page, you will enter manpower availability limits for the personnel groups by capability. You will enter the phase start dates and durations for the mission scenarios.

For each mission scenario, set the default start date and duration (in weeks) for each operational phase (phases 0-5).

1. Click on the date in the Start Date column (step A in Figure 10).
2. A calendar will appear.
3. Click on the right/left arrows to move forward or backward a month. Or click on the month name (step B in Figure 10).
4. A month and year view will appear.
5. Select a start month from the list on the left (step C in Figure 10).
6. Select a start year from the list on the right (step D in Figure 10).
    1. Fiscal Years start in October and end in September.
    2. Example 1: FY14 runs October 2013 through September 2014.
    3. Example 2: If planning for a start date in December of FY20, you would select December and year 2019.
7. Click "OK" (step E in Figure 10).
8. You will be returned to the calendar view. Click on a Sunday (last column on the right) for the start date of the scenario (step F in Figure 11).
    4. If you click on any other weekday, the tool will automatically select the previous Sunday of your selected date.
9. The start date and FY will be updated in the table (step G in Figure 11).
10. For each phase, enter the number of weeks the phase will last. Use the Tab key to move to the next phase duration value/cell.

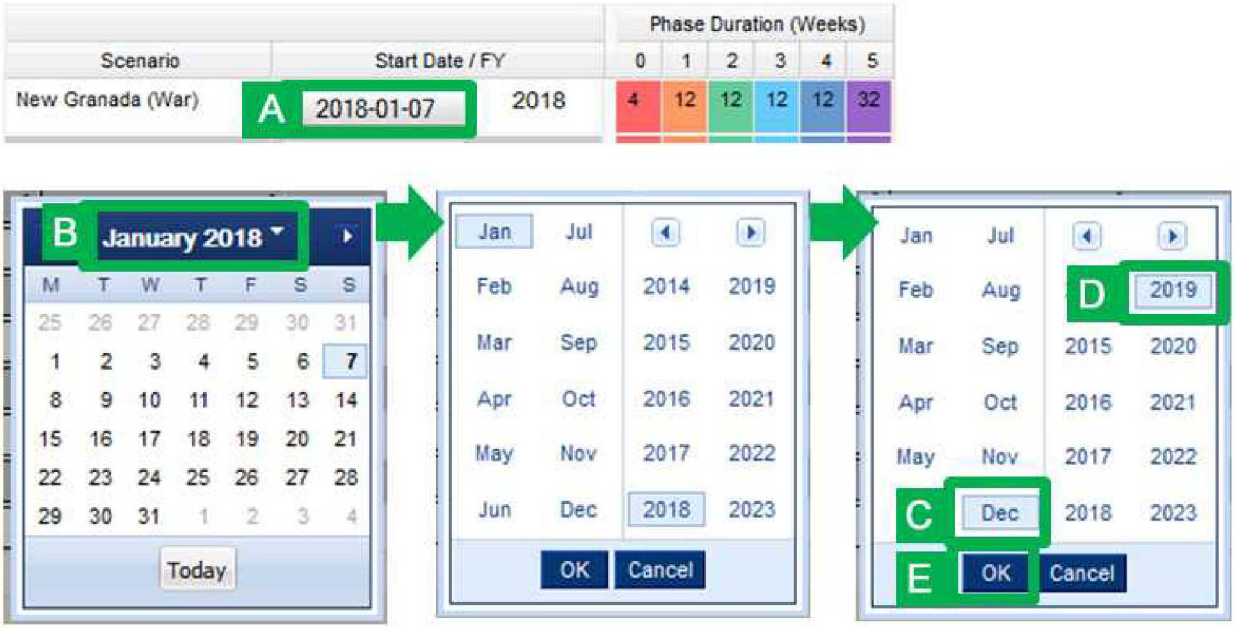

Figure 10. Selecting the month and year for a start date.

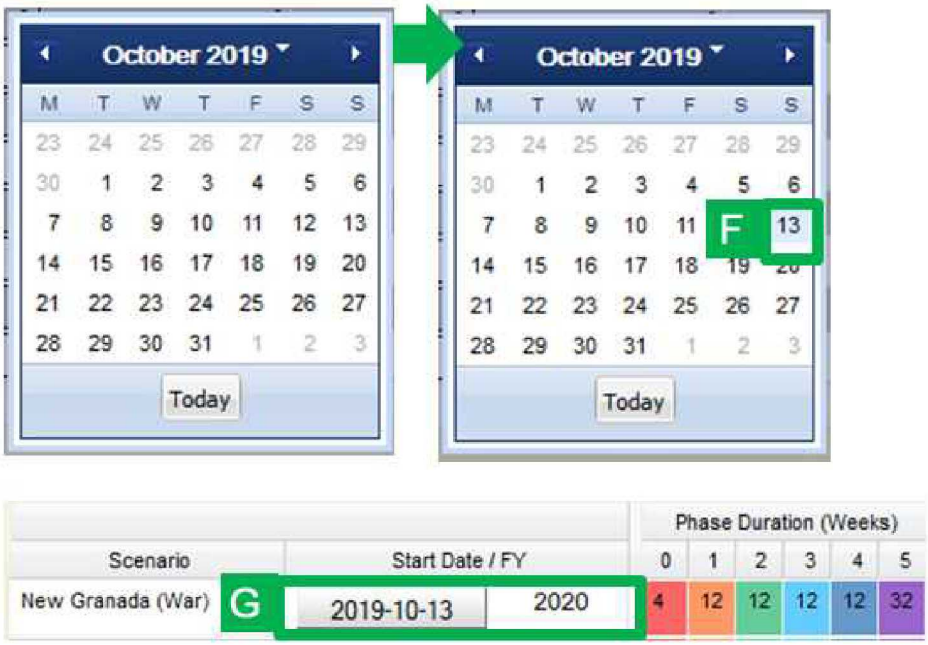

Figure 11. Selecting the day for a start date.

Page: Policies & Guidance
On this page, you will enter policies (as needed) for each base of a mission scenario. The table shows which policies have been applied to each base. The table displays which personnel groups can (Yes/green) or cannot (No/red) be used according to the policy. The row shown next to the base name shows the combined effect of the policies applied to the base.

Page: Risk in Using Non-Military Personnel
On this page, you will enter the level of risk in using non-military personnel at each base of a mission scenario.

Page: Finish
You have now completed reviewing and setting the default values. Revisit any pages by clicking on the page tabs at the top of the screen.

- You can complete this process later by selecting "Save as draft & Quit".
- If you are ready to complete this planning baseline, select the "Complete – Make this baseline available to Analysts" button. (See **Error! Reference source not found.** for more on the differences between Draft and Public modes.)
- Setting the planning baseline to complete means:
    - The baseline title cannot be changed.
    - Mission scenarios cannot be removed.
    - Additional mission scenarios can still be added, but their policies cannot be modified.
    - 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.

2.4. Creating a New Mission Scenario

This section presents a high-level overview of creating a new mission scenario (Figure 12). In this engineering prototype, you must create a new mission scenario in one session. You cannot quit and return to finish later.

Checklist: Before You Begin

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

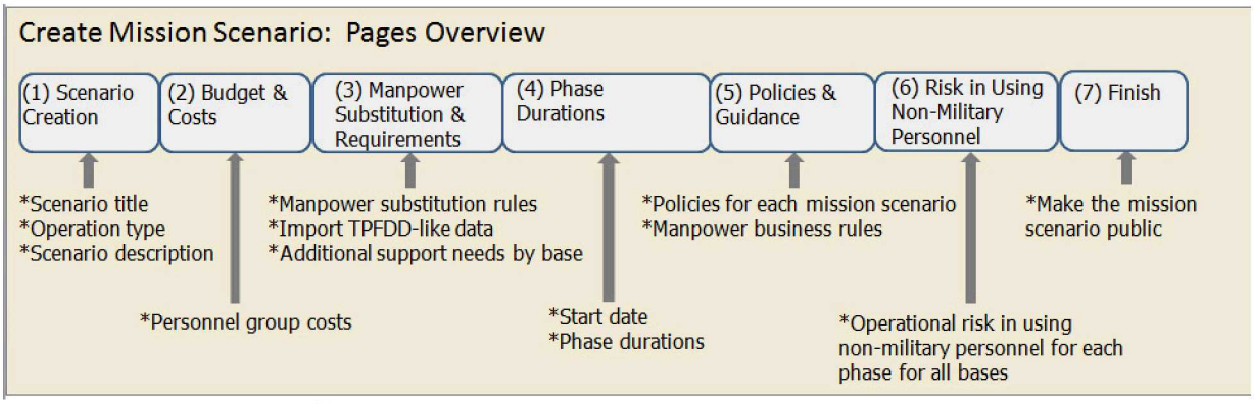

Figure 12. Page tabs when creating a new mission scenario.

First, select an existing planning baseline or create a new planning baseline before creating a new mission scenario.

Page: Mission Scenario
This page allows you to add, remove and create mission scenarios.

1. Click the "Add Mission Scenario" button (step A in Figure 13).
2. Click the "Create New Scenario" button (step B in Figure 14).

Figure 13. Creating a new mission scenario for a planning baseline.

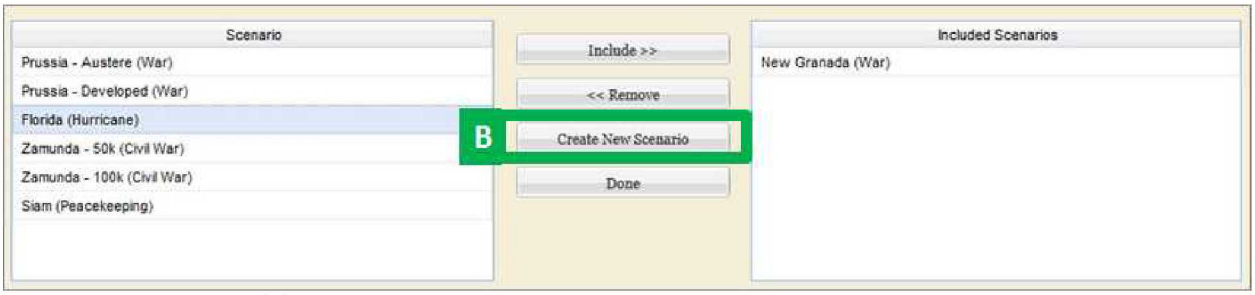

Figure 14. . How to add mission scenarios to the planning baseline.

Page: Scenario Creation
On this page, you will enter descriptive information about the new mission scenario.

Page: Budget & Costs
On this page, you will set the annual costs for Local Nation and Third Country National contractors.

Page: Manpower Substitutions & Requirements
On this page, you will set the manpower substitution rules, enter the manpower requirements for the scenario (via time-phased force and deployment data (TPFDD) or manual entry), and add additional support needs to the pre-existing manpower requirements.

Importing a TPFDD or TPFDD-like Data Set

1. Click "Browse" (step A in Figure 15).
2. In the file browser, locate the TPFDD. It must be an Excel file (xls or xlsx). Select the TPFDD and click "OK" or "Open".
3. Click "Import" (step B in Figure 15).

Figure 15. Importing a TPFDD.

4. In the *TPFDD Import* window, all tabs (or worksheets) found in the Excel file will be listed in the dropdown menu. Select the tab that contains the TPFDD data (step C in Figure 16). Click "Select" when finished.

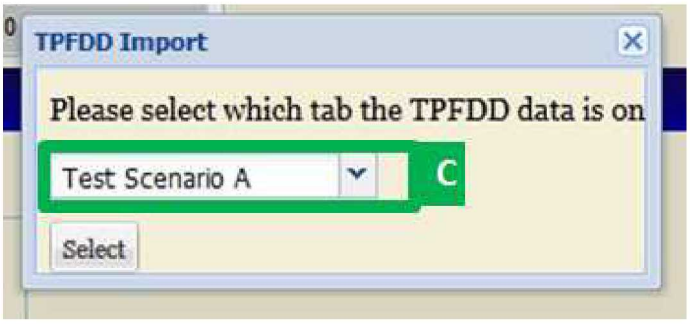

Figure 16 Selecting TPFDD data.

5. All column names from the Excel tab will be listed in the dropdown menus. Select which column names map to the needed data types (step 4 in Figure 17). Click "OK" when finished.

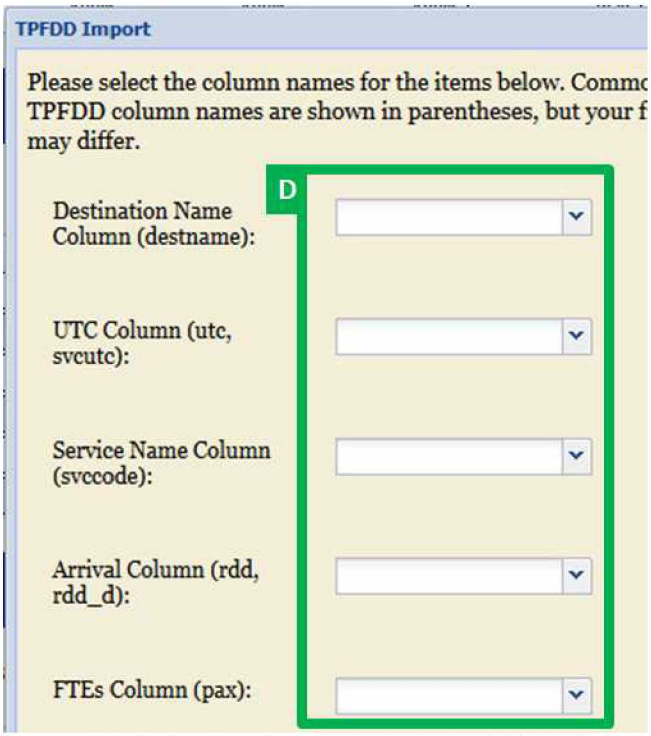

Figure 17. Select column names for TPFDD data.

Common TPFDD column names are listed in Table 2 as an aid. Your TPFDD may use different column names.

Table 2. Common TPFDD column names.

Destination name (base name):	*destname*
UTC (excluding the service code):	*utc, svcutc*
Service Name (single letter representing the service):	*svccode*
Arrival (date of arrival):	*rdd, rdd_d*
Bodies (number of people in unit):	*pax*

6. Numbers should appear in the table.
7. The tool will organize the TPFDD data by the destination name column. If no value is listed in the destination column, then these rows will be grouped together with a blank base name. The unit type codes (UTCs) will further be mapped to joint capability areas (JCAs) and operational phases (operational phases breakdown only shown in Additional Support Needs table).

Manual Entry of a TPFDD or TPFDD-like Data Set
You can also manually enter the TPFDD or TPFDD-like data related to this mission scenario. The TPFDD provides the manpower requirements for each capability by phase.

1. Click "Manually Enter Requirements".
2. Enter a base name, and click "Create".
3. The base name will appear in the dropdown menu above the manpower requirements table.
4. Enter the manpower requirements (in FTEs) for each JCA for each phase.
5. Add additional bases as needed.
6. To remove a base, select the base name in the dropdown menu. Click "Remove selected base".
7. Click "Done" when completed. NOTE: Once "Done" is clicked, the added bases cannot be removed or modified.
8. The bases will appear in manpower requirements table on the main page. Only the sum total of the JCAs will appear.

Adding Additional Support Needs
Below the TPFDD import table, there will be an Additional Support Needs table. This table allows for the addition of additional support requirements (in FTEs) by base.

1. Select a base from the dropdown menu. Bases from all mission scenarios added will be listed.
2. The first row is the support planning factors (additional FTE needs or percent "plus up"). Enter the percent additional support needed for each capability. Use the Tab key to move to the next cell.
3. Additional support is calculated as shown in Figure 18.
    a. The force requirements by capability (JCA) are taken from the Manpower Requirements table.
    b. The calculated additional support needed values are shown by phase in the table below the planning factors row.

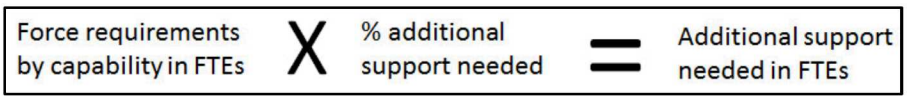

Figure 18. Equation for calculating additional support needs.

Page: Phase Durations
CCOT-P will convert the phase durations (in days) from the previous page to phase durations in weeks. If you do not like how CCOT-P converted the phase durations, you can modify the phase durations in weeks here.

Conversion rules:
Phase durations less than 7 days are set to 0.
Phase durations of 7-13 days are set to 1.
The "rounding" value for all other phase durations is 7. For example:

- A phase of 10 days will be converted to 1 week (10/7 = 1 remainder 3, where 3 < 7).
- A phase of 50 days will be converted to 7 weeks (50/7 = 7 remainder 1, where 1 < 7).

Page: Policies & Guidance
On this page, you will enter policies (as needed) for each base of a mission scenario. The table shows which policies have been applied to each base. For each policy, the table provides a visual representation by displaying which personnel groups can (Yes/green) or cannot (No/red) be used according to the policy. The row shown next to the base name shows the combined effect of the policies applied to the base.

Page: Risk in Using Non-Military Personnel
On this page, you will enter the level of risk in using non-military personnel at each base of a mission scenario.

Page: Finish
You have completed reviewing and setting the default values. Revisit any pages by clicking on the page tab at the top of the screen. In this engineering prototype, you must create a new mission scenario in one session. You cannot quit and return to finish later. If you do not click "Complete" during this session, the new scenario will not be created.

When you are ready to complete this mission scenario, click the "Complete: make this mission scenario available to analysts" button.

Keep in mind that setting a mission scenario to complete means:

8. The mission scenario's title, description, and TPFDD/manpower requirements data cannot be changed.
9. All other values remain modifiable.
10. 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.

When should you reuse an existing mission scenario versus create a new one? See Figure 19 on the next page to understand the differences.

Create New Mission Scenario .....Versus..... **Add Existing Mission Scenario**

Mission scenario set to DRAFT mode

1) Scenario Creation
- Assign a title
- Select an operation type
- Assign description

2) Budget & Costs
- Set default annual costs for Local National and Third-Country National Contractors

3) Manpower Substitution & Requirements
- Set default phase durations (in days) from the Level 2 Base Plan
- Import TPFDD-like data for manpower requirements
- Assign additional support needs by base
- Set default manpower substitution rules for Local National and Third-Country National Contractors

4) Phase Durations
- Set the default phase durations

5) Policies & Guidance
- Assign policies to each base

6) Risk in Using Non-Military Personnel
- Set default risk in using non-military personnel for each phase of all bases

7) Finish
- Mark **mission scenario** as complete (*sets mission scenario to Public mode*)

Mission scenario set to DRAFT mode

Scenario Creation
- ~~Assign a title~~*
- ~~Select an operation type~~*
- ~~Assign description~~*

1) Budget & Costs
- Set default annual costs for Local National and Third-Country National Contractors

2) Manpower Substitutions & Requirements
- ~~Set default phase durations (in days) from the Level 2 Base Plan~~*
- ~~Import TPFDD-like data for manpower requirements~~*
- Assign additional support needs by base
- Set default manpower substitution rules for Local National and Third-Country National Contractors

3) Manpower Availability & Phase Durations
- Set the default phase durations

4) Policies & Guidance
- Assign policies to each base

5) Risk in Using Non-Military Personnel
- Set default risk in using non-military personnel for each phase of all bases

6) Finish
- Mark **mission scenario** as complete (*sets mission scenario to Public mode*)

* Redlined parameters cannot be modified in existing mission scenarios.

Figure 19. Differences between creating a new mission scenario and adding/reusing an existing mission scenario.

3. 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.

There are two types of analyses that can be performed. First, the analyst can perform planning limited to scenarios within a COCOM or service. Second, the analyst can perform an integrated, centralized analysis using scenarios across all COCOMs and services.

3.1. Analyses Manager

The analyses manager is the home page for the analyst. Here you can create new analyses 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" (see Figure 20). Each analysis has a unique Analysis ID (first column) to simplify locating and referencing analyses.

- Expand a planning baseline to view its analyses.
- Expand an analysis to view its branches.

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.

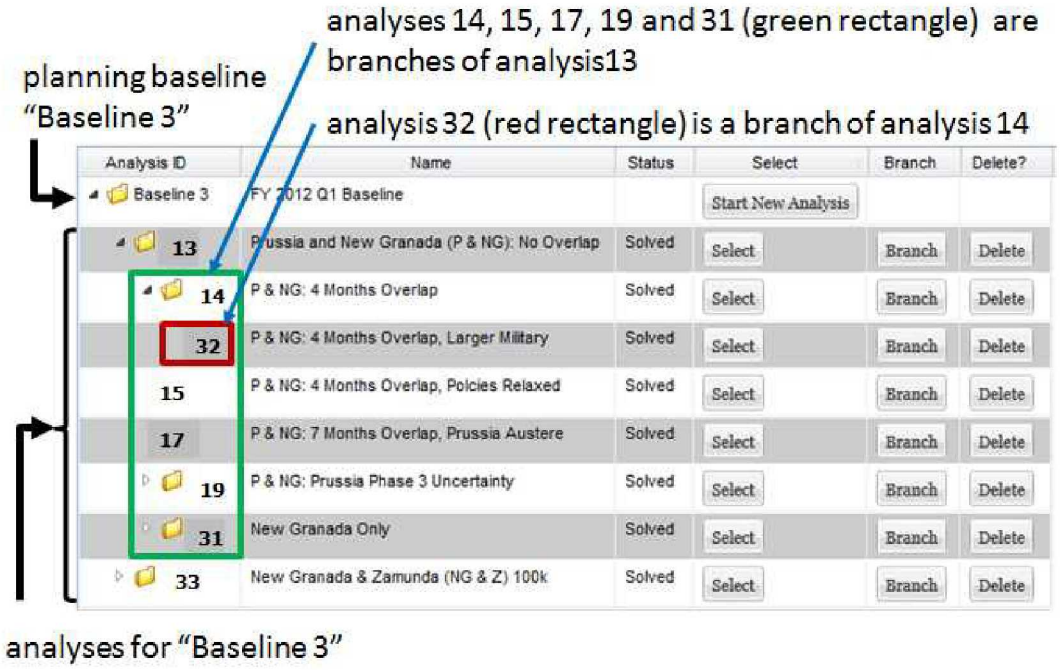

Figure 20. Overview of the Analyses Manager.

3.2. Analyses

3.2.1. Analysis Overview

An analysis has three main sections, as shown in Figure 21.

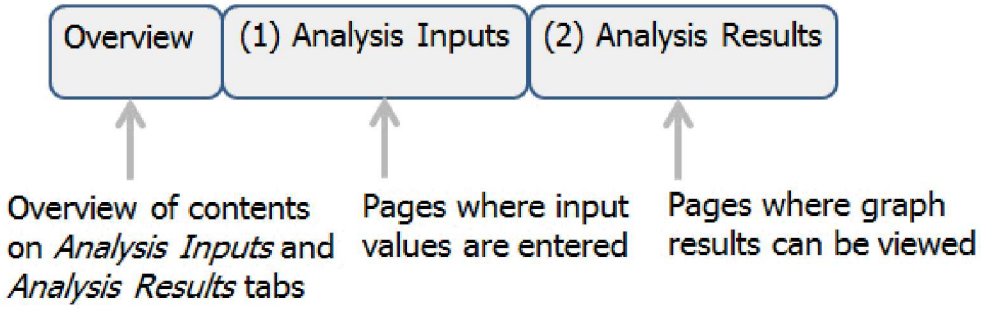

Figure 21. Main pages for an analysis.

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. It contains six sub-pages, which can be seen in Figure 23 in section 3.3. Starting a New Analysis or Branching a New Analysis.

Analysis Results – The Analysis Results page contains all of the graph results (see Figure 28). These results can only be viewed when the analysis is solved. Otherwise, this page appears blank. The graphs are described later in this section.

3.2.2. Two Types of Analyses

Whether starting a new analysis or branching off an existing one, select a type of analysis.

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.

A longer discussion can be found in User Manual [1] section 3.2.6. Analysis Results for Uncertainty of Phases 3-5 Durations.

3.3. Starting a New Analysis or Branching a New Analysis

This section presents a high-level overview of starting and branching an analysis.

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.

Select a baseline.
Click the "Start New Analysis" button. (step A in Figure 22)

…OR… Click the "Branch" button next to the analysis you would like to copy. (step B in Figure 22)

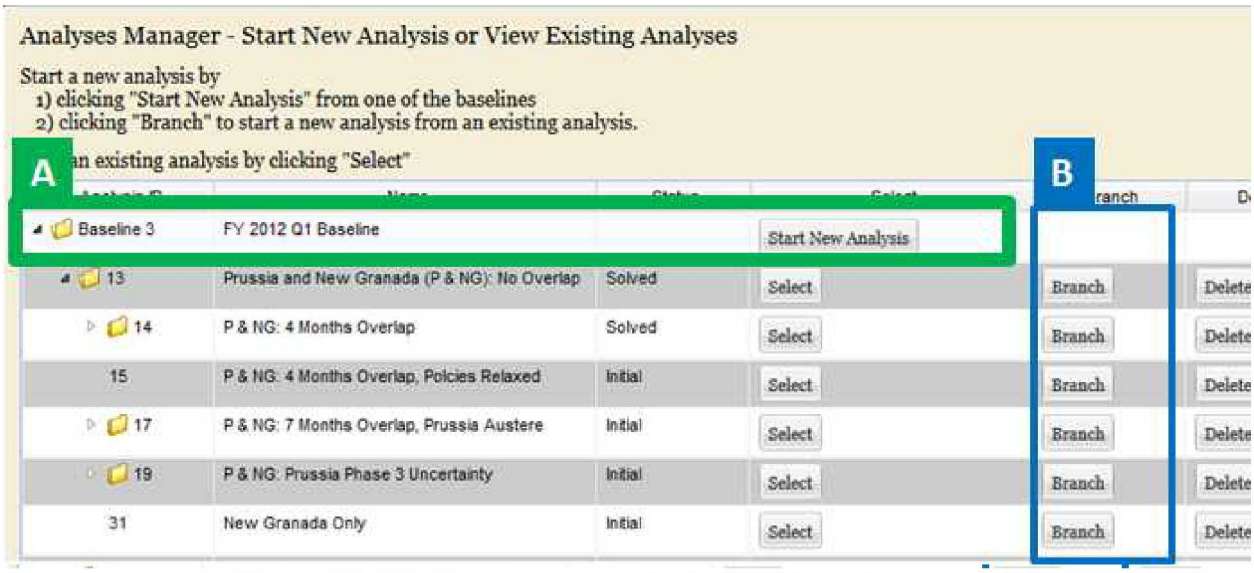

Figure 22. Starting a new analysis from baseline values.

Go to the *Analysis Inputs* tab (step C in Figure 23) to enter input values for the analysis.

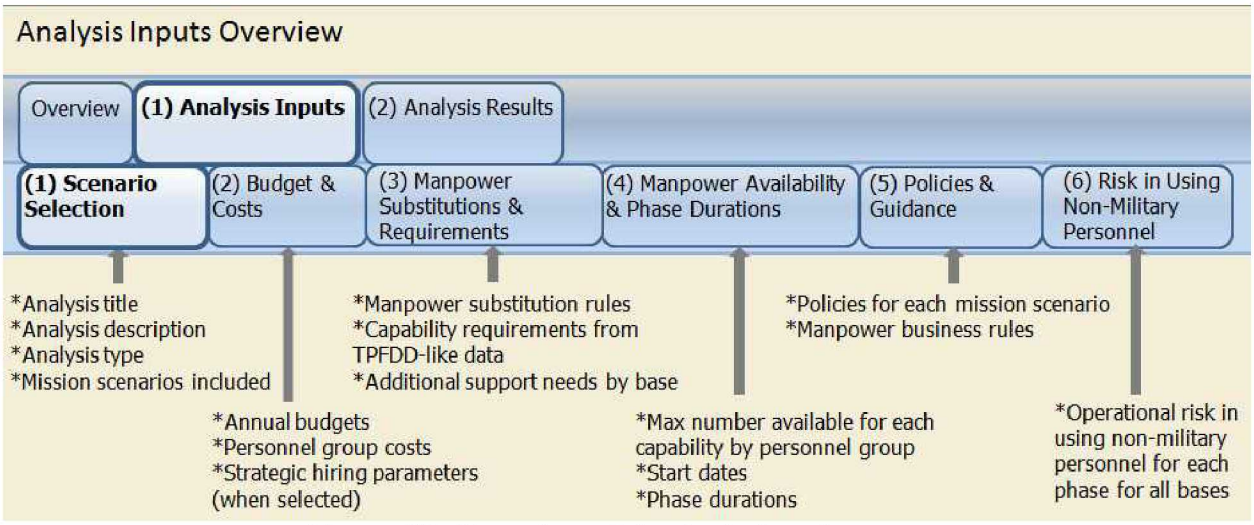

Figure 23. Overview of Analysis Inputs pages.

Page: Scenario Selections

On this page, you will enter descriptive information about your analysis. This will help you and other analysts understand the purpose of this analysis.

Page: Budget & Cost

On this page, you will set budget constraints and annual costs for Local Nation and Third Country National contractors.

Page: Manpower Substitutions & Requirements

On this page, you will set the manpower substitution rules, view previously entered manpower requirements, and add additional support needs to the pre-existing manpower requirements.

The Additional Support Needs table will be at the bottom of the page. This table allows the addition of additional support requirements (in FTEs) by base.

4. Select a base from the dropdown menu. Bases from all mission scenarios added will be listed.
5. The first row is the support planning factors (additional FTE needs or percent "plus up"). Enter the percent additional support needed for each capability. Use the Tab key to move to the next cell.
6. Additional support is calculated as shown in Figure 24.
    - The force requirements by capability (JCA) are taken from the Manpower Requirements table.
    - The calculated additional support needed values are shown by phase in the table below the planning factors row.

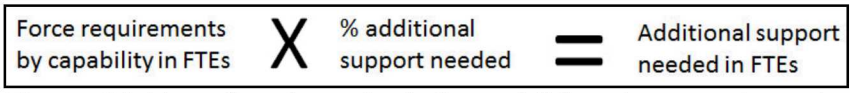

Figure 24. Equation for calculating additional support needs.

Page: Manpower Availability & Phase Durations
On this page, you will enter manpower availability limits for the personnel groups by capability. You will enter the phase start dates and durations for the mission scenarios.

By default, the tool assumes that there are no contractor limits. To include contractor limits, click the "Allow Contractor Limits" checkbox above the Manpower Availability table.

You will see links to two graphs under the Phase Durations table. These two graphs show you how mission overlap (or lack thereof) impacts resource requirements.

- NOTE: These graphs may be slow to load. Have patience.
- NOTE: If you make any changes to the Personnel Availability or Phase Durations, click "Save Changes" before opening a graph. This will ensure that your changes are reflected in the graphs.
- *Total Personnel Requirements by Scenario* – displays resource requirements over time by scenario.
- *Required vs. Available Personnel by Capability* – displays resource requirements for a selected capability against availability of military personnel.
- NOTE: Maximum availability of a personnel group can be modified in the first table on this page.

For each mission scenario, set the default start date and duration (in weeks) for each operational phase (phases 0-5).

1. Click on the date in the Start Date column (step A in Figure 25).
2. A calendar will appear.
3. Click on the right/left arrows to move forward or backward a month. Or click on the month name (step B in Figure 25).
4. A month and year view will appear.
5. Select a start month from the list on the left (step C in Figure 25).
6. Select a start year from the list on the right (step D in Figure 25).
    a. Fiscal Years start in October and end in September.
    b. Example 1: FY14 runs October 2013 through September 2014.
    c. Example 2: If planning for a start date in December of FY20, you would select December and year 2019.
7. Click "OK" (step E in Figure 25).
8. You will be returned to the calendar view. Click on a Sunday (last column on the right) for the start date of the scenario (step F in Figure 26).
    a. If you click on any other weekday, the tool will automatically select the previous Sunday of your selected date.
9. The start date and FY will be updated in the table (step G in Figure 26).
    a. For each phase, enter the number of weeks the phase will last. Use the Tab key to move to the next phase duration value/cell.

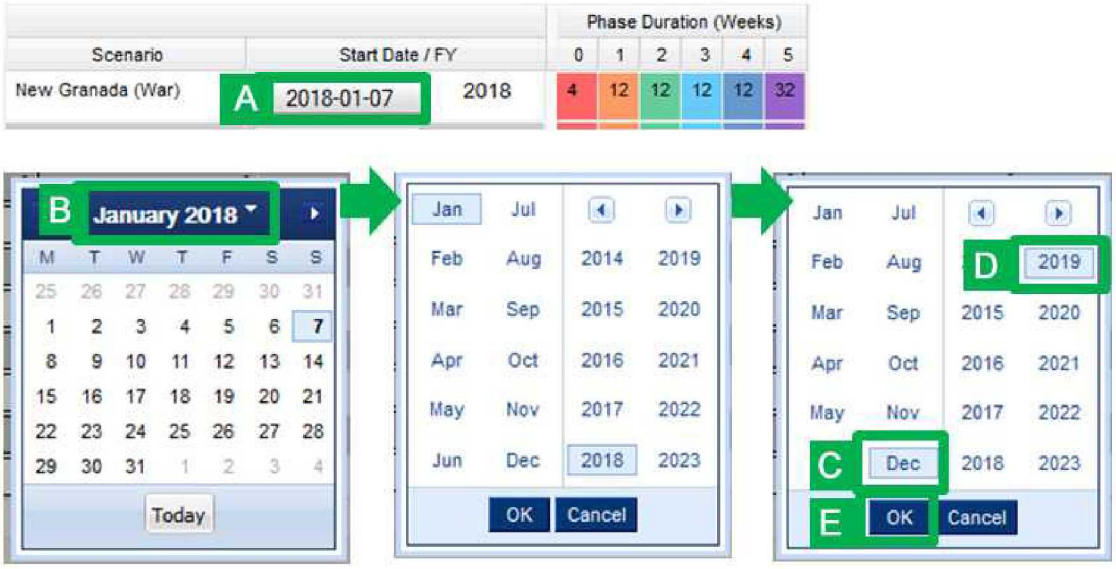

Figure 25. Selecting the month and year for a start date.

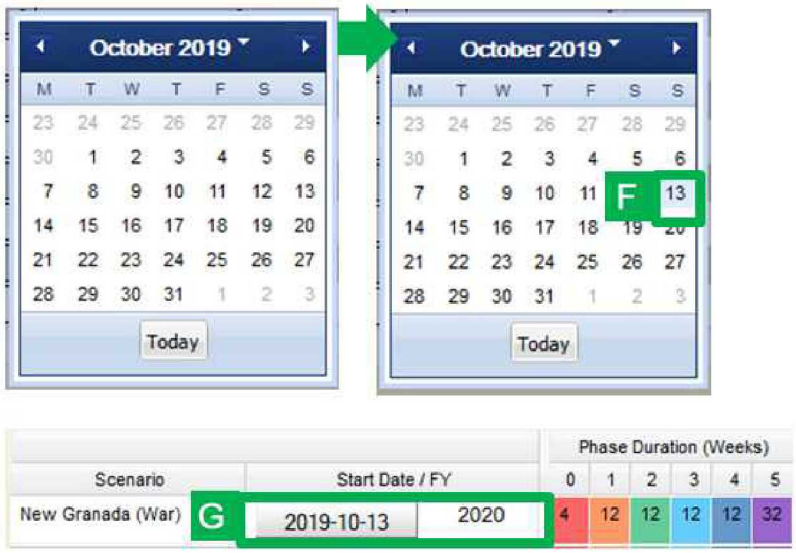

Figure 26. Selecting the day for a start date.

10. If you selected to create an analysis with uncertainty of phase durations:
    a. Select the start date as described in the previous step.
    b. Set the duration of phases 0-2 (in weeks).
    c. Set the minimum and maximum duration (in weeks) for phases 3, 4 and 5. It is okay if you want only one of the phases to have uncertainty. Set the min and max duration to the same number if you do not want uncertainty for one of the phases.
    d. NOTE: The tool uses a sampling technique optimized to handle uncertainty cases for two scenarios with a few months of uncertainty. Running more complex uncertainty cases is possible with the current configuration, but the results will be less accurate (see section The Optimization Model & Uncertainty in the User Manual [1]). If you need to run several uncertainty analyses for more than two

scenarios and/or several months of uncertainty, please contact the Administrator. Settings in the tool will need to be modified to handle the increased calculations.

Page: Policies & Guidance
On this page, you will enter policies (as needed) for each base of a mission scenario. The table shows which policies have been applied to each base. For each policy, the table provides a visual representation by displaying which personnel groups can (Yes/green) or cannot (No/red) be used according to the policy. The row shown next to the base name shows the combined effect of the policies applied to the base.

Page: Risk in Using Non-Military Personnel
On this page, you will enter the level of risk in using non-military personnel at each base of a mission scenario.

Page: Running the Analysis
If you are finished entering values for this analysis and do not need to make further changes, click "Continue: Run Analysis" to run the analysis.

- NOTE: *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.

Once the optimization model has completed computation, results will be available on the *Analysis Results* tab. Please see the next section

3.4. Viewing Results of an Existing Analysis for descriptions of the analysis results.

3.4. Viewing Results of an Existing Analysis

This section provides a high-level overview of accessing analyses to view their results. Descriptions of the graph results are also provided. Only solved analyses will have results. See User Manual [1] section 3 Analyst Activities for detailed instructions and explanations of analyses and their results.

Known Browser Issues

The tool should work in all browsers, but we do not recommend Internet Explorer (IE) 8. Testing has shown JavaScript issues in IE8, and this issue may occur in earlier versions of IE as well. When JavaScript takes too long to generate a graph, IE8 displays the error message, "Stop running this script?" If you receive this message in any browser while trying to view a graph, then that graph will probably never appear. This only affects graphs with "assignments" in their title.

(1) From the Analyses Manager, click the "Select" button of an analysis (step A in Figure 27). Only analyses with status *Solved* will have graph results.

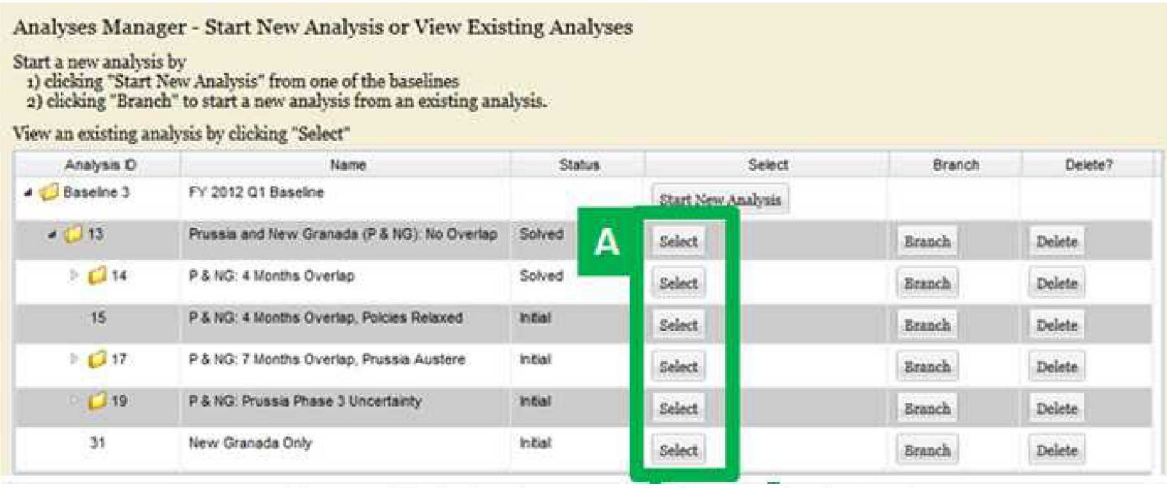

Figure 27. Selecting an existing analysis to view.

(2) Go to the *Analysis Results* tab (step B in Figure 28) to view the graph results for the analysis.

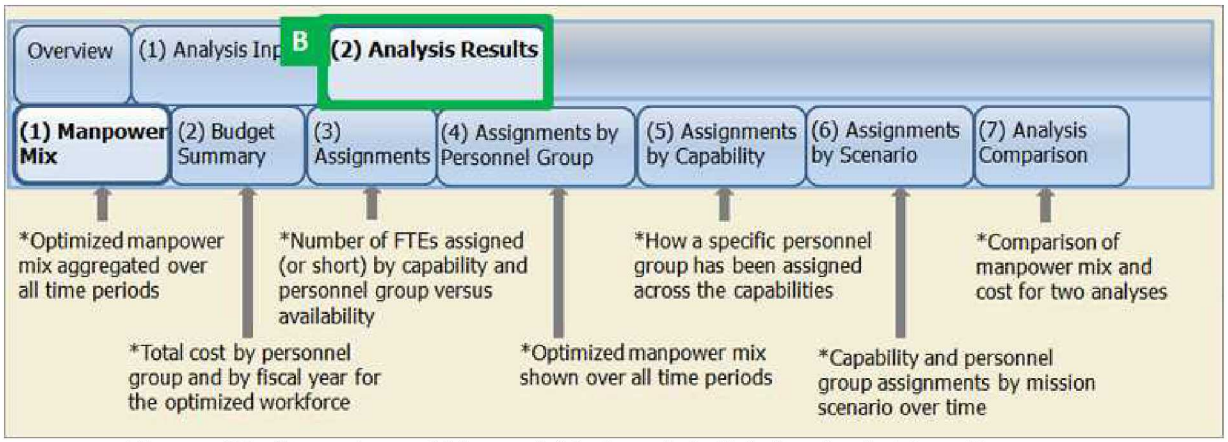

Figure 28. Overview of Normal (Deterministic) Analysis Results pages.

3.4.1. Normal Analysis Results

The following graph descriptions describe the graph results for normal (deterministic) analyses. All of the values displayed in the graphs are based on the optimization model's optimized workforce mix. Except for Manpower Mix and Model Run Comparison, all of these graphs are displayed on a timeline.

(1) Manpower Mix

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.

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.

(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.

Assignments are displayed as the number of FTEs from a specific personnel group used to perform a specific capability. The personnel group and capability (Joint Capability Area) must be selected from the dropdown menus.

Availability is shown as a capacity line – the maximum number of personnel available in FTEs with that capability. The capacity line value is set on Model Inputs sub-tab *Manpower Availability & Phase Durations*. Contractors do not have a capacity line (maximum availability) since they are assumed to be an unlimited resource.

Overages are displayed as the number of additional FTEs for the selected personnel group and capability that would be required to accomplish the requested workload. When there are insufficient resources to accomplish workload the model will identify the cheapest resource pool that could be used to fulfill the unsatisfied demand.

(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. 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.

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

Uncertainty runs: Expected values will be displayed.

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

(7) Model Run Comparison
This graph allows you to compare the manpower mix and the use cost of two model runs. The manpower mix pie charts are shown side-by-side. The use costs (broken down by personnel groups) are displayed in a table. 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.

The graphs can further be filtered by capability and by mission scenario.

3.4.2. Uncertainty Analysis Results
This section describes the graph results for uncertainty analyses (Figure 29). The following graph descriptions describe the graph results for uncertainty analyses for operational phases 3, 4 and 5. More detailed results discussions are described in User Manual [1] section 3.2.6 Analysis Results for Uncertainty of Phases 3-5 Durations.

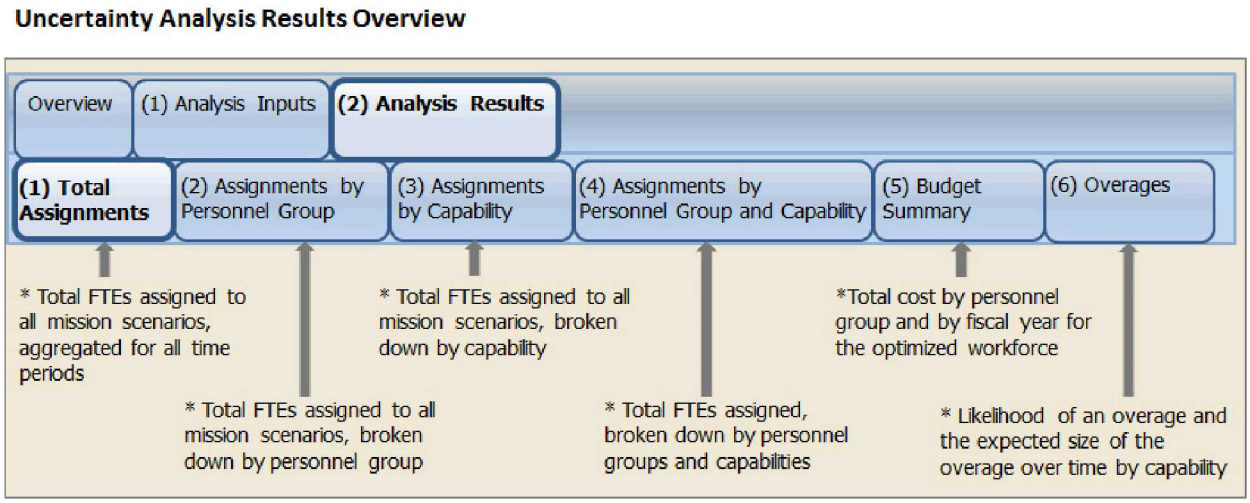

Figure 29. Overview of Uncertainty Analysis Results pages.

(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.

Consider a case where the 25th, 50th, and 75th percentiles for a given week are 5,000, 10,000 and 11,000 personnel. This implies that given the uncertainties around mission scenario durations, there is only a 25% chance that fewer than 5,000 personnel will be required. The same idea is true for the 50th and 75th percentiles. A detailed description of percentiles is provided in the User Manual [1].

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.

In the previous example, the 50th and 75th percentiles only differed by 1,000 personnel. This indicates that 25% of the time the demand will be between 10,000 and 11,000 personnel and that there is only a 25% chance of requiring more than 11,000 personnel. These results can be used to identify cases where normal (determinist) analysis should be conducted to understand impacts of specific mission scenario durations.

(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. The personnel group must be selected from the dropdown menu.

(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. The capability must be selected from the dropdown menu.

(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. The personnel group and capability must be selected from the dropdown menus.

(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. A detailed description of the expected value is provided later in this section.

The line graph shows the 25th, 50th and 75th total cost percentiles. These results show how the uncertainty around assignments impacts the total cost. These results can be interpreted in the same manner as the prior four assignments' results (first four tabs).

(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).

Overages may occur because of budget or resource pool size limitations. The likelihood of an overage helps quantify the risk that the mission cannot be accomplished due to resource limitations. The average size of the overage gives an indication of the scale of additional resources that would be required to satisfy the mission needs.

When analyzing overages, it is important to consider two factors. First, only the average value of the overage is shown. Consider a situation where one case has an overage of 500 personnel and a second case has an overage of 1,000 personnel. In this situation the average overage would be 750 personnel. However, this does not imply that 750 additional resources should be acquired. One strategy might be to acquire 500 additional personnel to guard against one of the scenarios but not the other. Another strategy might be to acquire 1,000 personnel to guard against both scenarios. Second, it is important to understand which personnel groups can be assigned to the overage. Hiring more contractors would not be useful if the overage occurs for military only activities.

4. ADMINISTRATOR ACTIVITIES

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. The administrator also helps to maintain CCOT-P and to manage user access to the planning tool.

4.1. Login Roles

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

When the user accesses the tool URL, the system will authenticate their CAC credentials. Next, the tool will prompt the user for their CCOT-P username and password to grant access to the tool.

4.1.1. Adding New Users to Tomcat File

1. Contact the system administrator to add a new user to the tool.
2. The system administrator will need to add the new user's username and password to the *tomcat-users.xml* file (usually located in Tomcat's */conf/* directory).
3. The system administrator will need to restart Tomcat/the application after the new user is added.
4. The tool administrator must next complete the steps in section 4.1.2.

4.1.2. Adding New Users

1. First, complete the instructions in section 4.1.1.
2. Login to CCOT-P as administrator.
3. Go to 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. A row for the new user will appear at the bottom of the table.
7. Enter the person's user name.
8. Assign roles to the user by clicking the appropriate checkboxes.
9. Click "Save Changes".
10. The new user will now have access to the tool.

4.1.3. Deleting Users

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".

1. Login to CCOT-P.
2. Go to Login Roles tab.
3. This table displays all active users for the tool and the roles to which they are assigned.
4. Click the "Delete" button next to the user name.
5. Click "Save Changes".

6. To view all deleted accounts, click on “Include deleted login roles”.

4.1.4. Reactivating Accounts for Deleted Users

1. Login to CCOT-P.
2. Go to Login Roles tab.
3. Click on “Include deleted login roles”.
4. Find the account to be reactivated.
5. Click “Un-Delete” next to the account name.
6. Click “Save Changes”.
7. The “Un-Delete” button will change to “Delete” when the account is activated.

4.2. Preset Baseline Values

There is only one screen for the Administrator: Preset Baseline Values. The preset baseline values are values that should remain constant across all planning baselines and mission scenarios. They can only be modified by the administrator. These values include:

- Annual costs of all personnel groups
- Manpower substitution rules for all non-military personnel groups
- Manpower business rules
- Model parameter: overuse penalty

New planning baselines 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.

4.2.1. Modifying Annual Costs

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

1. Login to CCOT-P.
2. The Annual Cost is the first table.
3. Locate the personnel group across the top of the table.
4. Click in the cell below, which will activate editing.
5. Delete the old value.
6. Enter a new value.
7. Click “Save Changes”.

4.2.2. Modifying Manpower Substitution Rules

This table shows the manpower substitution rules for all personnel groups. Only non-military groups are modifiable. The Planning Manager will be able to modify the rules for 3rd-Country and Local Nation Contractors in planning baselines. 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).

1. Login to CCOT-P.
2. The Manpower Substitution Rules is the second table.
3. Locate the personnel group across the top of the table.
4. Click in the cell below, which will activate editing.
5. Delete the old value.
6. Enter a new value.
7. Click “Save Changes”.

4.2.3. Modifying Manpower Business Rules

Derived from DODI 1100.22, this table shows whether each personnel group is allowed to perform each capability. These values can only be modified by the Administrator.

1. Login to CCOT-P.
2. The Manpower Business Rules is the third table.
3. Locate the personnel group across the top of the table.
4. Locate the capability along the left side of the table.
5. Click on the dropdown menu arrow and keep the mouse button pressed.
6. Drag the cursor to select “Yes” or “No” from the dropdown menu in the corresponding cell.
7. Click “Save Changes”.

4.2.4. Tool Clean Up

It is recommended to clean up the database every 6 months. The time it takes this function to run depends on the number of analyses that have been flagged for deletion. For example, cleaning up (permanently deleting) 80 analyses from the database can take 10+ minutes.

When an Analyst deletes an 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 permanently delete the flagged analyses (and thus clean up the database):

1. Login to CCOT-P.
2. Tool Clean Up is the fouth section on the page.
3. Click the “Permanently delete flagged analyses”.

REFERENCES

[1] A. Bandlow, K. L. Adair, T. R. Brounstein, J. D. Durfee, J. L. Gearhart, K. A. Jones, N. Martin and L. K. Nozick, "Contingency Contractor Optimization Phase 3, User Manual," Sandia National Laboratories, Albuquerque, 2013.

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

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


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