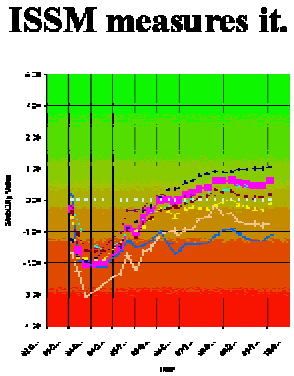
Operations Other Than War (MOOTW)
Flexible Asymmetric Simulation Technologies (FAST)
Prototype Toolbox:
ISSM v4.00 Users' Guide



OOTW FAST Prototype Toolbox Refinement

Contract Number:
N61339-06-C-0040

Prepared for:
NAVAIR Orlando TSD PJM
12350 Research Pkwy.
Orlando, FL 32826-3275

Prepared by:
Dynamics Research Corporation
3505 Lake Lynda Drive
Suite 100
Orlando, FL 32817

15 December 2006

OOTW FAST Prototype Toolbox:
ISSM v4.00 Users' Guide

Authored by:
Dean S. Hartley III

Prepared by:
Dynamics Research Corporation
3505 Lake Lynda Drive
Suite 100
Orlando, Florida 32817
POC: Wayne Randolph

Sponsored by:
Defense Modeling and Simulation Office
1901 N. Beauregard St.
Suite 504
Alexandria, VA 22311

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. BACKGROUND

This document provides a guide to the operation of the Interim Semi-static Stability Model and its pre- and post-processors. A separate document, the ISSM Analysts' Guide, describes the underlying logic of the model and how to customize the logic in the pre- and post-processors. The ISSM is still in the prototype stage. Any errors should be reported to Dean Hartley, DSHartley3@comcast.net.

The user must have a valid copy of Microsoft Excel™ (version 97 or later) installed on his computer. The ISSM is implemented as a spreadsheet model in Excel.

1.1 PURPOSE

The ISSM is

- a political, military, economic, societal, information, & infrastructure (PMESII) model
- that supports measuring, tracking, projecting and understanding the status of Diplomatic, Information, Military, and Economic (DIME) interventions
- in any phase of conflict and throughout the transitions of the phases (see Table 1-1 below).

The ISSM supports the tracking of DIME/PMESII variables by plotting their values over time. Figure 1-1 displays the plot of the major PMESII output variables. The annotations are not produced by the ISSM, but are added to correlate the tracks with external events.

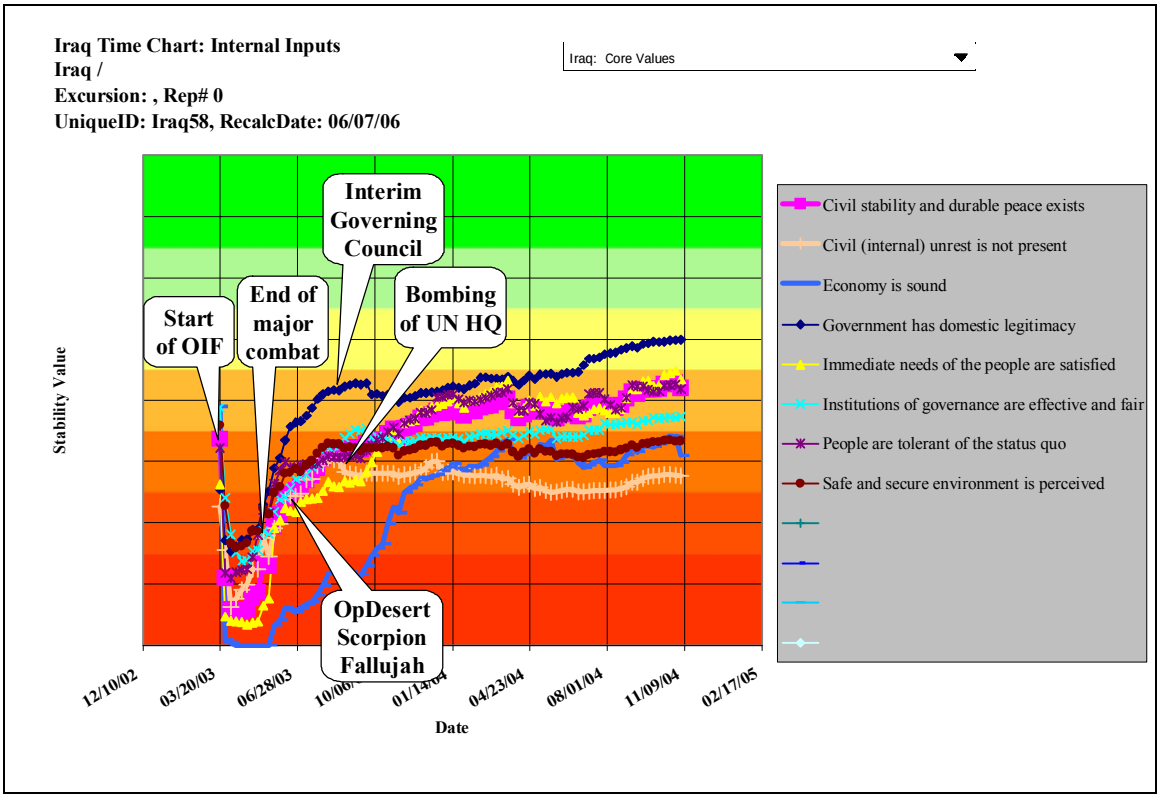


Figure 1-1. Plotting variables over time

Table 1-1 shows the military phases and the ways that the ISSM can be used in each phase while tracking a real-world situation or a simulated situation (for analysis).

Table 1-1. Military Phases and ISSM Uses

Phase #	0	1	2	3	4	5
Name	Shape	Deter	Seize the Initiative	Dominate	Stabilize	Enable Civil Authority
Real-World	Track situation	Monitor situation	Monitor situation	Monitor situation	Track situation	Track situation
	Evaluate strategic shaping	Evaluate operational shaping			Evaluate tactical options	Evaluate tactical options
	Evaluate need for intervention	Support planning for phases 2-5	Support planning for phases 3-5	Support planning for phases 4&5	Support replanning intervention	Support replanning intervention & evaluate ending intervention
Simula-tion	Contingency planning	Support planning for phases 2-5	Support planning for phases 3-5	Support planning for phases 4&5	Support planning for phase 5	

1.2 GENERAL DESCRIPTION

The acronym ISSM stands for Interim Semi-static Stability Model. The ISSM computes the inferred value of "**civil stability and durable peace,**" given the values of a set of factors within a single geopolitical area. If this inference is viewed in terms of the impact of PMESII factors, then it is an instantaneous impact. This is a static model, as opposed to a dynamic one, and it is a view of the situation looking from outside of it. To view the "next moment in time," the user must input a new set of values for the input factors.

The ISSM implements a model of the connections between

- Observables
    - Conflict indicators
    - Economic indicators
    - Local government indicators
    - Populace dislocation indicators
    - Basic needs indicators
    - Other, miscellaneous indicators

and

- Interventions
    - Basic needs
    - Populace displacement
    - Conflict
    - Security
    - Government
    - Physical infrastructure
    - Economy

- Miscellaneous
- Multipliers & Weights

to discover the

- Situation status
  - Effectiveness and fairness of government
  - Legitimacy of government
  - Economic status
  - Satisfaction of basic needs
  - Safety and security
  - Internal unrest
  - Popular tolerance of the status quo

  and finally the
  - Level of civil stability and peace

1.2.1 Past Versions

The earliest version, ISSM v1.6, recorded user PMESII inputs over time and displayed the results. Despite an explicit representation of time, the model is a static, not a dynamic, model.

Version 2.0 adopted external interventions: when a change is introduced into a situation, as in an intervention, there is a characteristic lag before any effect is seen and a time interval during which the effect grows to its maximum. These are dynamic attributes, hence the "**semi-static**" in the model name.

A Preprocessor and Postprocessor were added in version 2.0 of the ISSM. These extra workbooks allow the user to customize the inputs and the outputs of the ISSM.

Version 3.0 added a Controller to ensure that the versions and scenarios of the Preprocessor, Postprocessor and main ISSM are in synchrony. The main purpose of the Controller is to manage the naming and saving of the triplets of workbooks to ensure that the user can reconnect the proper triplets at some time in the future, not mixing the wrong workbooks together.

Version 4.0 added functionality to support automated upgrades. That is, a scenario built in Version 4.0 will support automatic transfer of its data and custom logic to a later version with minimal manual intervention. This functionality provides improved error-checking for the custom logic. Version 4.0 also integrates the DIAMOND custom logic and general custom logic, which had previously required two sets of versions under the umbrella of Version 3.0.

Version 4.0 is as a system of four Excel workbooks, as shown in Figure 1-2. Intervention data is entered directly into the ISSM Main; observation data may be entered directly into the ISSM Main or through the Preprocessor; and the output may be taken from the ISSM Main or the Postprocessor. The Controller is used to ensure coordination among the workbooks containing data for each scenario.

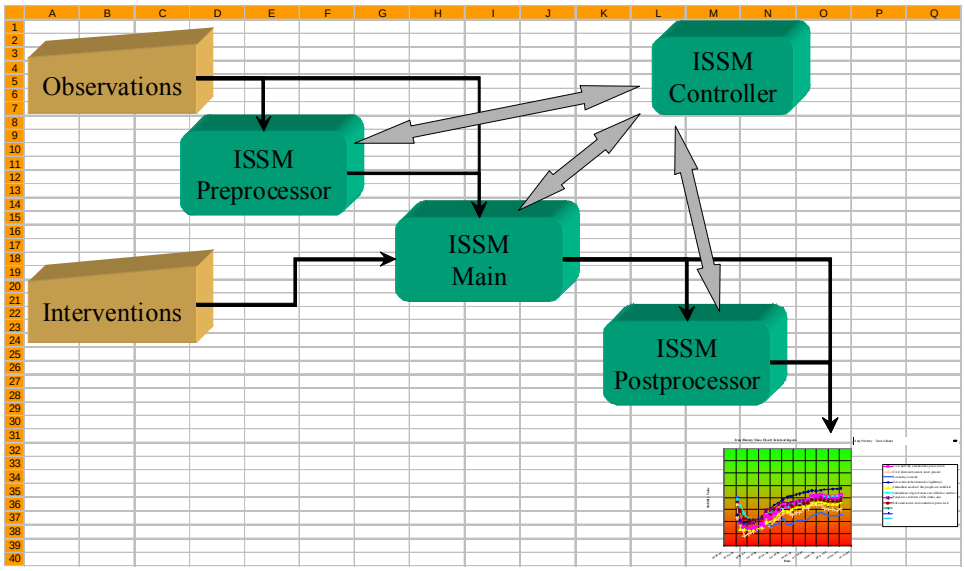


Figure 1-2. ISSM System

1.2.2 Current Versions

The current version of the ISSM system is 4.00; however, each of the workbooks that make up the system has its each version number, as shown in Table 1-2, below.

Table 1-2. Current Version Numbers

Workbook	Version	Date	File Name
Controller	4.00	7/20/06	ISSMControl4_00.xls
Preprocessor	4.01	6/30/06	Preprocessor4_01Blank.xls
ISSM Main	4.02	7/10/06	ISSM4_02Blank.xls
Postprocessor	4.01	6/30/06	Postprocessor4_01Blank.xls

1.2.3 Validity

The underlying model of the ISSM, like any other model, is an approximation. For example, the ISSM does not allow for any feedback loops. The assumption is that the results of feedback will be visible to the user and will affect subsequent sets of input data. Further, the connecting logic and mathematics, while plausible and derived from reasonable sources, have not been validated. Hence the "**interim**" in the model name. The structure is sufficiently flexible to permit ease of modification of the mathematical model as the situation warrants.

This model was inspired by the model described in *Doing Windows: Non-Traditional Military Responses to Complex Emergencies*, Bradd C. Hayes and Jeffrey I. Sands, CCRP, 1998. However, nodes have been added; some definitions have been changed; and some connections have been changed. In addition, the connecting logic, while similar, is not identical.

Since 2002 the FAST verification and validation (V&V) processes have been under way. These processes included V&V of the ISSM and have been documented.[1, 2]

1.2.4 Operating Modes

The ISSM may be used in two basic modes: real-world and simulated-world.

In the real-world mode, the user observes the state of the world, usually a single country or autonomous region, and any efforts to ameliorate the situation. The user records the date and the state data and intervention progress. Then the user waits a week or a month and repeats the observation and recording processes. The ISSM supports measuring, tracking, projecting and understanding the status of a real OOTW, phase 0 through phase 5.

In the simulated-world mode, the user observes the state of a simulated situation, periodically recording the simulated dates and reported data. The ISSM supports measuring, tracking, projecting and understanding the status of a simulation, where the status of PMESII situation is critical to understanding the situation.

A major problem of using the ISSM in the real-world mode is acquiring the needed data. In general, the user will have to create custom logic for each OOTW to convert the available data into the needed data. Unlike the real world, where needed data may exist but be unavailable, in a simulation, some data may not exist at all. If the simulation does not model some aspect of the world, for example, medical crisis and responses, it cannot provide any input to the ISSM on that aspect. The user may have to use multiple models or supplement the simulation with non-computer modeling. Like the real world, the data that the simulation does contain, may not be exactly what is needed; however, it may be used to infer what is needed. Hence, the user will need to have custom logic, not for each OOTW, but for each simulation program. That is, once custom logic has been created for a simulation, such as DIAMOND, it does not need to be re-created for each new situation.

1.3 OOTW NEEDS SPACE

The position of the Interim Semi-Static Stability Model (ISSM) in the OOTW needs space is shown in Figure 1-3, beginning in the Semi-Static Impact Evaluation position (upper right of the figure) and extending into the Situation Display area (center). The ISSM lies in the Impact Evaluation Application domain, but in the Non-Simulation direction, as opposed to DIAMOND and JCATS, which are simulations. The discussion below will show why it ranges from the Operations (Now) Time Frame all the way to the Analysis (Later) Time Frame. The ISSM is displayed as a relatively thin slice of the space because its applicability is currently limited. However, as also discussed below, enhancements are possible that would extend its range of applicability and as discussed above, use with a simulation can result in a larger combined coverage.

---

[1] Senko, Robert M, *Military Operations Other Than War (MOOTW): Flexible Asymmetric Simulation Technologies (FAST) Prototype Toolbox: Verification Strategy and Plan*, Dynamics Research Corporation, Vienna, VA, August 2005.

[2] Hartley, Dean S., III, *Military Operations Other Than War (MOOTW): Flexible Asymmetric Simulation Technologies (FAST) Prototype Toolbox: FY05 Validation Strategy and Plan*, Dynamics Research Corporation, Vienna, VA, December 2005.

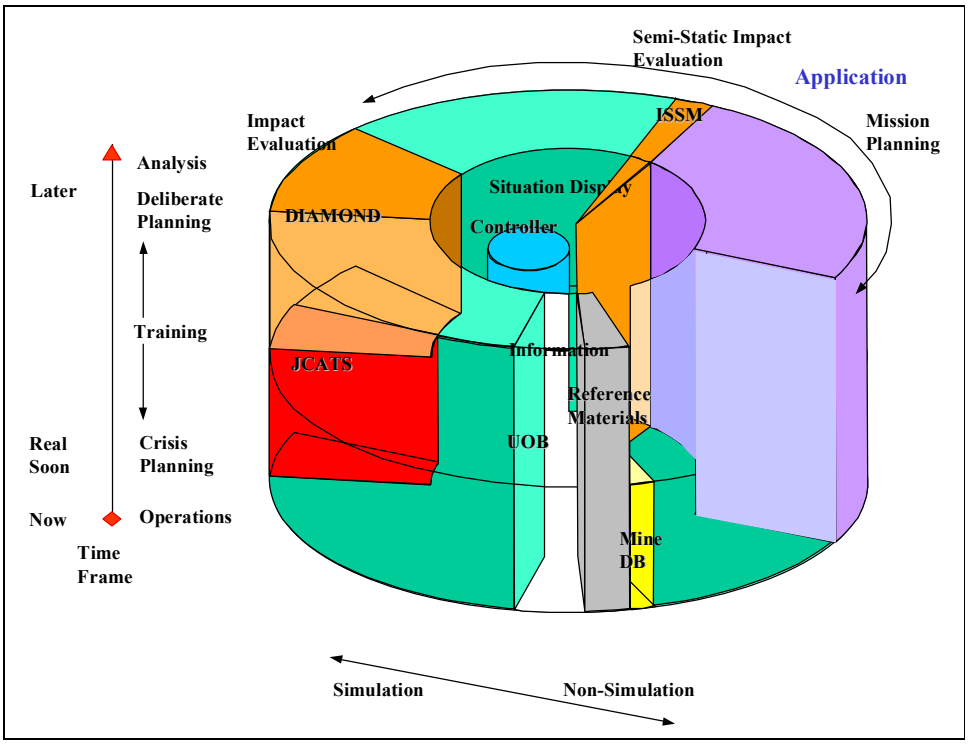


Figure 1-3. OOTW Needs Space

The ISSM provides an immediately useful tool at the higher end of the frequency of use spectrum, illustrated in Figure 1-4 (derived from a January 2003 MORS workshop on deploying quantitative support to the Combatant Commander).

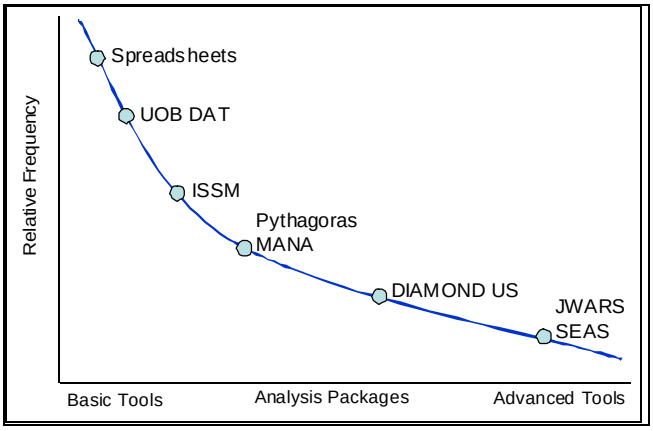


Figure 1-4. Use Frequency vs Tool Category

1.4 OVERVIEW OF THE MODEL

The ISSM is a logic model to make inferences about the status of a country or geographic or political region, given observations on specific variables. Version 1 gave an instantaneous snapshot based on 30 input variables. By retaining the snapshots over time, it supported a view of trends over time. Version 2 added a few new nodes and added external intervention variables. These external interventions have the property of producing results at times after their initiations, requiring new logic to introduce the time

delays and show the results at the appropriate times. Version 2 added a Preprocessor, a Postprocessor, and new graphs to support additional views of the data. Version 3 added a Controller. Version 4.0 has 34 input variables and 90 external intervention variables.

1.4.1 Central ISSM Model

The connections for the model are shown in the diagram below. Each sector (Conflict, Economy, Justice, Misc, Movement, Needs, and Core) has its own color, shown in the node outlines and in the connecting lines. Independent nodes (those with values defined by user inputs) have a blue fill. Nodes whose values are dependent on the values of other nodes are filled with the color for the sector.

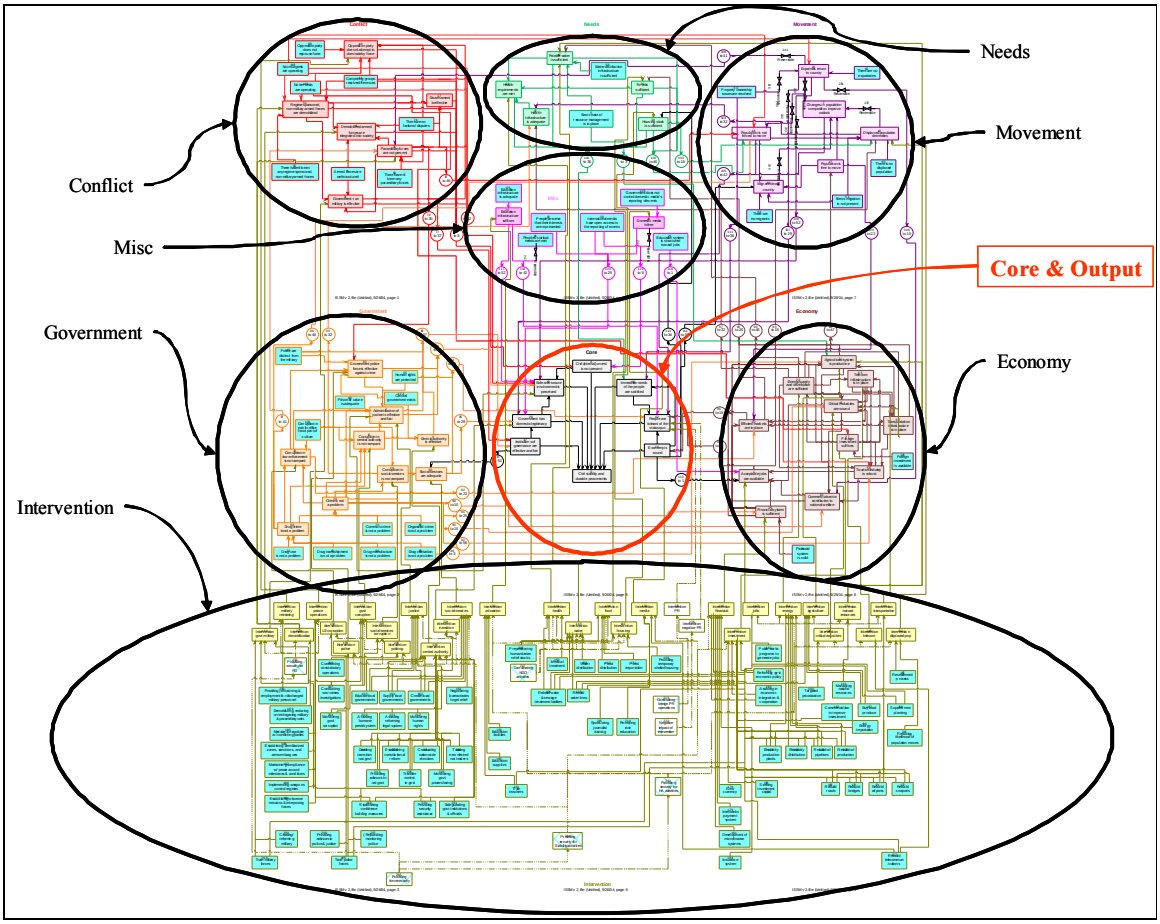


Figure 1-5. ISSM Variable Connections

1.4.2 ISSM Preprocessor

The ISSM Preprocessor supports custom user logic to tie new input variables and their observed values to the Main ISSM input variables. The user must define new input variables and new intermediate variables and the logic that connects them to each other and to the ISSM input variables. The user then enters the data on a periodic basis and uses the Preprocessor to copy the results to the ISSM Main. The user continues to enter external intervention data into ISSM Main; but does not enter data into the ISSM internal inputs, as they come from the Preprocessor.

Using the Preprocessor entails a considerable extra input burden on the user, which must be justified by the additional traceability of the results.

1.4.3 ISSM Postprocessor

The ISSM Postprocessor supports custom user logic to create additional output variables from the ISSM Main set of variables. The user must define all the new variables and the logic connecting them to each other and to the ISSM Main variables. No data entry is required.

Using the Postprocessor allows the user to produce additional Measures of Merit (MoMs) that match the needs of the Commander in the field or other enduser of the ISSM

1.4.4 ISSM Controller

The ISSM Control supports configuration management of the data produced by the ISSM system. Because the ISSM is implemented as a set of Excel workbooks, which contain both the program and the data, each scenario or variant requires a complete set of copies of the workbooks (except for the Controller). The user needs to organize the locations in which these sets are saved and the naming of the workbooks to support retention and retrieval. The Controller manages this process. It also contains the graphical progress meter that is used during the longer calculations of the workbooks to assure the user that something is happening.

1.5 USE CASES

The simplicity of the ISSM supports use at several echelons of military and civilian activities. In its most straightforward interpretation, the ISSM gives an estimate of the situation on the ground in terms of a top-level Measure of Political Effectiveness (MoPE), namely the status of the assertion that civil stability and durable peace exist. Thirty-four inputs are required. The values of these inputs can be obtained by intuition, based on observations of the current situation, or they might be obtained by sophisticated data collection by teams in the field. Naturally, the believability of the output value may be influenced by the believability of the input values. In any case, the calculation of the output value, given the input values requires only minutes for input and seconds for the spreadsheet calculation.

1.5.1 Supporting Operations

One way the ISSM can be used is to support operations by tracking the situation over time. The end user may be at the JTF / Ambassador level or at a lower level.

1.5.1.1 JTF / Ambassadorial level

At the JTF/Ambassadorial level, the inputs would be derived from inputs from each subordinate command of the operation. Further, the ultimate goal would be to achieve a sufficiently high overall output level to support transition out of the operation. However, the status of the individual sectors would be examined for contraindications. For example, if the overall level were good, but the Justice sector showed poor values, this unevenness in the country's recovery might be judged to make transition risky.

1.5.1.2 Subordinate command level

At the tactical or operational level, one can envision the S2/G2 staff coordinating with the Civil Affairs and Public Relations staffs to create a weekly appreciation of the current situation and its change from the

previous report. The individual input values are sufficiently well-defined that obtaining the values should impose no particular hardship. In fact, these are factors that are commonly known to be important in Stability and Support Operations, as follows:

- Conflict Sector
  - Armed forces are well structured
  - Competing groups resolve differences
  - Opposition party does not espouse force
  - There haven't been any paramilitary forces
  - There haven't been any regime-sponsored, non-military armed forces
  - There are no factional disputes
  - No insurgents are operating
  - No terrorists are operating
- Economic Sector
  - Foreign investment is available
  - Financial system is solid
- Government Sector
  - Human rights are protected
  - Police are distinct from the military
  - Prison structure is adequate
  - Corruption in public office is not part of culture
  - Central government exists
  - Drug cultivation is not a problem
  - Drug manufacture is not a problem
  - Drug transshipment is not a problem
  - Drug use is not a problem
  - Organized crime is not a problem
  - Common crime is not a problem
- Miscellaneous Sector
  - Education infrastructure is adequate
  - Educational system is tailored toward jobs
  - Government does not control domestic media's reporting of events
  - International media have open access to the reporting of events
  - People perceive that their interests are represented
  - People's spiritual needs are met
- Movement Sector
  - Property ownership issues are resolved
  - Stress migration is not present
  - There are no expatriates
  - There is no displaced population
  - There are no migrants
- Needs Sector
  - Basic natural resource management is in place
  - Water distribution infrastructure is sufficient

As long as the change is positive and not dramatic, the output values would be reported and posted to the graph with no major comment. If a negative change were observed, or a dramatic change in any direction, the staff would describe the principal sectors and driving input variables involved to the Commanding Officer. This information would support Course of Action modification decisions.

1.5.2 Monitoring Multiple Countries within a Combatant Command

Combatant Commands (COCOM) with responsibility for numerous countries must monitor, and to the extent possible, shape the situation in America's interests. The COCOM (Planning, Analysis and Intelligence) would use the ISSM to compute the PMESII situation for each country of interest. By monitoring the results over time, the COCOM would have warning of negative trends. Further, the intervention facility in the ISSM could be used to evaluate possible shaping efforts.

1.5.3 Supporting Studies

A third type of use for the ISSM is in tracking the situation for studies where the situation is developed, not by changes in the real world, but by changes in a simulation. Figure 1-6 illustrates this use case as developed in a study for The Joint Staff/J-8 in support of the Quadrennial Defense Review in 2005.

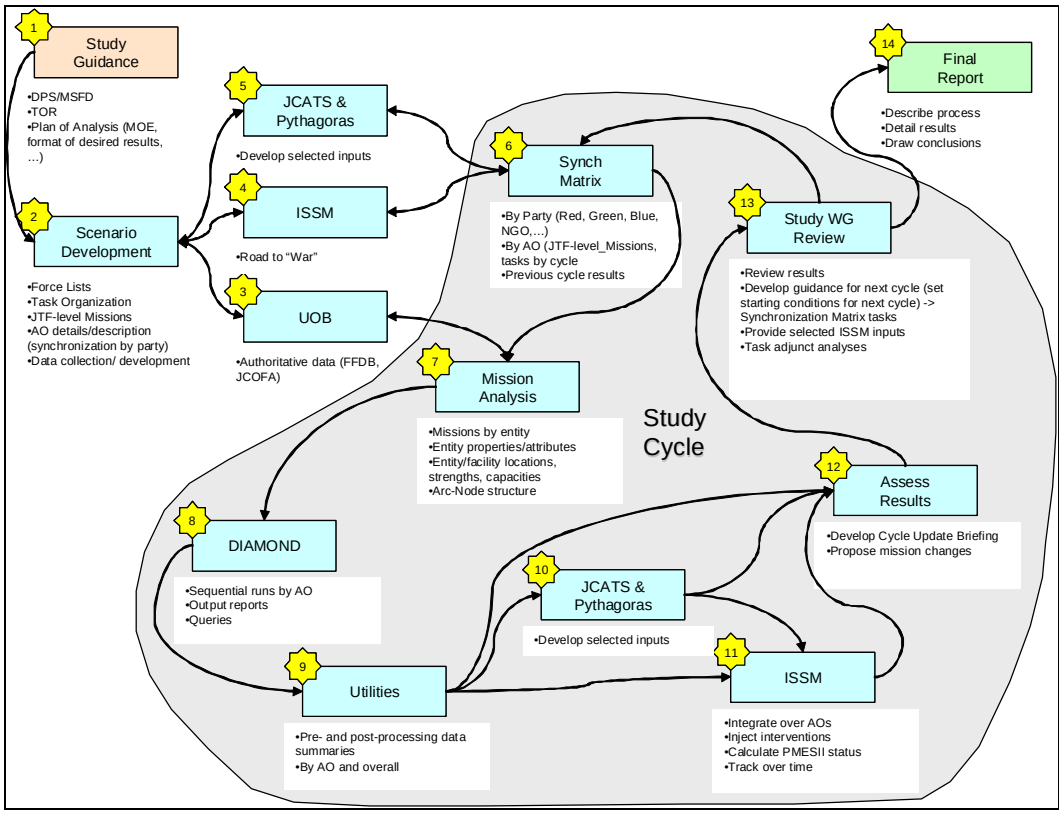


Figure 1-6. Use of the ISSM within a study

The study began with the study guidance and supporting materials (step 1, in the figure) and a requirement for a final report (step 14). After the analysts had developed the scenario (step 2), the Unit Order of Battle (UOB) tool was used to prepare the force lists to be used (step 3) and the ISSM was used to convert the study guidance into a "road to war" that converted the text description into the PMESII variable values (step 4). The Pythagoras agent-based tool (and potentially other tools, such as JCATS) was used to develop selected inputs (step 5).

At this point, the analysis entered into a cycle of steps. Analysts created a synchronization matrix (step 6) and a mission analysis (step 7) from the existing situation. These elements were used to define the

scenario for the DIAMOND simulation, which was run for a simulated period (step 8). The outputs of DIAMOND were transformed in a set of utilities (step 9) for input into the ISSM (step 11) (and potentially input to Pythagoras and/or JCATS (step 10), with further use as inputs to the ISSM). The outputs of the ISSM and certain outputs from DIAMOND were used to assess the situation (step 12), from a modeling perspective. These results were used by the study working group to assess the situation from a study perspective and create the plan for the next cycle (step 13).

When sufficient cycles were completed, step 13 was followed by the creation of the final report (step 14), rather than a new cycle. In this report, the ISSM and Pythagoras produced the principal measures of merit.

1.6 RESEARCH ISSUES AND OPPORTUNITIES

As mentioned earlier, the ISSM is an interim model. DMSO can provide the ISSM to several military schools as the basis for research and improvement. For example, students at the Naval Postgraduate School or the National Defense University are using (Fall 2006) the ISSM in a course on modeling & simulation of Stability, Security, Transition, & Reconstruction (SSTR) operations and could work on several different questions. Suggested topics include the following:

- Validation/improvement of the social factors relationships currently expressed,
- Definition and implementation of the standard host governmental feedback loops that exist (although perhaps in an impaired fashion) in a country of concern,
- Creation of a fully dynamic version of the underlying model.

Department of Defense support of such activities would lead to improvements in the tool offering of the toolbox. It would also support the education of future users of the toolbox. Further, it could lead to directing research into a field that will ultimately support better accomplishment of the US military's OOTW missions.

1.7 ORGANIZATION OF THE USERS' GUIDE

Section 2 describes the operation of the ISSM controller. These instructions include subsections on initial setup, naming conventions, selecting and opening programs, saving and closing programs, connecting and disconnecting the UserWorksheets, preparing to upgrade to a new version, and performing the upgrade.

Section 3 presents the operating instructions for the central ISSM model. These instructions include subsections on starting a new model, preparation and data entry for internal (to the geopolitical area) inputs, preparation and data entry for external (intervention) inputs, use of the Time Charts, and modifying the history records. There are also sections on the UserWorksheet and using the ISSM Main with the DIAMOND simulation. The user is referred to the Analysts' Guide for information on selecting values for the inputs and changing the model.

Section 4 presents the operating instructions for the ISSM preprocessor. These instructions include subsections on preparing a new scenario, entering data, modifying data, and viewing the data graphically. There are also sections on the UserWorksheet and using the Preprocessor with the DIAMOND simulation. The user is referred to the Analysts' Guide for details on creating custom logic in the Preprocessor.

Section 5 presents the operating instructions for the ISSM post-processor. These instructions include subsections on preparing a new scenario, entering data, modifying data, and viewing the data graphically. There is also a section using the Postprocessor with the DIAMOND simulation. The user is referred to the Analysts' Guide for details on creating custom logic in the Postprocessor.

2. ISSM CONTROLLER OPERATING INSTRUCTIONS

The Controller assists you in maintaining control of your various sets of ISSM files, each set pertaining to a scenario or scenario variant. The original main ISSM, Preprocessor, and Postprocessor files are maintained as read-only files in the same folder as the Controller. The Controller supports you in opening either the original files or a previously defined scenario set, saving the files in a new folder, and closing the files. The Controller maintains a registry of the last used set of files and their locations.

2.1 BEGINNING THE PROCESS

The ISSM Controller may be started from the FAST Controller through the ISSM icon (recommended) or started as a separate Excel workbook. The Controller uses macros, so you must click the Enable Macros button. Figure 2-1 shows the contents of the Controller's first worksheet.

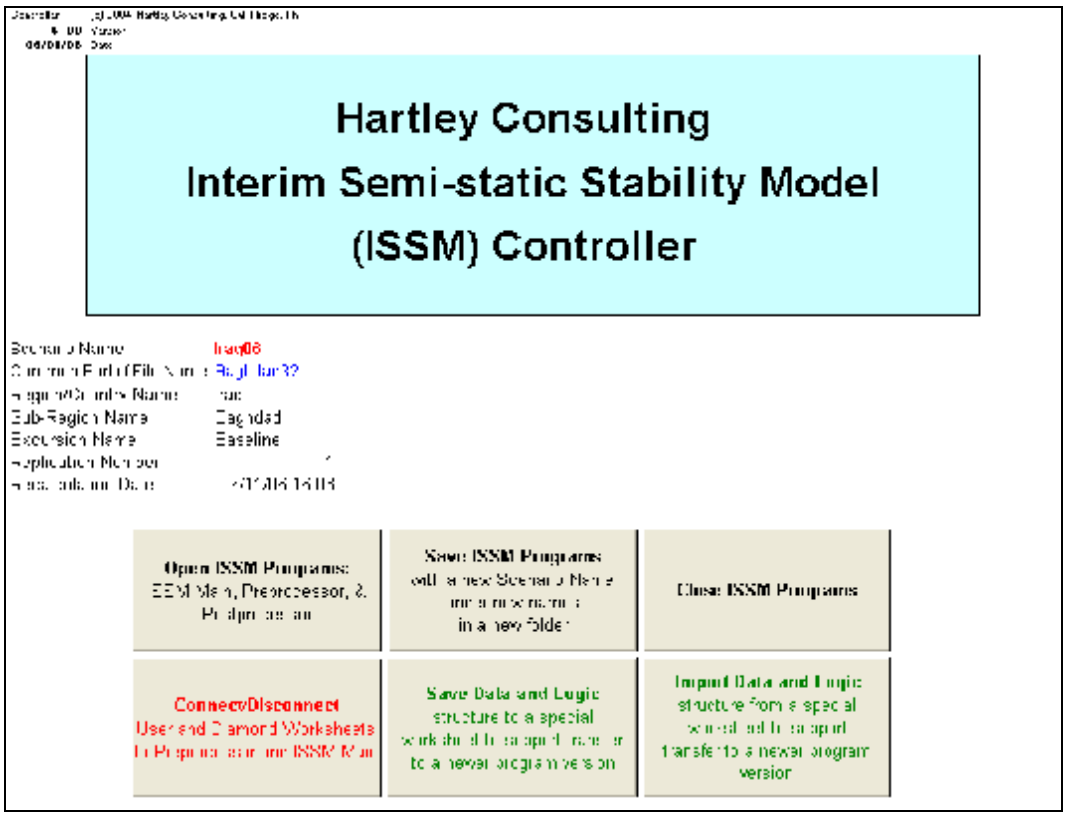


Figure 2-1. Controller main screen

This worksheet contains the name and version information in the upper left corner. It contains the scenario set information below the workbook banner. Below this information are six control buttons. The scenario set information initially contains whatever was last used. When ISSM files are opened and saved, the appropriate information is displayed. The first three controls permit you to open, save and close the ISSM programs, as shown in the top half of Figure 2-2. The last two controls support exporting your model's unique data and logic for import into a newer version of the ISSM, as shown in the bottom half of Figure 2-2.

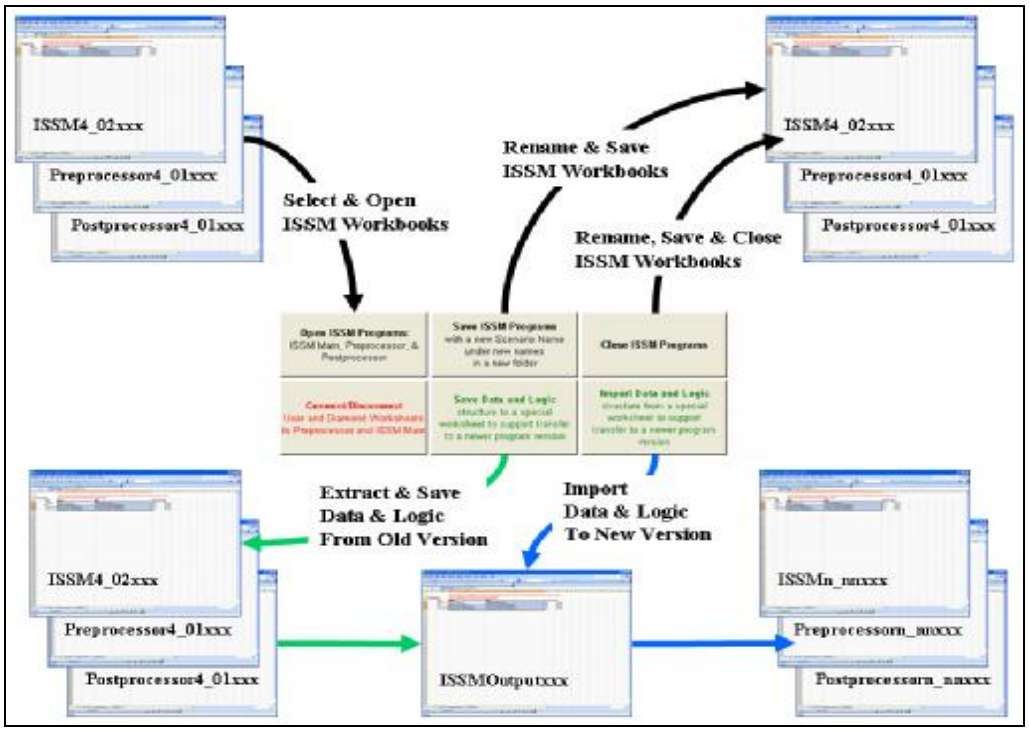


Figure 2-2. Open, Save & Close vs Save & Import Controls

The fourth control allows you to choose whether to use the DIAMOND specific worksheets or the User defined worksheets in the ISSM Main and the Preprocessor to pass data to the ExternalInputs or RawData worksheet, respectively, as shown in Figure 2-3.

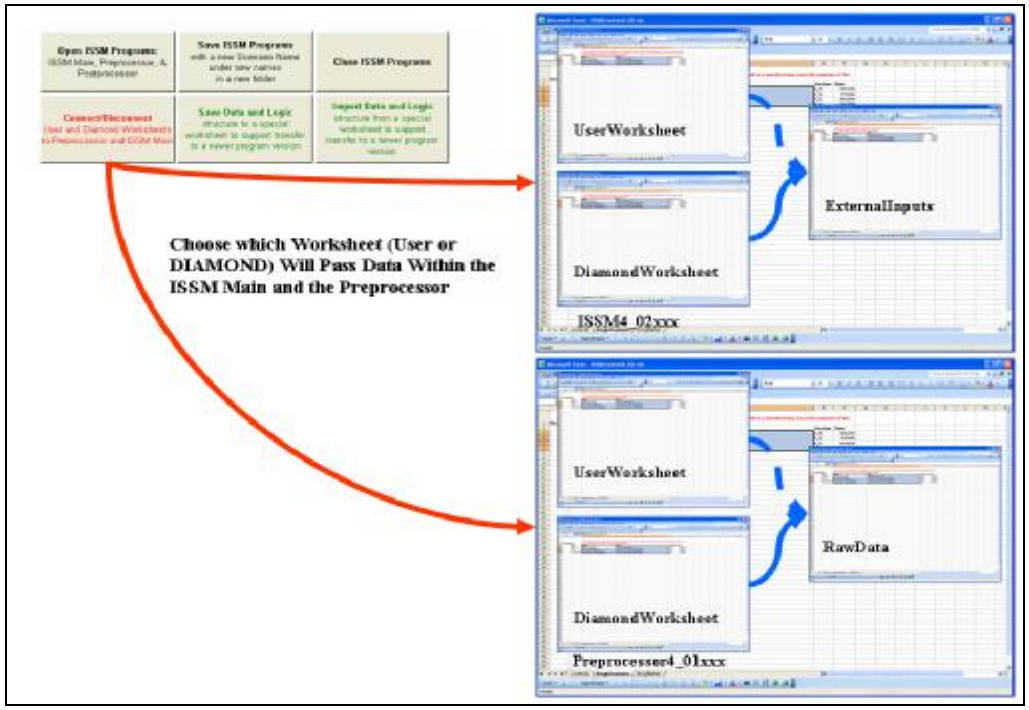


Figure 2-3. Connect/Disconnect Control

2.2 FIRST USE ON A NEW COMPUTER

When the Controller is installed on a new computer or if it is moved to a new location, you must erase any registration information from the previous computer or location. Figure 2-4 shows sample contents of the second worksheet in the Controller, the Registrations page.

Program IDs — The first time the controller is installed in a new computer, or if it is moved to a new directory, erase the contents of the name & path cells for each of the four program types.

Type	Name	Path	Version	Date
Controller	ISSMControl4_00.xls	E:\Projects\ISSM\v4_00	4_00	06/07/06
ISSM	ISSM4_02Baghdad33.xls	E:\Projects\Consult\FAST06\Baghdad	4_02	07/10/06
Preprocessor	Preprocessor4_01Baghdad33.xls	E:\Projects\Consult\FAST06\Baghdad	4_01	06/30/06
Postprocessor	Postprocessor4_01Baghdad33.xls	E:\Projects\Consult\FAST06\Baghdad	4_01	06/30/06

Figure 2-4. Registration information

As the directions on the page say, you must erase the contents of the Name and Path cells for each file type. You may then return to the Controls page and initiate operations.

2.3 NAMING CONVENTIONS

One of the changes introduced with the 3_0 version of the Controller and continued with the 4_0 version was the inclusion of version numbers in the file names. When the user saves his work, the Controller automatically begins the name of each workbook with its identifier: Preprocessor, ISSM, or Postprocessor. The Controller also automatically adds the current version number of the workbook. Finally, the Controller adds the user supplied identifier. This naming discipline makes it possible for the user to distinguish between the four workbook types and between various user projects.

It is recommended that the user create and maintain additional naming discipline by numbering the versions of a particular project. For example, Test_Iraq_01 was the name for the first version of a project of entering historical data concerning Iraq into the ISSM. By incrementing the number each time a significant amount of new data were added, one can identify the workbooks that make up each set by the commonality of name and identify the latest version by largest number. If for some reason, the computer has made the latest version unreadable, the user has available the previous version, which while requiring work to bring back to what should be available in the latest version, at least requires less work than recreating the entire project from nothing.

2.4 SECOND CHANCE DIALOGS

Each of the control buttons initiates a second chance dialog (see Figure 2-5). This dialog tells you which button you selected and gives you the chance to cancel if you clicked that button by mistake. Discussion of these dialogs will be omitted from the individual control discussions below.

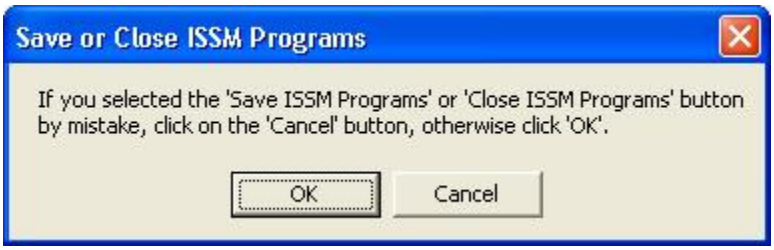


Figure 2-5. Second chance dialog box

2.5 SELECTING AND OPENING PROGRAMS

Left-clicking the "Open" control displays a dialog box that asks whether you want to start with blank files or to open a previous set of ISSM files.

Selecting "Yes" results in the display of an "Open ISSM Files" dialog box, showing the location of the Controller and the blank ISSM files. The Controller file is already open, so the user should select the ISSM file. By holding down the <Ctrl> button on the keyboard and left-clicking either the Preprocessor, the Postprocessor, or both files, you can select all the desired files at once. You then click on the "Open" control in the dialog box. Depending on the speed of the computer, this may be a slow process. A meter will be displayed to show the progress during the process (Figure 2-6). If you accidentally select the Controller file in this operation, a dialog box will inform you of this and ask if you really want to open it again. Respond by clicking the "no" button. Later versions of Excel may just ignore this duplicate selection without telling you.

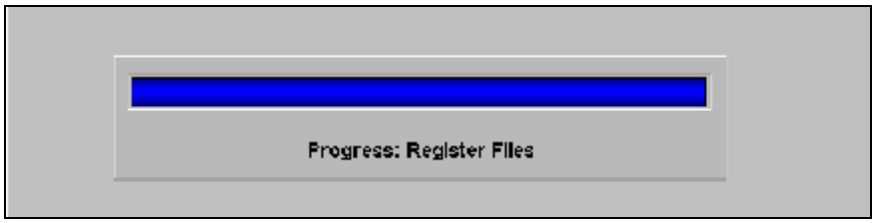


Figure 2-6. Progress meter (finished)

When the opening and registration process is complete, the main page will be redisplayed. You can now use the “Window” control on the main Excel toolbar to select the desired file and proceed to work as described in the appropriate section (ISSM, Preprocessor or Postprocessor) below.

Selecting "No" results in the display of an "Open ISSM Files" dialog box, showing the location of the most recently used ISSM files. If this is not the desired location, use the standard navigation process to find the correct folder. You should select the ISSM file or files with the desired scenario or scenario variant, if multiple sets were saved in the same folder. By holding down the <Ctrl> button on the keyboard and left-clicking either the Preprocessor, the Postprocessor, or both files, you can select all the desired files at once. If multiple scenario sets were saved to this folder, you should take care to select the corresponding Preprocessor and/or Postprocessor files. You then click on the "Open" control in the dialog box. Depending on the speed of the computer, this may be a slow process. The progress meter will be shown.

You are not required to open all desired files at the same time; however, you must open a copy of the ISSM in the first opening process. For example, if you decide to open the ISSM and the Preprocessor, but not the Postprocessor, you may either open them both with one use of the "Open" button or use the "Open" to open the ISSM and then at a later time use the "Open" button again to open the Preprocessor.

If at some later time, you wish to use these same two files (saved prior to exiting), they may be opened together or separately, as above, simply using the "No" response to access previously saved files. If you want to add the Postprocessor, because it will have not been saved to the same folder with the common name, you must use the "Open" button again and open a blank copy of the Postprocessor. When this set of files is saved, they will all receive the common name.

2.6 SAVING PROGRAMS

Left-clicking the "Save" control begins the process of identifying and saving your work. You will be asked to identify your workbooks through a set of dialog boxes (Figure 2-7).

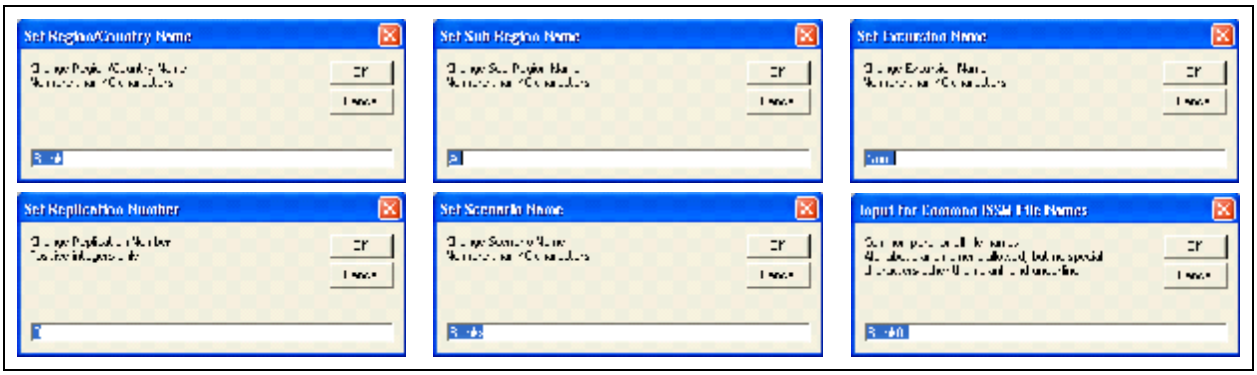


Figure 2-7. Scenario definition dialog boxes

The first six rows in Table 2-1 correspond to the dialog boxes and describe the information you will be asked to enter. Simply type in the information (at least one character satisfying any restrictions listed in the dialog) and press the "OK" button. This information is repeated on the output charts, providing traceability when you save these externally for later use. The progress meter shows progress.

Table 2-1. Scenario Identification Information

Identification Element	Explanation	Example
Region/Country Name	Geographical region that is larger than that covered by this scenario	Iraq
Sub-Region Name	Geographical region of this scenario	Baghdad
Excursion Name	Excursion within this scenario represented by this set of workbooks	Baseline
Replication Number	When based on a stochastic simulation, the replication number represented by this set of workbooks	1
Scenario Name	General name for the scenario, including excursions and replications	Iraq06
Common Part of File Name	Code to identify all the workbooks belonging to this set	Baghdad18
Recalculation Date	Last date/time of full recalculation of all workbooks in this set: set by the program	7/11/06 15:32

When the dialog box appears that requests the folder in which to store the file, use the standard navigating process (including the creation of a new folder) to select the desired folder. Once this folder has been satisfactorily selected, press the "Save" button. If a dialog box appears asking if you wish to replace a file of the same name, select "Yes." If you are using an earlier version of Excel (e.g., 97), you may be

informed that information may be lost. It won't be. Select "OK." This process will be repeated for each of the files the user has opened (other than the Controller).

During the save process, do not switch to another application. Sometimes Excel will abort when you don't give it your full attention.

2.7 CLOSING PROGRAMS

Left-clicking the "Close" control displays the "close files" dialog boxes that allow you to select a new identification information. The progress meter shows progress.

When the dialog box appears that requests the folder in which to store the file, use the standard navigating process (including the creation of a new folder) to select the desired folder. Make sure that the desired folder is selected. **It may not be the one shown immediately.** Once this folder has been satisfactorily selected, press the "Save" button. If a dialog box appears asking if you wish to replace a file of the same name, select "Yes." If you are using an earlier version of Excel (e.g., 97), you may be informed that information may be lost. It won't be. Select "OK." This process will be repeated for each of the files the user has opened (other than the Controller).

During the close process, do not switch to another application. Sometimes Excel will abort when you don't give it your full attention.

In addition to saving and closing the Preprocessor (if open), Postprocessor (if open), and Main ISSM workbooks, the "Close" control also saves and closes the Controller. This is the process that allows the Controller to retain the location of the last set of workbooks used.

The Excel application is left open for further use or manual closing.

2.8 CONNECT/DISCONNECT

Prior to using this control, the user must complete the UserWorksheets or DiamondWorksheets in the Preprocessor and ISSM Main, as described in the respective sections below and (more fully) in the Analysts' Guide.

Left-clicking the "Connect/Disconnect" control displays the dialog box (Figure 2-8) to select whether to connect the UserWorksheets, the DiamondWorksheets, or neither to the RawData and ExternalInputs worksheets in the Preprocessor and ISSM Main, respectively. Left click the "Yes" button to disconnect the current selection and connect the UserWorksheets, the "No" button to disconnect the current selection and connect the DiamondWorksheets, and "Cancel" to disconnect the current selection and leave neither worksheet connected.

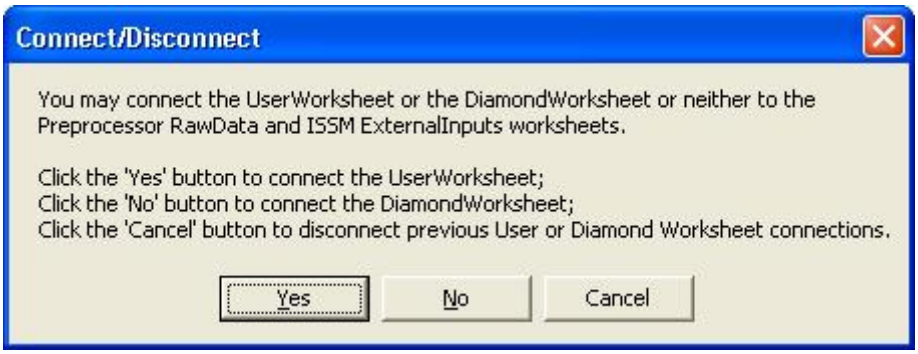


Figure 2-8. Connect/Disconnect dialog box

The progress meter shows the progress; however, the last chunk is very slow to show up. Part of the process checks for errors, which must be corrected before the entire process can complete. If errors are found, an "Output" workbook is created.

Table 2-2 contains the error messages that may be generated by the Connect/Disconnect button, both messages that show on the screen and messages in the Errata worksheet of the "Output" workbook.

Table 2-2. Controller Connect/Disconnect Error Messages

Message	What it means	What to do
Date # nn in (worksheet) = (date); however, the corresponding date in (worksheet) = (date).	The dates in the two worksheets must agree in sequence.	You may have skipped a date in one worksheet or the dates may not be exactly the same. You will have to correct the dates or add a column of information for the missing date.
Errors were found in the connections between the User/Diamond worksheets and the Preprocessor or Main ISSM inputs. They are shown in the Output Workbook. You must correct these and re-run the 'Connect/Disconnect' procedure.	General message that errors have been found.	Find the particulars in the Errata sheet.
Node nnn in (worksheet) is not listed in (worksheet).	A node is missing in one worksheet.	You will have to add (or delete) the node, with accompanying logic.

Once you have a clean process, the RawData worksheet will contain the nodes from the appropriate worksheet and their units and values and the ExternalInputs worksheet will contain the values from the appropriate worksheet in the fifth row for each node, with a label showing which worksheet was the source.

2.9 PREPARING TO UPGRADE TO A NEW VERSION

When a new version of the ISSM is distributed, you will want to convert any models you have built to the new version. This can be done manually; however, it is very difficult and subject to error. You use the Save Data & Logic button to save all of the information from a current set of workbooks into a special "Output" workbook. This workbook will have the name "ISSMOutputxxxx.xls," where "xxxx" is the common part of the file names of the workbooks of your model. You will then use the Import Data & Logic button to copy this information into a blank set of new-version workbooks.

Prior to saving the information, you should check the Diamond- and UserWorksheets in the ISSM Main and the Preprocessor to make sure the sliders are pushed to their full left and up positions. If one of these sheets has the Excel "Freeze Panes" unfrozen and the upper left corner is not visible, the save process will create the Freeze Panes in the wrong positions.

Table 2-3 contains the error messages that may be generated by the Save Data & Logic button, both messages that show on the screen and messages in the Errata worksheet of the "Output" workbook.

Table 2-3. Controller Save Data & Logic Error Messages

Message	What it means	What to do
A logical loop in the node structure has been detected in (a Nodesheet). Check the nodes in (the Nodesheet) with unassigned Calculation Sequence values. A complete circular reference will cause this; however, it can also be caused by a set of 'FromNode' references that imply the cycle, even without the corresponding 'ToNode' references.	A node that passes its value to itself or a sequence of nodes that eventually pass a value back to an earlier node constitutes a logical loop, which is not permitted. A properly defined loop would have all of the FromNode and ToNode references filled out. However, even if the loop is not properly defined, the set of FromNode references imply a loop.	Look at the sheet named (Nodesheet) in the Output workbook for nodes that don't have entries in the Calculation Sequence column. Then check these nodes in the correct Scenario workbook for incorrect connections. Correct them all and re-run save data & logic.
Messages have been added to the Errata sheet in the Output workbook.	Error or information messages were generated and placed on the Errata sheet.	Look at the Errata sheet (in the Output workbook) to find out what the messages say. Then correct any errors and re-run save data & logic.
To save data, you must have opened a complete set of three workbooks.	You do not have all three workbooks (Preprocessor, Main, & Postprocessor) open.	Before you save the data and logic, open whichever workbooks that are missing.
You have a problem with node nnn. It may be missing a NodeName and thus partially eliminated. You need to correct this problem in the workbook.	Node nnn appears in some places but not everywhere it needs to be for complete definition. The node may be listed in the Constants sheet without a Node name.	Either eliminate the node number from the Constants sheet or give it a Node name then re-run save data & logic.
You have a problem with node nnn. It may be missing a NodeName and thus partially eliminated. You need to correct this problem in the workbook.	Node nnn appears in some places but not everywhere it needs to be for complete definition. The node may be listed in the Constants sheet without a Node name.	Either eliminate the node number from the Constants sheet or give it a Node name then re-run save data & logic.
You have a problem with node nnn. It may be missing and thus partially eliminated. You need to correct this problem in the workbook.	Somewhere there is a reference to a node numbered nnn; however, at least one of the corresponding references that are needed to fully define this node is missing. This is almost certainly a custom logic node, either Preprocessor or Postprocessor.	From the node number, you can tell whether the node is in the Preprocessor, Main or Postprocessor. Look for this node and either add the missing references or delete the existing references.

Table 2-4 contains the error messages that may be generated by the Save Data & Logic button that are placed within certain sheets in the "Output" workbook. The sheet names are preceded by a reference to the Preprocessor, Main, or Postprocessor, indicated by the ellipsis in the Sheet with msg column. The ellipsis in the Message column indicates that there may be a preceding part of the message, found in another row.

Table 2-4. Controller In-Sheet Messages

Sheet with msg	Message	What it means	What to do
...FromNodes Sheet	...; FromNode missing from Node sheet	The node in column B is not in the Node sheet.	Either this node doesn't appear as a "Hero" node or it isn't in the Constants sheet.
...FromNodes Sheet	...; Node missing from Node sheet	The node in column A is not in the Node sheet.	Either this node doesn't appear as a "Hero" node or it isn't in the Constants sheet.
...FromNodes Sheet	Missing from ToNode sheet	The link from the node in column B to the node in column A is not in the ToNode sheet as a link from a node in column A to a node in column B.	The logic on the right side of the "Hero" node is missing this connection. Either add the logic or remove the logic on the left side.
...FromNodes Sheet	OK	Part or all of tests were successful.	
...ToNodes Sheet	...; Node missing from Node sheet	The node in column A is not in the Node sheet.	Either this node doesn't appear as a "Hero" node or it isn't in the Constants sheet.
...ToNodes Sheet	...; ToNode missing from Node sheet	The node in column B is not in the Node sheet.	Either this node doesn't appear as a "Hero" node or it isn't in the Constants sheet.
...ToNodes Sheet	Missing from ToNode sheet (message should actually say "FromNode" sheet)	The link from the node in column A to the node in column B is not in the FromNode sheet as a link from a node in column B to a node in column A.	The logic on the left side of the "Hero" node is missing this connection. Either add the logic or remove the logic on the right side.
...ToNodes Sheet	OK	Part or all of tests were successful.	
...NodeConnections	...; ToNode missing from Node sheet	The node in column B is not in the Node sheet.	Probably this node isn't in the Constants sheet.
...NodeConnections	FromNode missing from Node sheet	The node in column A is not in the Node sheet.	Probably this node isn't in the Constants sheet.
...NodeConnections	OK	Part or all of tests were successful.	

2.9.1 Structure of the Output Workbook.

The Output workbook contains a large number of worksheets, which are briefly described below. The Analysts' Guide provides more detailed information.

2.9.2 Errata Worksheet

Figure 2-9 shows a part of the Errata worksheet. In this case, the messages are that the dates in the DiamondWorksheet do not match the corresponding columns in the ExternalInputs worksheet. If you have data in the DiamondWorksheet, these are serious messages; however, if the data you have entered are in the UserWorksheet, you will not have bothered to make the DiamondWorksheet dates correspond and these messages may be disregarded. Naturally, there may be other messages in the worksheet that require attention.

Date # 1 in DiamondWorksheet = 03/29/03; however, the corresponding date in ExternalInputs = 03/20/03.
Date # 2 in DiamondWorksheet = 04/26/03; however, the corresponding date in ExternalInputs = 03/27/03.
Date # 3 in DiamondWorksheet = 05/24/03; however, the corresponding date in ExternalInputs = 04/03/03.
Date # 4 in DiamondWorksheet = 06/21/03; however, the corresponding date in ExternalInputs = 04/10/03.
Date # 5 in DiamondWorksheet = 07/19/03; however, the corresponding date in ExternalInputs = 04/17/03.
Date # 6 in DiamondWorksheet = 08/16/03; however, the corresponding date in ExternalInputs = 04/24/03.
Date # 7 in DiamondWorksheet = 09/13/03; however, the corresponding date in ExternalInputs = 05/01/03.

Figure 2-9. Section of Errata worksheet

2.9.3 GeneralData Worksheet

Figure 2-10 shows the GeneralData worksheet, where the file identification data is captured for each of the workbooks that are to be upgraded.

	ISSM File	Scenario	Min Manual Date	Max Manual Date	External Date interval	Region /Country	Sub-Region Name	Excursion Name	Replication Number	Recalculation Date	Common Part of File Name
Controller	ISSMControl4_00.xls	Iraq				Iraq			0	6/7/2006 12:08	Iraq60
Main	ISSM4_02Iraq60.xls	Iraq	5/1/2012	11/1/2013	7	Iraq			0	10/9/2006 11:11	Iraq60
Preprocessor	Preprocessor4_01Iraq60.xls	Iraq	5/1/2012	11/1/2013		Iraq			0	10/9/2006 11:09	Iraq60
Postprocessor	Postprocessor4_01Iraq60.xls	Iraq	5/1/2012	12/1/2013		Iraq			0	10/9/2006 11:33	Iraq60

Figure 2-10. GeneralData worksheet

2.9.4 Sector Worksheet

Figure 2-11 shows the Sector worksheet where the names of the sectors are matched to the SectorID values and information is collected on the numbers of nodes in each sector in each workbook and the topological connectivity of the nodes. This information is used in processing the logic of each workbook and in building the logic diagrams. The "Other" sector should have no entries, so a value other than zero indicates an error.

SectorID	Sector	Max Nodes per SeqNo in	Neighbors 0	1	2	3	4	5	6	7	8	9	10	Max Nodes per SeqNo in Preproc	Neighbors 0	1	2	3	4	5	6	7	8	9	10	Max Nodes per SeqNo in	Neighbors 0	1	2	3	4	5	6
0	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Conflict	22	0	82	4	10	0	8	0	0	14	24	0	39	0	82	0	0	0	2	6	0	0	0	0	18	0	0	0	0	0	0	0
2	Economy	24	0	0	130	20	2	10	18	68	18	10	0	6	0	0	12	0	0	0	0	0	0	0	0	22	0	0	45	0	0	0	0
3	Govt	55	0	0	0	180	6	2	4	0	24	22	0	17	0	0	0	46	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0
4	Misc	12	0	0	0	0	20	0	0	2	4	20	0	16	0	0	0	0	38	0	0	0	0	0	0	12	0	0	0	0	0	0	0
5	Movement	6	0	0	0	0	0	32	12	0	2	12	0	9	0	0	0	0	0	22	0	0	0	0	0	12	0	0	0	0	0	0	0
6	Needs	21	0	0	0	0	0	0	72	6	10	10	0	4	0	0	0	0	0	0	8	0	0	0	0	12	0	0	0	0	0	0	0
7	Physical	24	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Security	7	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Core	2	0	0	0	0	0	0	0	0	0	12	14	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0
10	Output	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Figure 2-11. Sector worksheet

2.9.5 Group Worksheet

Figure 2-12 shows the Group worksheet where the names of the groups (of variables) are matched to the GroupID values. This information is used in processing the logic of each workbook and in building the logic diagrams. The "Other" group should have no entries, so a value other than zero indicates an error.

GroupID	Group
0	Other
1	Pre-Input
2	Pre-Intermed
3	Input
4	Intervention
5	Intermediate
6	Core
7	Output
8	Post-Intermed
9	MOM

Figure 2-12. Group worksheet

2.9.6 MainNodes Worksheet

Figure 2-13 shows a section of the MainNodes worksheet where information on each of the nodes in ISSM Main (internal input, external input, intermediate, and output) is collected. The Analysts' Guide contains more detail on this worksheet.

NodeID	NodeName	CalcSeq	NodeCalcType	SectorID	GroupID	Sheet	Notes	InfluenceNotes
1	Acceptable jobs are available	14		2	5	Economy		
2	Administration of justice is effective and fair	9		3	5	Govt		
3	Agricultural system is productive	11		2	5	Economy		
4	Armed forces are well structured	4		1	3	Conflict		
5	Basic natural resource management is in place	4		6	3	Needs	two parts: infrastructure & govt/private management system; missing=-3, bad=-2, moderately bad=-1, fair=0, moderately good=1, good=2, excellent=3	

Figure 2-13. Section of the MainNodes worksheet

2.9.7 MainFromNodes Worksheet

Figure 2-14 shows a section of the MainFromNodes worksheet. Each node that passes values to another node is a FromNode (except for external input nodes) and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	From Node	From Val	Weight	WeightIsVariable	ValueIsMultiplier	ConnectionProblem
1	10	-1.49859	1			OK
1	15	-2.47975	1			OK
1	25	-0.22875	1			OK
1	56	-1.44028	1			OK
1	21	3.208824	1			OK
1	147	1.197348	1			OK
1	19	-1.36153	1			OK

Figure 2-14. Section of the MainFromNodes worksheet

2.9.8 MainToNodes Worksheet

Figure 2-15 shows a section of the MainToNodes worksheet. Each node that receives values from another node is a ToNode and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	To Node	Inflate	Center	Val	InflateIsVariable	ConnectionProblem
1	18	1.5	0	-0.5577292		OK
1	42	1	-0.5	-0.8718195		OK
2	37	2	0	-1.0758457		OK
2	52	1.5	0	-0.8068843		OK
3	10	1	0	-0.2729082		OK
3	26	1.5	0	-0.4093622		OK
4	16	1	0	-1.3076923		OK

Figure 2-15. Section of the MainToNodes worksheet

2.9.9 MainExternalNodeConnections Worksheet

Figure 2-16 shows a section of the MainExternalNodeConnections worksheet. Information on each of the external inputs (in the role of passing data) is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

FromNode	ToNode	TimeDelay	Weight	ReplicatedToNode	DivisorNode	ConnectionProblem
150	141	0	1			OK
150.1	150				TRUE	OK
151	136	7	1			OK
151.1	151				TRUE	OK
152	136	0	1			OK
152.1	152				TRUE	OK
153	143	0	1			OK
153.1	153				TRUE	OK

Figure 2-16. Section of the MainExternalNodeConnections worksheet

2.9.10 MainInputData Worksheet

Figure 2-17 shows a section of the MainInputData worksheet. All of the internal inputs data is collected in this worksheet.

	Dates							
Nd#	3/20/2003	3/27/2003	4/3/2003	4/10/2003	4/17/2003	4/24/2003	5/1/2003	5/8/2003
4	2.096154	-0.6	-2.90769	-3	-3	-3	-3	-3
11	-1	-2	-3	-3	-3	-3	-3	-3
59	-0.9375	-1.0625	-2.875	-2.875	-2.875	-2.875	-2.8125	-2.875
60	-0.75	-1.25	-3	-3	-2.875	-2.875	-2.25	-2.25
61	-3	-3	-3	-3	-3	-3	-2	-1
74	-1.83333	-1.875	-3	-3	-3	-2.58333	-2.08333	-2.33333

Figure 2-17. Section of the MainInputData worksheet

2.9.11 MainExternalInputsData Worksheet

Figure 2-18 shows a section of the MainExternalInputsData worksheet. All of the external inputs data is collected in this worksheet.

			Date							
Node #	**Activity**	**Units**	3/20/2003	3/27/2003	4/3/2003	4/10/2003	4/17/2003	4/24/2003	5/1/2003	5/8/2003
150	Coalition Forces		0							
150	Other US Depts & Agencies		1000	500	500	200	0	0	0	0
150	UN Depts & Agencies									
150	NGOs & PVOs		0	100	100	0	0	0	0	100
150	From UserWorksheet									
150	Medical treatment	People	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
150.1	Medical treatment	People	5000	10000	10000	15000	20000	20000	20000	20000
151	Coalition Forces									
151	Other US Depts & Agencies		500	4000	4000	4000	4000	4000	4000	7500
151	UN Depts & Agencies									
151	NGOs & PVOs									
151	From UserWorksheet									
151	Food importation	Tons	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
151.1	Food importation	Tons	10000	10000	10000	10000	10000	10000	10000	10000

Figure 2-18. Section of the MainExternalInputsData worksheet

2.9.12 MainVariableInflateData Worksheet

Figure 2-19 shows a section of the MainVariableInflateData worksheet. All of the user's overrides of the standard inflate values are collected here.

			Date							
Node #	**ToNode**	**StdInflate**	03/20/03	03/27/03	04/03/03	04/10/03	04/17/03	04/24/03	05/01/03	05/08/03
18	7	1	1	1	1	1	1	1		
24	7	0.8	0.8	0.8	0.8	0.8	0.8	0.8		
24	10	0.8	0.8	0.8	0.8	0.8	0.8	0.8		
24	29	1	1	1	1	1	1	1		
24	41	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
24	46	0.25	0.25	0.25	0.25	0.25	0.25	0.25		
24	52	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
28	8	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
39	7	1	1	1	1	1	1	1		
44	42	0.25	0.25	0.25	0.25	0.25	0.25	0.25		
50	24	1	1	1	1	1	1	1		

Figure 2-19. Section of the MainVariableInflateData worksheet

2.9.13 MainDiamondWorksheet Worksheet

Figure 2-20 shows the top part and Figure 2-21 shows the bottom part of the MainDiamondWorksheet worksheet. This worksheet is a direct copy of the DiamondWorksheet from the ISSM Main.

If you cannot view the top of the worksheet, the probable cause is that the Freeze Panes are in the wrong position. You may either delete this "Output" workbook and reposition the DiamondWorksheet to the top left before re-saving the data or you may manually correct the Freeze Panes. To manually correct the Freeze Panes, use the Excel "Window" toolbar menu to find and activate the "Unfreeze Panes" command. Move the horizontal pane divider to a position between row 2 and row 3 and the vertical pane divider between column E and column F. Then activate the "Freeze Panes" command on the "Window" menu.

ISSM Main DiamondWorksheet			Use the area below for data input and calculations. Insert as many rows as desired. You may not insert columns. Use the shaded area below the input and calculation area to copy final results for transfer to the External Inputs worksheet.									
			03/29/03	04/26/03	05/24/03	06/21/03	07/19/03	08/16/03	09/13/03	10/11/03	11/08/03	12/06/03
		1st date should correspond to						Initial	Month 1	Month 2	Month 3	Month 4
Node	Formulas											
	Needs Intervention Calculations											
	FoodD(i,AOj)=food delive	FoodD(i,AO1)						100	33600000	33600000	33600000	33600000
	FoodN(i,AOj)=food neede	FoodN(i,AO1)	100	100	100	100	100	100	8502732	5097552	3716277	2340996
		FoodD(i,AO2)										
		FoodN(i,AO2)										
		FoodD(i,AO3)										
		FoodN(i,AO3)										
		FoodD(i,AO4)										
		FoodN(i,AO4)										
		FoodD(i,AO5)										
		FoodN(i,AO5)										
152	sum over j {FoodD(i,AOj)}	FoodD(i) pounds						100	33600000	33600000	33600000	33600000
152.1	sum over j {FoodN(i,AOj)}	FoodN(i) pounds	100	100	100	100	100	100	8502732	5097552	3716277	2340996

Figure 2-20. Section of the top part of the MainDiamondWorksheet worksheet

Use this block for memo items, such as date offset. No links allowed.	You must identify the Node #	Units	Insert as many rows as desired in the shaded area below the double line and above the last shaded row. You may not insert columns. Put dates in box below - Column positions **MUST CORRESPOND** with dates in ExternalInputs, with dated data in the area below									
			03/29/03	04/26/03	05/24/03	06/21/03	07/19/03	08/16/03	09/13/03	10/11/03	11/08/03	12/06/03
	152	pounds						100	33600000	33600000	33600000	33600000
	152.1	pounds	100	100	100	100	100	100	8502732	5097552	3716277	2340996
	188							0.375	0.9	1.35	2.25	2.625
	188.1							6	6	6	6	6
	218	trips						0	0	0	0	0
	218.1	trips	40	40	75	100	100	0	0	0	0	0

Figure 2-21. Section of the bottom part of the MainDiamondWorksheet worksheet

2.9.14 MainUserWorksheet Worksheet

Figure 2-22 shows the top part and Figure 2-23 shows the bottom part of the MainUserWorksheet worksheet. This worksheet is a direct copy of the UserWorksheet from the ISSM Main.

If you cannot view the top of the worksheet, the probable cause is that the Freeze Panes are in the wrong position. You may either delete this "Output" workbook and reposition the UserWorksheet to the top left before re-saving the data or you may manually correct the Freeze Panes. To manually correct the Freeze Panes, use the Excel "Window" toolbar menu to find and activate the "Unfreeze Panes" command. Move the horizontal pane divider to a position between row 2 and row 3 and the vertical pane divider between column E and column F. Then activate the "Freeze Panes" command on the "Window" menu.

ISSM Main UserWorksheet				Use the area below for data input and calculations. Insert as many rows as desired. You may not insert columns. Use the shaded area below the input and calculation area to copy final results for transfer to the External Inputs worksheet.										
node					3/20/03	3/27/03	4/3/03	4/10/03	4/17/03	4/24/03	5/1/03	5/8/03	5/15/03	5/22/03
			avg US combat killed		23.5	23.5	11.75	11.75	11.75	11.75	1.4	1.4	1.4	1.4
			US combat killed		**23**	**24**	**12**	**11**	**12**	**11**	**2**	**1**	**2**	**1**
		70	**Opposition**		**0.67**	**0.66**	**0.83**	**0.84**	**0.83**	**0.84**	**0.97**	**0.99**	**0.97**	**0.99**
235	0.86	250	**Force Security**	rating	**0.91**	**0.90**	**0.95**	**0.96**	**0.95**	**0.96**	**0.99**	**1.00**	**0.99**	**1.00**
			US troops killed											
			bad guys killed											
			bad guys captured											
			notable		war starts 3/19/03				Mosul falls to Kurds			end of major combat		

Figure 2-22. Section of the top part of the MainUserWorksheet worksheet

Use this block for memo items, such as date offset. No links allowed.	You must identify the Node #	Insert as many rows as desired in the shaded area below the double line and above the last shaded row. You may not insert columns. Put dates in box below - Column positions **MUST CORRESPOND** with dates in ExternalInputs, with dated data in the area below										
		Units	03/20/03	03/27/03	04/03/03	04/10/03	04/17/03	04/24/03	05/01/03	05/08/03	05/15/03	05/22/03
	158	fraction										
	158.1	whole							1	1	1	1
	159	schools										
	159.1	schools								4400	4400	4400
	160	units										
	160.1	units										33.2815
	161	teachers										
	161.1	teachers										
	162	fraction										
	162.1	whole								1	1	1
	163	fraction										
	163.1	whole								1	1	1
	164	units										
	164.1	units					800	800	800	800	800	800
	165	people								500	500	500
	165.1	people								10000	20000	20000

Figure 2-23. Section of the bottom part of the MainUserWorksheet worksheet

2.9.15 MainDiagram Worksheet

Figure 2-24 shows the diagram that is created for the ISSM Main logic. It is located on the MainDiagram worksheet. The figure below has been rotated and reduced in size for display in the Users' Guide.

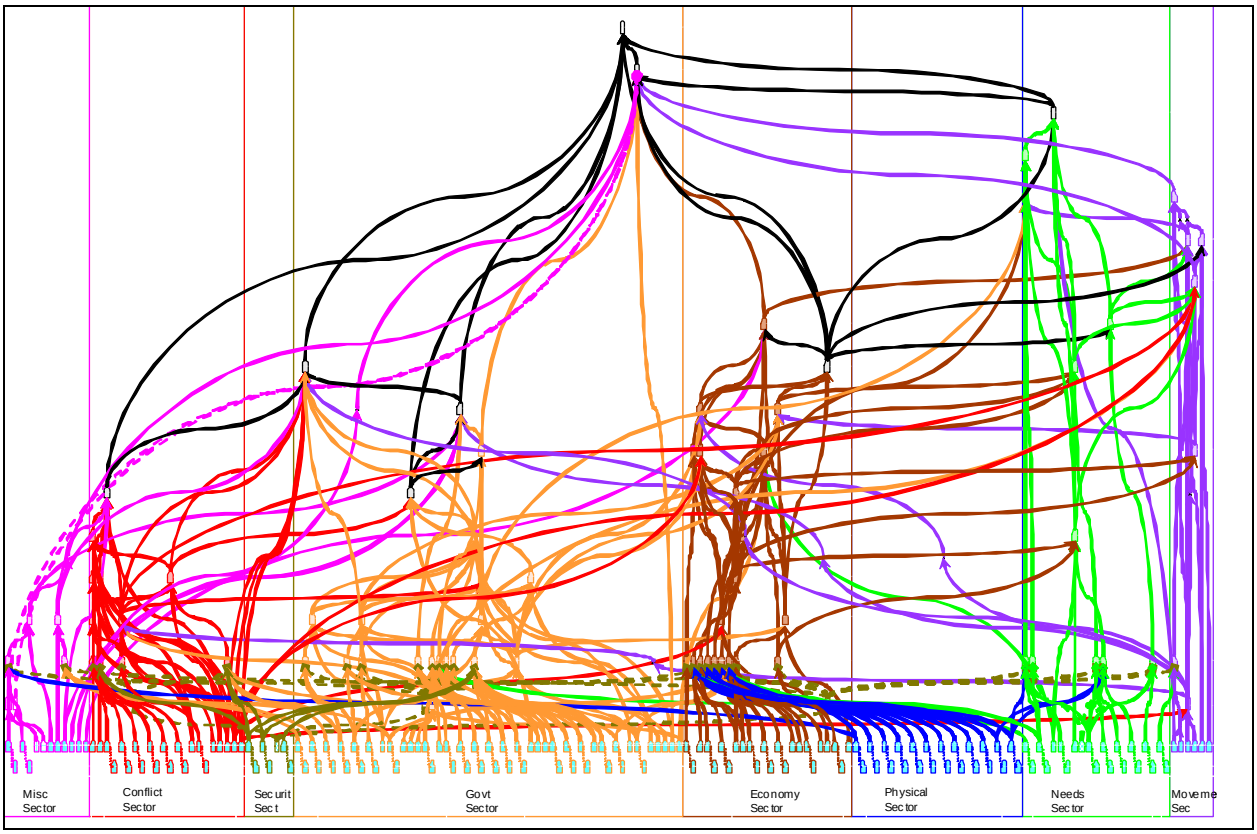


Figure 2-24. ISSM Main logic diagram

2.9.16 PreprocessorNodes Worksheet

Figure 2-25 shows a section of the PreprocessorNodes worksheet where information on each of the nodes in the Preprocessor is collected. The Analysts' Guide contains more detail on this worksheet.

NodeID	NodeName	CalcSeq	NodeCalcType	SectorID	GroupID	Sheet	Notes	InfluenceNotes
4	Armed forces are well structured		2	1	3			
5	Basic natural resource management is in place		2	6	3		two parts: infrastructure & govt/private management system; missing=-3, bad=-2, moderately bad=-1, fair=0, moderately good=1, good=2, excellent=3	
11	Competing groups resolve differences		2	1	3			
21	Educational system is tailored toward jobs		3	4	3			

Figure 2-25. Section of the PreprocessorNodes worksheet

2.9.17 PreprocessorFromNodes Worksheet

Figure 2-26 shows a section of the PreprocessorFromNodes worksheet. Each node that passes values to another node is a FromNode and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	From Node	From Val	Weight	WeightIsVariable	ValueIsMultiplier	ConnectionProblem
4	1001	-1	1			OK
4	1401	#VALUE!	1			OK
4	1101	-2.97	1			OK
4	1102	-1.8	0.25			OK
4	1103	0.17	1			OK
5	1033	1.75	1			OK
5	1408	#VALUE!	1			OK
5	1104	0	1			OK

Figure 2-26. Section of the PreprocessorFromNodes worksheet

2.9.18 PreprocessorToNodes Worksheet

Figure 2-27 shows a section of the PreprocessorToNodes worksheet. Each node that receives values from another node is a ToNode and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	To Node	Inflate	Center	Val	InflateIsVariable	ConnectionProblem
1001	4	1	0	-1		OK
1002	11	1	0	-0.5		OK
1003	59	1	0	0		OK
1004	60	1	0	-1.5		OK
1005	61	1	0	2.25		OK
1006	74	1	0	-1.5		OK

Figure 2-27. Section of the PreprocessorToNodes worksheet

2.9.19 PreprocRawDataNodeConnections Worksheet

Figure 2-28 shows a section of the PreprocRawDataNodeConnections worksheet. The nodes that originate on the RawData worksheet require specification as to which nodes are divisor nodes. That data is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

FromNode	ToNode	TimeDelay	Weight	ReplicatedToNode	DivisorNode	ConnectionProblem
1101.1	1101				TRUE	OK
1102.1	1102				TRUE	OK
1120.1	1120				TRUE	OK
1401.1	1401				TRUE	OK
1402.1	1402				TRUE	OK

Figure 2-28. Section of the PreprocRawDataNodeConnections worksheet

2.9.20 PreprocessorRawInputsData Worksheet

Figure 2-29 shows a section of the PreprocessorRawInputsData worksheet. All of the input data is collected here.

			Date									
Node #	**Activity**	**Units**	03/20/03	03/27/03	04/03/03	04/10/03	04/17/03	04/24/03	05/01/03	05/08/03	05/15/03	05/22/03	05/29/03
1001	Expert: Armed forces are well structured	rating	2	0	-3	-3	-3	-3	-3	-3	-3	-3	-3
1002	Expert: Competing groups resolve differences	rating	-1	-2	-3	-3	-3	-3	-3	-3	-2	-3	-2
1003	Expert: Opposition party does not espouse force	rating	-1	-1	-3	-3	-3	-3	-3	-3	-3	-3	-3
1004	Expert: There haven't been any paramilitary forces	rating	-1	-2	-3	-3	-3	-3	-2	-2	-2	-2	-2
1005	Expert: There haven't been any regime-sponsored non-military armed forces	rating	-3	-3	-3	-3	-3	-3	-2	-2	0	0	0

Figure 2-29. Section of the PreprocessorRawInputsData worksheet

2.9.21 PreprocDiamondWorksheet Worksheet

Figure 2-30 shows the top part and Figure 2-31 shows the bottom part of the PreprocDiamondWorksheet worksheet. This worksheet is a direct copy of the DiamondWorksheet from the Preprocessor.

If you cannot view the top of the worksheet, the probable cause is that the Freeze Panes are in the wrong position. You may either delete this "Output" workbook and reposition the DiamondWorksheet to the top left before re-saving the data or you may manually correct the Freeze Panes. To manually correct the Freeze Panes, use the Excel "Window" toolbar menu to find and activate the "Unfreeze Panes" command. Move the horizontal pane divider to a position between row 2 and row 3 and the vertical pane divider between column E and column F. Then activate the "Freeze Panes" command on the "Window" menu.

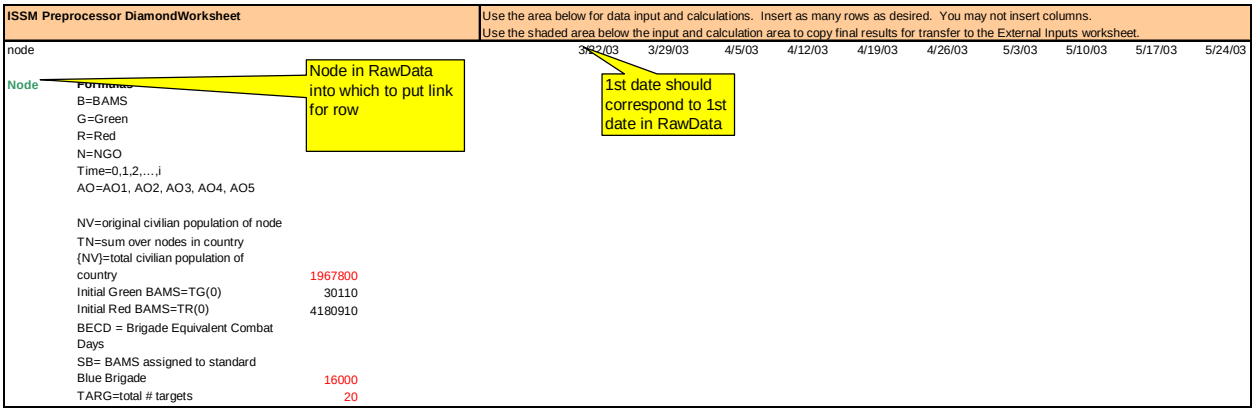


Figure 2-30. Section of the top part of the PreprocDiamondWorksheet worksheet

Use this block for memo items No links allowed.	You must identify the Node #	Insert as many rows as desired in the shaded area below the double line and above the last shaded row. You may not insert columns. Put dates in box below - Column positions **MUST CORRESPOND** with dates in RawData, with dated data in the area below the do									
		Units	03/22/03	03/29/03	04/05/03	04/12/03	04/19/03	04/26/03	05/03/03	05/10/03	05/17/03	05/24/03
	1401											
	1401.1											
	1402											
	1403											
	1404											
	1405											
	1406											
	1407											
	1408											
	1409											

Figure 2-31. Section of the bottom part of the PreprocDiamondWorksheet worksheet

2.9.22 PreprocessorUserWorksheet Worksheet

Figure 2-32 shows the top part and Figure 2-33 shows the bottom part of the PreprocessorUserWorksheet worksheet. This worksheet is a direct copy of the UserWorksheet from the Preprocessor.

If you cannot view the top of the worksheet, the probable cause is that the Freeze Panes are in the wrong position. You may either delete this "Output" workbook and reposition the UserWorksheet to the top left before re-saving the data or you may manually correct the Freeze Panes. To manually correct the Freeze Panes, use the Excel "Window" toolbar menu to find and activate the "Unfreeze Panes" command. Move the horizontal pane divider to a position between row 2 and row 3 and the vertical pane divider between column E and column F. Then activate the "Freeze Panes" command on the "Window" menu.

ISSM Preprocessor UserWorksheet				Use the area below for data input and calculations. Insert as many rows as desired. You may not insert columns. Use the shaded area below the input and calculation area to copy final results for transfer to the External Inputs worksheet.									
node				3/20/03	3/27/03	4/3/03	4/10/03	4/17/03	4/24/03	5/1/03	5/8/03	5/15/03	5/22/03
			Displaced		300.00	246.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
1130			Displaced s rating	2.55	-2.50	-2.05	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11
	max=0	Invest $											
4560													
		Invest scaled											
1126			Invest scale rating	0.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.88	-2.76	-2.64	-2.52
(178)	Economy	1.00	currency conversion 6 wks										
			Strong Currency										
1127			Strong Curi rating	-1.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.75

Figure 2-32. Section of the top part of the PreprocessorUserWorksheet worksheet

Use this block for memo items No links allowed.	You must identify the Node #	Insert as many rows as desired in the shaded area below the double line and above the last shaded row. You may not insert columns. Put dates in box below - Column positions **MUST CORRESPOND** with dates in RawData, with dated data in the area below the do									
		Units	03/20/03	03/27/03	04/03/03	04/10/03	04/17/03	04/24/03	05/01/03	05/08/03	05/15/03	05/22/03
	1101	EffBatallions	175	50	10	0	0	0	0	0	0	0
	1101.1	EffBatallions	200	200	200	200	200	200	200	200	200	200
	1102	EffBatallions	175	40	0	0	0	0	0	0	0	0
	1102.1	EffBatallions	200	200	200	200	200	200	200	200	200	200
	1104	rating	-1.00	-1.00	-1.50	-2.00	-2.50	-2.50	-2.00	-1.50	-1.50	-1.50
	1105	rating	-1.00	-1.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.75
	1106	rating	-1.00	-2.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-2.33	-2.67
	1107	rating	-0.88	-1.13	-2.75	-2.75	-2.75	-2.75	-2.63	-2.75	-2.58	-2.58
	1108	rating	-1.67	-1.75	-3.00	-3.00	-3.00	-2.17	-2.17	-2.67	-2.17	-2.17
	1109	rating	2.00	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-0.50	-0.50
	1120	people	83300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1120.1	people	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00	100000.00

Figure 2-33. Section of the bottom part of the PreprocessorUserWorksheet worksheet

2.9.23 PreprocessorDiagram Worksheet

Figure 2-34 shows the diagram that is created for sample Preprocessor logic. It is located on the PreprocessorDiagram worksheet. The figure below has been rotated and reduced in size for display in the Users' Guide.

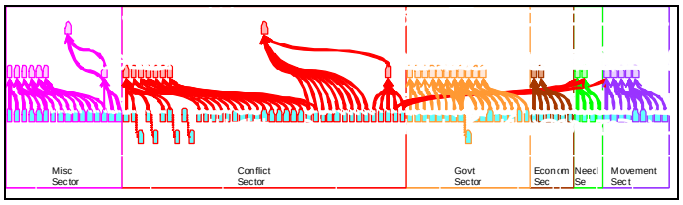


Figure 2-34. Sample Preprocessor logic diagram

2.9.24 PostprocessorNodes Worksheet

Figure 2-35 shows a section of the PostprocessorNodes worksheet where information on each of the nodes in the Postprocessor is collected. The Analysts' Guide contains more detail on this worksheet.

NodeID	NodeName	CalcSeq	NodeCalcType	SectorID	GroupID	Sheet	Notes	InfluenceNotes
1	Acceptable jobs are available	22		2	5			
2	Administration of justice is effective and fair	22		3	5			
3	Agricultural system is productive	22		2	5			
4	Armed forces are well structured	22		1	3			
5	Basic natural resource management is in place	22		6	3		two parts: infrastructure & govt/private management system; missing=-3, bad=-2, moderately bad=-1, fair=0, moderately good=1, good=2, excellent=3	

Figure 2-35. Section of the PostprocessorNodes worksheet

2.9.25 PostprocessorFromNodes Worksheet

Figure 2-36 shows a section of the PostprocessorFromNodes worksheet. Each node that passes values to another node is a FromNode and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	From Node	From Val	Weight	WeightIsVariable	ValueIsMultiplier	ConnectionProblem
2001	56	-1.29352	1			OK
2001	2403	#N/A	1			Missing from ToNode sheet
2401	23	-0.43394	1			OK
2401	55	-0.42416	1			OK
2401	57	-0.33597	1			OK
2402	3	-0.27291	1			OK
2402	10	-0.7493	1			OK
2402	56	-1.29352	1			OK

Figure 2-36. Section of the PostprocessorFromNodes worksheet

2.9.26 PostprocessorToNodes Worksheet

Figure 2-37 shows a section of the PostprocessorToNodes worksheet. Each node that receives values from another node is a ToNode and information about the node in this role is collected here. If there is a problem with the connection, it is described in the ConnectionProblem column. The Analysts' Guide contains more detail on this worksheet.

Nd#	To Node	Inflate	Center	Val	InflateIsVariable	ConnectionProblem
2001	2501	1	0	-1.2935214		OK
2401	2901	1	0	-0.3980246		OK
2402	2404	1	0	-0.7719086		OK
2403	2404	1	0	-0.9454087		OK
2403	2404	1	0	-0.9454087		OK
2403	2404	1	0	-0.9454087		OK

Figure 2-37. Section of the PostprocessorToNodes worksheet

2.9.27 PostprocessorDiagram Worksheet

Figure 2-38 shows the diagram that is created for sample Postprocessor logic. It is located on the PostprocessorDiagram worksheet. The figure below has been rotated and reduced in size for display in the Users' Guide.

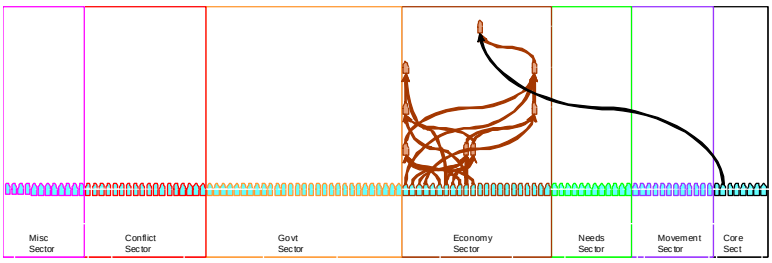


Figure 2-38. Sample Postprocessor logic diagram

2.10 PERFORMING THE UPGRADE

After you have saved the data and logic from an old set of workbooks and corrected any errors (re-saving, if necessary), you are ready to perform the upgrade. You will need to Close the ISSM Programs and restart the Controller. At this point, open Blank new-version Main, Preprocessor and Postprocessor workbooks. Click on the Import Data and Logic button. After the are-you-sure message, you will have to read the warning that you must select a file containing saved ISSM data – as opposed to some other type of ISSM file (Figure 2-39). This workbook will have the name "ISSMOutputxxxx.xls," where "xxxx" is the common part of the file names of the workbooks of your model. It should be in the same directory as the other workbooks of your model; however, if you did any directory changing (e.g., looking at other Excel files) prior to or during its creation, Excel may have saved it somewhere else.

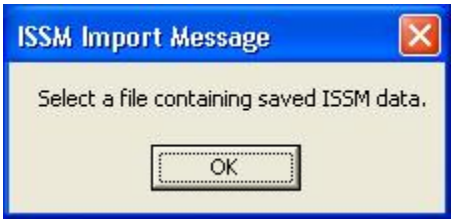


Figure 2-39. File type warning

2.10.1 Import Use Cases

After you have found and selected the proper file, you must select among a set of options to control the import process. There are three use cases.

- Use Case 1: No Diamond related data or logic will be imported. The DiamondWorksheets will contain (possibly new) logic from the new version and the Preprocessor will contain the corresponding (possibly new) logic for all Diamond related variables. Non-Diamond related data and logic will be imported.
- Use Case 2: If possible, Diamond related data will be imported (other than the Diamond worksheets). The new versions of the Diamond worksheets will be retained and the new version of the Diamond logic and Diamond related variables will be retained. The user may have to perform several manual operations to relate his old data to the new logic. Non-Diamond related data and logic will be imported.
- Use Case 3: All Diamond related data and logic will be imported (including the Diamond worksheets). This will maintain all of the old data and logic as it was and will contain no new-version Diamond related variables or logic. Non-Diamond related data and logic will be imported.

The first question is whether you have Diamond related data and logic that you want to import (Figure 2-40). If you answer "No" the import process will proceed with no further questions.

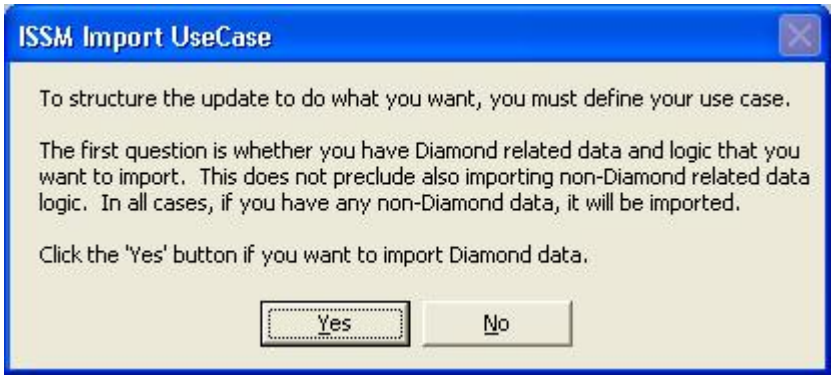


Figure 2-40. Use case first question

If you answer "Yes" the second question is whether you want to use the (possibly) new Diamond related logic or use your old Diamond related logic (Figure 2-41). In either case the import process will proceed with no further questions.

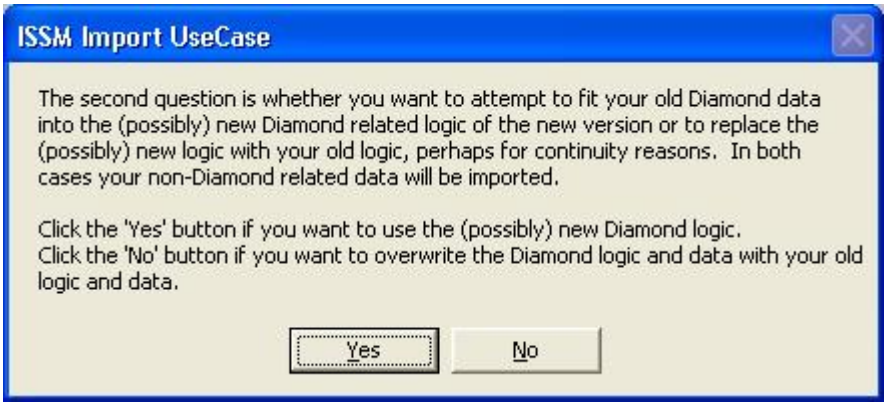


Figure 2-41. Use case second question

When the importing process is finished (with no errors), you will have a set of [Read-Only] workbooks with prefaces indicating the type and version number and the suffix "Blank." You will have the proper data in the User- and DiamondWorksheets in the Preprocessor and ISSM Main; however, the data are not connected to RawData and ExternalInputs, respectively. Use the Save ISSM Programs button to rename the workbooks and save them to the desired directory. This will allow you to recover from any errors without having to re-import the data.

2.10.2 Error Messages

If errors were found during the import process, an on-screen message will be shown (Figure 2-42) to that effect.

Figure 2-42. Errors have been found message

Table 2-5 - Table 2-8 contain the error messages that may be generated by the Import Data & Logic button, both messages that show on the screen and messages in the Errata worksheet of the "Output" workbook.

Table 2-5. Controller Import Data & Logic Error Messages (part 1)

Message	What it means	What to do
Messages have been added to the Errata sheet in the Output workbook.	Error or information messages were generated and placed on the Errata sheet.	Look at the Errata sheet (in the Output workbook) to find out what the messages say. Then correct any errors and re-run save data & logic.
No file was opened.	You did not select a file designated (by naming convention) as an ISSM save data & logic output file.	Try it again.
Not all of your workbooks are shown as blank. Normally, you will only want to import data into blank workbooks. Importing data into populated workbooks will have unpredictable results. Do you wish to import data into the workbooks you have open?	At least one of your three workbooks doesn't have "Blank" as part of its name.	Use the cancel button; close your current workbooks; open blank workbooks; and import your data & logic.
Of the 18 required worksheets in an ISSMOutput file, only nn were found. Either the worksheet names have been changed or this is not a proper ISSMOutput file.	The file you selected does not have the sheets with the proper names for an ISSM save data & logic output file.	Try it again with a different file.
The Main DiamondWorksheet was not copied to the new workbook. You will need to manually copy the data from the MainDiamondWorksheet to the new DiamondWorksheet in Main.	The use case you selected prevents copying the old Main DiamondWorksheet into the new set of workbooks. Normally this will be done to prevent the loss of new logic in the DiamondWorksheet.	If you want to preserve your old data, use the Excel copy sheet method to place a copy of the old worksheet in the new workbook. Copy the relevant data, then delete the extra worksheet.
The new Scale Factor for node nnn is (newvalue) and the old model has a value of (oldvalue).	The new version has a default Scale Factor value that is different from the value you had in the old version.	Either use the new version Scale Factor value (generating different results from your old model) or replace the new value with your old value.
The new Standard VariableInflate model has nnn lines and the old model has mmm lines.	This may mean that the new ISSM version has additional reversible and variable inflator connections.	You may have additional inputs that were not previously available to consider with the new version.
The new Standard VariableInflate value for node (FromNode) to node (ToNode) is (newvalue) and the one you have been using is (oldvalue). To continue using the old value, you must manually put it into all of the dated columns as VariableInflate values for this node pair.	The default variable inflator value has been changed.	You may use the new default value (which will generate different results from those of your old model) or you may use the old default value by specifically setting that value for all dates.
The new Start Point for node nnn is (newvalue) and the old model has a value of (oldvalue).	The new version has a default Start Point value that is different from the value you had in the old version.	Either use the new version Start Point value (generating different results from your old model) or replace the new value with your old value.
The old node number, nnn, has been converted to mmm on worksheet (sheet). This may affect either the UserWorksheet or the DiamondWorksheet.	Node numbers are changed for several reasons; however, all occurrences should be changed, except any on the UserWorksheet or DiamondWorksheet.	Manually change all occurrences of nnn to mmm on the UserWorksheet and DiamondWorksheet.
The Preprocessor DiamondWorksheet was not copied to the new workbook. You will need to manually copy the data from the PreprocDiamondWorksheet to the new DiamondWorksheet in Main (should be Preprocessor).	The use case you selected prevents copying the old Preprocessor DiamondWorksheet into the new set of workbooks. Normally this will be done to prevent the loss of new logic in the DiamondWorksheet.	If you want to preserve your old data, use the Excel copy sheet method to place a copy of the old worksheet in the new workbook. Copy the relevant data, then delete the extra worksheet.
There are two nodes in the Postprocessor Custom MOM range (2501-2900) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Postprocessor Custom Output range (2001-2400) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.

Table 2-6. Controller Import Data & Logic Error Messages (part 2)

Message	What it means	What to do
There are two nodes in the Postprocessor Input range (1-1000) with the same NodeID. If this is due to changing the wording in the new version, you do not need to do anything. Otherwise, you have a problem that needs manual attention.	The program has found two nodes with the same node number, but different node names. The new node name will be used.	Look in the Errata sheet to find the node number. Check to see if the new node name is just a variant of the old name. If it is not, then you will have to check your logic to see what the problem is.
There are two nodes in the Postprocessor standard MOM range (2901-2999) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Postprocessor standard output range (2401-2500) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Custom Input range (1101-1400) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Custom Middle range (1501-1900) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Diamond Input range (1401-1500) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names. These both are in your old workbook.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Diamond Middle range (1901-1999) with the same NodeID. This is a fatal error. Processing will stop.	The program has found two nodes with the same node number, but different node names. These both are in your old workbook.	Look in the Errata sheet to find the node number. You will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Expert Input range (1001-1100) with the same NodeID. If this is due to changing the wording in the new version, you do not need to do anything. Otherwise, you have a problem that needs manual attention.	The program has found two nodes with the same node number, but different node names. The new node name will be used.	Look in the Errata sheet to find the node number. Check to see if the new node name is just a variant of the old name. If it is not, then you will have to check your logic to see what the problem is.
There are two nodes in the Preprocessor Output range (1-1000) with the same NodeID. If this is due to changing the wording in the new version, you do not need to do anything. Otherwise, you have a problem that needs manual attention.	The program has found two nodes with the same node number, but different node names. The new node name will be used.	Look in the Errata sheet to find the node number. Check to see if the new node name is just a variant of the old name. If it is not, then you will have to check your logic to see what the problem is.
There is a new Postprocessor input node with NodeID nnn. You may want to consider it.	The new version has a new variable that is available from ISSM Main.	You may want to use this new variable in some custom logic.
There is a new Postprocessor standard MOM node with NodeID nnn. It is not allowed and will not be added.	Your old data has a node with a node number that isn't allowed.	You may want to use a different node number.
There is a new Postprocessor standard output node with NodeID nnn. It is not allowed and will not be added.	Your old data has a node with a node number that isn't allowed.	You may want to use a different node number.
There is a new Preprocessor Diamond input node with NodeID nnn. You will have to create new data to feed it.	The new version probably has a new DIAMOND input node.	You will have to create new data to address the new node.
There is a new Preprocessor Diamond middle node with NodeID nnn. You will have to create new data to feed it.	The new version has a new DIAMOND middle node.	The new middle node may also have new input nodes that require data not in your old scenario.
There is a new Preprocessor expert input node with NodeID nnn. You will have to create new data to feed it.	The new version probably has a new output node (based on a new input node in the ISSM Main) and thus a new expert opinion node to feed it.	You will have to create new data to address the new expert opinion node.

Table 2-7. Controller Import Data & Logic Error Messages (part 3)

Message	What it means	What to do
There is a new Preprocessor output node with NodeID nnn. You will have to create new data to feed it.	The new version has a new output node (based on a new input node in the ISSM Main).	You will have to create new logic and data to address the new output node.
There is a node with NodeID > 1999. These numbers are reserved for the Postprocessor. This node will not be used. You must correct any problems manually.	You have created a node in the Preprocessor that has a node number larger than 1999.	You will have to renumber this node in your old workbook and rerun the save and the import processes.
There is a node with NodeID > 2999. These numbers are forbidden. This node will not be used. You must correct any problems manually.	You have created a node in the Postprocessor that has a node number larger than 2999.	You will have to renumber this node in your old workbook and rerun the save and the import processes.
To save data, you must have opened a complete set of three workbooks.	You do not have all three workbooks (Preprocessor, Main, & Postprocessor) open.	Before you import the data and logic, open whichever workbooks that are missing.
You are trying to add a new expert opinion node, NodeID nnn. This is not allowed.	You are not allowed to add a new expert opinion node.	Delete the offending logic.
You are trying to add a new output node, NodeID nnn. This is not allowed.	You are not allowed to add new output nodes because you cannot add the corresponding input nodes to ISSM Main.	Delete the offending logic.
You had a Postprocessor input node with NodeID nnn. It is no longer produced by ISSM Main.	The new version no longer has this variable.	If you use this variable in your custom logic, you will have to remove it.
You have an invalid NodeID, nnn.	You have created a node in the Preprocessor that has a node number larger than 1999 or in the Postprocessor with a node number larger than 2999.	You will have to renumber this node in your old workbook and rerun the save and the import processes.
You have introduced a new Preprocessor Diamond input node with NodeID nnn. It may not be automatically added; you may have to do this manually.	This DIAMOND input node is not in the new version.	Check to see if it was automatically added. If not, you will have to add it manually.
You have introduced a new Preprocessor Diamond middle node with NodeID nnn. It may not be automatically added; you may have to do this manually.	This DIAMOND middle node is not in the new version.	Check to see if it was automatically added. If not, you will have to add it manually.
You have introduced a new Preprocessor expert input node with NodeID nnn. It will not be automatically added; you must do this manually.	If an old Preprocessor output was deleted in the new version, the expert input node would also have been deleted. Alternatively, you may have created an additional expert input node for an existing output that is not included in the new version.	If you created an additional expert input node, you will have to add it to the new version manually.
You have introduced a new Preprocessor output node with NodeID nnn. It will not be automatically added; you must do this manually.	The new version does not have an output node corresponding to one in your old data. This may be an error in numbering or the new version may have removed an old output.	This has an indeterminate solution.
You have two nodes with NodeID nnn.	The program has found two nodes with the same node number, but different node names. The new node name will be used.	Look in the Errata sheet to find the node number. Check to see if the new node name is just a variant of the old name. If it is not, then you will have to check your logic to see what the problem is.
You will have to manually import the Preprocessor Diamond logic. There are nodes or connections in the old file that do not exist in the new version. This situation is too complex for automatic processing.	You selected automatic processing; however, the program can't handle the situation.	You are going to have to manually create the logic in the new workbook.

Table 2-8. Controller Import Data & Logic Error Messages (part 4)

Message	What it means	What to do
Your old Preprocessor had the center value to ToNode nnn from Node mmm on worksheet (logicsheet) set at (oldvalue), but the corresponding weight (should be center value) in the new model is (newvalue).	The center value in the new version is different from the center value in the old version.	Either use the new version center value (generating different results from your old model) or replace the new center with your old center.
Your old Preprocessor had the inflate value to ToNode nnn from Node mmm on worksheet (logicsheet) set at (oldvalue), but the corresponding weight (should be inflate value) in the new model is (newvalue).	The inflate value in the new version is different from the inflate value in the old version.	Either use the new version inflate value (generating different results from your old model) or replace the new inflate with your old inflate.
Your old Preprocessor had the weight value from FromNode nnn to Node mmm on worksheet (logicsheet) set at (oldvalue), but the corresponding weight in the new model is (newvalue).	The weight in the new version is different from the weight in the old version.	Either use the new version weight (generating different results from your old model) or replace the new weight with your old weight.
Your old Preprocessor has a node that is not in the Preprocessor, nnn.	This node (may be a fromnode or a tonode) is not present where it should be.	Search your logic.
Your old workbook had the center value from ToNode nnn from Node mmm on worksheet (LogicSheet) set at (oldvalue), but the corresponding weight (should be center value) in the new model is (newvalue).	The new version has a center inflate value from that of the old version. This will cause different results to be calculated.	You may use the new center value or replace it with your old value.
Your old workbook had the inflate value from ToNode nnn from Node mmm on worksheet (LogicSheet) set at (oldvalue), but the corresponding weight (should be inflate value) in the new model is (newvalue).	The new version has a different inflate value from that of the old version. This will cause different results to be calculated.	You may use the new inflate value or replace it with your old value.
Your old workbook had the weight value from FromNode nnn to Node mmm on worksheet (LogicSheet) set at (oldvalue), but the corresponding weight in the new model is (newvalue).	The new version has a different weight value from that of the old version. This will cause different results to be calculated.	You may use the new weight value or replace it with your old value.

2.10.3 Cleaning Up the Imported Workbooks

In use cases 1 and 3, once any errors have been corrected, the user should only have to use the Connect/Disconnect control to reset the connections between the User- or Diamond- worksheets in the Preprocessor and ISSM Main, reset the date and axis controls in each of the workbooks, and make sure the desired use of interventions is correctly selected. Then each workbook should be recalculated.

For Use Case 2 some manual operations on the DiamondWorksheets will be required prior to performing the steps of the paragraph above. In this case, the user's original model has potentially different logic and data from that in the new version that the user wishes to retain, but must manually transfer to the new version. The operations with respect to the DiamondWorksheet of the ISSM Main are relatively straightforward, as compared to those for the Preprocessor. This is because the nodes that will be output from the DiamondWorksheet of the ISSM Main are constrained to be only the ExternalInputs. In the ISSM Main's DiamondWorksheet, the user simply adds the rows from the top half of his old worksheet (see Section 45, below) and decides which connections to make in the lower half of the worksheet and what to do about any new ExternalInputs nodes.

In the Preprocessor's DiamondWorksheet, the problem is more difficult as the outputs from the DiamondWorksheet are variable, depending on the logic implemented in the preprocessor. The user will have to create for himself an understanding of the complete new logic and his old logic. Then the user must create a plan to merge the two sets of logic. Once this plan is complete, the user should use the process described in the Analysts' Guide to implement the changes.

3. ISSM V4.0 OPERATING INSTRUCTIONS

This model describes the impact on the "civil stability and durable peace" of the values of a set of factors within a single country. This is an instantaneous impact and does not allow for any feedback loops or actions over time. The principal output variable and the input variables are described below. The description includes valuation and sector information.

3.1 STARTING A NEW MODEL

The words "new model" here refers to the use of the ISSM in modeling a situation that is different from any previous situation, perhaps a new country is to be modeled. The creation of variations or excursions from a current model is treated later.

3.1.1 Starting from "Blank" Workbooks

Use the Controller to open the ISSM file with the "Blank" suffix. If desired, also open either the Preprocessor file with the "Blank" suffix or the Postprocessor file with the "Blank" suffix or both. Then proceed as described in the sections below, starting with 3.2. This is the preferred method to use.

3.1.2 Starting from an Existing Model, Not Using the User- or Diamond- Worksheet, and Not Using the Preprocessor

To start a new model, any and all data that resides in some current model must be removed to ensure that the new model is not contaminated by spurious data. After the old data is removed, new data can be added. This method is not recommended.

The process requires five steps.

1. First, disconnect user & diamond worksheets using the Connect/Disconnect control in the Controller.

2. Second, the initial data for the first record of the new model must be entered into the Internal Inputs sheet, but not added to the model.

   - Enter the new Scenario Name by shifting to the ISSM Controller workbook and using the Save procedure to create the new name and save the files to a new location;
   - Return to the ISSM Main and enter the new initial date; and
   - Enter the input data for the independent variables.
   - Do not press the "Add New Data" control button. (Pressing this button is not a significant error, as the added data will be removed in step 3. It only wastes a little time.)

3. Third, any external input data must be removed.

   - Press the "Erase External Input Data" button on the Controls sheet.
   - This action erases all input data in the External Inputs sheet.

4. Fourth, enter any desired external input data.

   - Enter the beginning date for external input data in cell F2 of the External Inputs sheet. This date should be no later than the initial date used on the Internal Inputs sheet. In general, it

should be early enough that all interventions that began prior to the "initial date" will be included.

- Change the labels, in the External Inputs sheet, for the parties performing the interventions, if desired. Change the "Time delay in days" values for the interventions in the External 2 sheet, if desired. See the section on External Inputs for a complete discussion of these matters.
- Enter the appropriate interventions, by date, up to the date shown in External Inputs that equals or just precedes the "initial date." However, for any given intervention, only the data for dates starting from the "Time delay in days" value (on the External 2 sheet) prior to the "initial date" forward are required. See the section on External Inputs for a complete discussion of these matters.

5. Fifth, all internal input data must be removed and the new record added.
   - Press the "Initialize Scenario" button on the Controls sheet.
   - This action erases all internal input data, calculates the first set of dependent variable values (including the effects of external inputs), and posts the first record to the Scenario History sheet.

If you discover that you forgot any step, simply repeat the five steps in their proper order. The (last four) instructions and controls are shown in Figure 3-1.

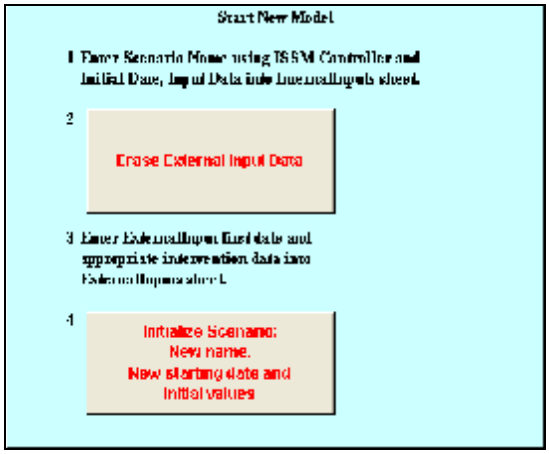


Figure 3-1. Start New Model Instructions & Controls

3.1.3 Starting from an Existing Model, Not Using DIAMOND Outputs, But Using the Preprocessor

Perform steps 1 and 2, above, then perform the Preprocessor setup actions, found in section 4.1. Next perform steps 3 – 5, above.

If you are using the UserWorksheet or the DiamondWorksheet, you will need to refer to the Analyst's Guide, section 5.13 or 5.14 for instructions. You will need to use the Connect/Disconnect control in the Controller to remake the UserWorksheet connections to the ExternalInputs worksheet.

In either case, once you have prepared the ISSM Main, return to the Preprocessor and complete the steps beginning with section 4.2 for at least one date, ending with copying the data to the ISSM Main.

3.2 INTERNAL INPUTS - OBSERVATIONS OF THE CURRENT STATUS

The Internal Inputs consist of observations of the current status of a situation. They focus on the situation irrespective of any outside intervention and are required in all situations. Currently 129 observations can be entered, covering 2.5 years if observations are made weekly and more than 10 years if observations are made monthly. Table 3-1 lists the 34 internal inputs, with node number and Sector name. The Analysts' Guide contains extensive descriptions of each of these inputs and information on how to decide the value to use for each one.

Table 3-1. ISSM Main Internal Inputs

Node	Name	Type	Sector
4	Armed forces are well structured	Input	Conflict
5	Basic natural resource management is in place	Input	Needs
11	Competing groups resolve differences	Input	Conflict
21	Educational system is tailored toward jobs	Input	Misc
35	Human rights are protected	Input	Govt
38	International media have open access to the reporting of events	Input	Misc
43	People perceive that their interests are represented	Input	Misc
44	People's spiritual needs are met	Input	Misc
45	Police are distinct from the military	Input	Govt
49	Prison structure is adequate	Input	Govt
50	Property ownership issues are resolved	Input	Movement
54	Stress migration is not present	Input	Movement
58	Water distribution infrastructure is sufficient	Input	Needs
59	Opposition party does not espouse force	Input	Conflict
60	There haven't been any paramilitary forces	Input	Conflict
61	There haven't been any regime-sponsored, non-military armed forces	Input	Conflict
62	There are no expatriates	Input	Movement
63	There is no displaced population	Input	Movement
64	There are no migrants	Input	Movement
65	Drug cultivation is not a problem	Input	Govt
66	Drug manufacture is not a problem	Input	Govt
67	Drug transshipment is not a problem	Input	Govt
69	Organized crime is not a problem	Input	Govt
71	Financial system is solid	Input	Economy
72	Drug use is not a problem	Input	Govt
73	Common crime is not a problem	Input	Govt
74	There are no factional disputes	Input	Conflict
121	Corruption in public office is not part of culture	Input	Govt
122	Central government exists	Input	Govt
124	Foreign investment is available	Input	Economy
125	Government does not control domestic media's reporting of events	Input	Misc
126	Education infrastructure is adequate	Input	Misc
148	No insurgents are operating	Input	Conflict
149	No terrorists are operating	Input	Conflict

3.2.1 Preparation

The first action required is to set the ISSM to use or not use the External Inputs (Intervention) data. If there is no intervention or if, for some reason, the user desires to examine the situation without using any

intervention inputs (whether they have been input or not), the radio button for "Observation" should be chosen on the Controls sheet, as in Figure 3-2. If intervention inputs will be used, select the other radio button.

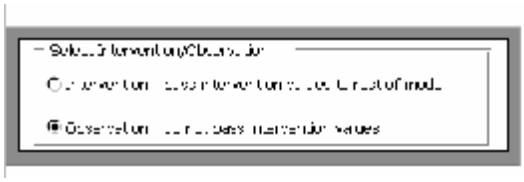


Figure 3-2. Choose not to use External Inputs data

3.2.2 Data Entry

Figure 3-3 shows an overview of the Internal Inputs form on the Internal Inputs sheet. If you are using the Preprocessor, which is always the case if you are using DIAMOND outputs, you will not be using this worksheet.

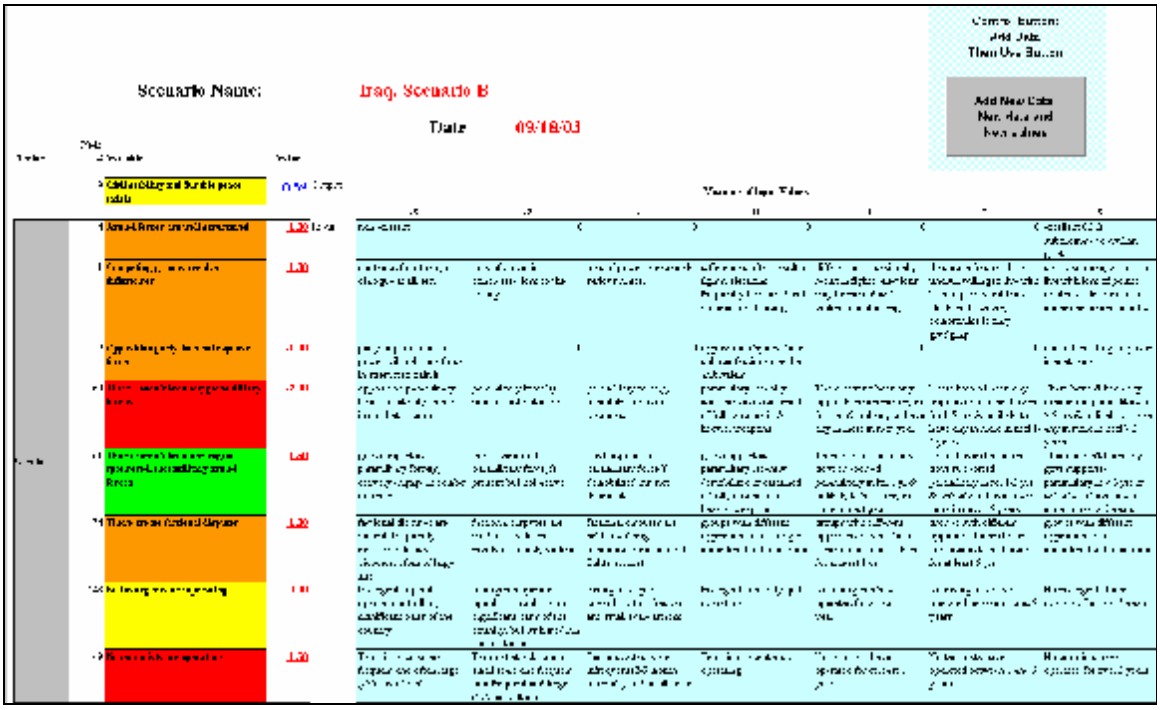


Figure 3-3. Part of the Internal Inputs sheet

The upper part of the sheet contains the input fields for the scenario name and the date of the current observation, which will apply to the subsequent input data. This part of the sheet also contains the Add New Data control button, the field headers for the lower part of the sheet and the output variable and its current value. The upper part of the sheet is fixed so that it always shows, despite downward scrolling of the sheet.

Use the Tab key to cycle through the input positions. Each position has a validation check to ensure that only proper values are entered. The Scenario Name field can be changed at any time; however, it only needs to be changed when a new scenario is being defined. It is a 40 character alpha-numeric field. The observation date must be changed for each new data entry. Fill in the date as mm/dd/yy. The input data

fields are restricted to values between -3.00 and +3.00, inclusive. Lower values represent negations of the variable name statements and positive values represent support of the statements. The seven columns to the right of the input location provide sample statements about the range of possible values for each variable to help define the value that fits the particular scenario situation at the observation date. The cell containing the variable definition has been set to change background color, depending on the variable value. The color scheme shown in Table 3-2 is carried out throughout the model. (Note that variables other than the input variables may assume values between -4.00 and +4.00 to allow for certain extreme behaviors, but prevent too much domination by extremes.)

Table 3-2. Color Codes

The variables change color to reflect their values:	
Green:	**1.00 <= Value <= 4.00**
Yellow:	**0.00 <= Value < 1.00**
Orange:	**-1.00 <= Value < 0.00**
Red:	**-4.00 <= Value < -1.00**

Once the input data for a particular observation and the corresponding external data (if interventions are being used) are satisfactory, click on the Add New Data control to add the new data (and all the intermediate calculations) to the Scenario History page, enabling the full use of the various Time Charts.

3.3 EXTERNAL INPUTS - INTERVENTIONS AND THE CAMPAIGN PLAN

The External Inputs consist of on-going interventions by one or more external agents. These interventions may be the uncoordinated efforts of multiple NGOs or the coordinated campaign plan of a military commander or a combination of uncoordinated and coordinated intervention efforts. The use of external inputs in the ISSM is optional. Table 3-3 lists most of the external inputs, with node number and Sector.

Table 3-3. ISSM Main External Inputs

Node	Name	Type	Sector
150	Medical treatment	Intervention	Needs
150.1	Medical treatment	Intervention	Needs
151	Food importation	Intervention	Needs
151.1	Food importation	Intervention	Needs
152	Food distribution	Intervention	Needs
152.1	Food distribution	Intervention	Needs
153	Water distribution	Intervention	Needs
153.1	Water distribution	Intervention	Needs
154	Negotiating bureaucracies to get relief	Intervention	Needs
154.1	Negotiating bureaucracies to get relief	Intervention	Needs
155	Resettlement processes	Intervention	Needs
155.1	Resettlement processes	Intervention	Needs
156	Providing temporary shelter/housing	Intervention	Needs
156.1	Providing temporary shelter/housing	Intervention	Needs
157	Buy local produce	Intervention	Economy
157.1	Buy local produce	Intervention	Economy
158	Support new planting	Intervention	Economy

Node	Name	Type	Sector
158.1	Support new planting	Intervention	Economy
159	Education facilities	Intervention	Govt
159.1	Education facilities	Intervention	Govt
160	Education supplies	Intervention	Govt
160.1	Education supplies	Intervention	Govt
161	Train teachers	Intervention	Govt
161.1	Train teachers	Intervention	Govt
162	Create local governments	Intervention	Govt
162.1	Create local governments	Intervention	Govt
163	Educate local governments	Intervention	Govt
163.1	Educate local governments	Intervention	Govt
164	Supply local governments	Intervention	Govt
164.1	Supply local governments	Intervention	Govt
165	Train police forces	Intervention	Govt
165.1	Train police forces	Intervention	Govt
166	Train military forces	Intervention	Govt
166.1	Train military forces	Intervention	Govt
167	Electricity production plants	Intervention	Physical
167.1	Electricity production plants	Intervention	Physical
168	Electricity distribution	Intervention	Physical
168.1	Electricity distribution	Intervention	Physical
169	Rebuild roads	Intervention	Physical
169.1	Rebuild roads	Intervention	Physical
170	Rebuild bridges	Intervention	Physical
170.1	Rebuild bridges	Intervention	Physical
171	Rebuild airports	Intervention	Physical
171.1	Rebuild airports	Intervention	Physical
172	Rebuild seaports	Intervention	Physical
172.1	Rebuild seaports	Intervention	Physical
173	Rebuild oil production	Intervention	Physical
173.1	Rebuild oil production	Intervention	Physical
174	Rebuild oil pipelines	Intervention	Physical
174.1	Rebuild oil pipelines	Intervention	Physical
175	Rebuild water lines	Intervention	Physical
175.1	Rebuild water lines	Intervention	Physical
176	Rebuild water & sewage treatment facilities	Intervention	Physical
176.1	Rebuild water & sewage treatment facilities	Intervention	Physical
177	Rebuild telecommunications	Intervention	Physical
177.1	Rebuild telecommunications	Intervention	Physical
178	New currency	Intervention	Economy
179	Interbanks payment system	Intervention	Economy
180	Targeted privatization	Intervention	Economy
180.1	Targeted privatization	Intervention	Economy
181	Development of microfinance systems	Intervention	Economy
181.1	Development of microfinance systems	Intervention	Economy
182	Commercial law to improve investment	Intervention	Economy
183	Public works programs to generate jobs	Intervention	Economy
183.1	Public works programs to generate jobs	Intervention	Economy
184	Insurance system	Intervention	Economy

Node	Name	Type	Sector
185	Mediating & negotiating w/ conflicting parties	Intervention	Conflict
185.1	Mediating & negotiating w/ conflicting parties	Intervention	Conflict
186	Establishing demilitarized zones, sanctions, and arms embargoes	Intervention	Conflict
186.1	Establishing demilitarized zones, sanctions, and arms embargoes	Intervention	Conflict
187	Maintaining compliance with peace accord milestones & conditions	Intervention	Conflict
187.1	Maintaining compliance with peace accord milestones & conditions	Intervention	Conflict
188	Implementing weapons control regimes	Intervention	Conflict
188.1	Implementing weapons control regimes	Intervention	Conflict
189	Demobilizing, reducing, or reintegrating military & paramilitary units	Intervention	Conflict
189.1	Demobilizing, reducing, or reintegrating military & paramilitary units	Intervention	Conflict
190	Providing job training and employment for discharged military personnel	Intervention	Conflict
190.1	Providing job training and employment for discharged military personnel	Intervention	Conflict
191	Establishing observer missions & interposing forces	Intervention	Conflict
191.1	Establishing observer missions & interposing forces	Intervention	Conflict
192	Reforming government economic policy	Intervention	Economy
193	Assisting in economic integration & cooperation	Intervention	Economy
194	Managing natural resources	Intervention	Economy
194.1	Managing natural resources	Intervention	Economy
195	Seeking investment capital	Intervention	Economy
195.1	Seeking investment capital	Intervention	Economy
196	Energy importation	Intervention	Economy
196.1	Energy importation	Intervention	Economy
197	Conducting war crimes investigations, tribunals, etc.	Intervention	Govt
197.1	Conducting war crimes investigations, tribunals, etc.	Intervention	Govt
198	Conducting constabulary operations	Intervention	Govt
198.1	Conducting constabulary operations	Intervention	Govt
199	Establishing, staffing & funding effective transition national govt	Intervention	Govt
200	Establishing a mechanism for constitutional reform	Intervention	Govt
201	Conducting nationwide elections	Intervention	Govt
201.1	Conducting nationwide elections	Intervention	Govt
202	Training newly elected national political leaders	Intervention	Govt
202.1	Training newly elected national political leaders	Intervention	Govt
203	Providing advisors to national govt officials	Intervention	Govt
203.1	Providing advisors to national govt officials	Intervention	Govt
204	Monitoring and reporting on corruption by govt officials	Intervention	Govt
204.1	Monitoring and reporting on corruption by govt officials	Intervention	Govt
205	Transferring control of government functions to host nation officials	Intervention	Govt
206	Monitoring government powersharing arrangements	Intervention	Govt
206.1	Monitoring government powersharing arrangements	Intervention	Govt
207	(Re)building & monitoring new police force	Intervention	Govt
207.1	(Re)building & monitoring new police force	Intervention	Govt
208	Providing advisors to police & criminal justice organizations & supporting establishment of operations	Intervention	Govt
208.1	Providing advisors to police & criminal justice organizations & supporting establishment of operations	Intervention	Govt
209	Creating or reforming & monitoring military	Intervention	Govt
209.1	Creating or reforming & monitoring military	Intervention	Govt
210	Assisting in establishing humane penal systems	Intervention	Govt
210.1	Assisting in establishing humane penal systems	Intervention	Govt

Node	Name	Type	Sector
211	Assisting in establishing/reforming legitimate legal system	Intervention	Govt
212	Monitoring human rights practices	Intervention	Govt
212.1	Monitoring human rights practices	Intervention	Govt
213	Conducting benign public information operations	Intervention	Misc
214	Promoting civic education	Intervention	Misc
214.1	Promoting civic education	Intervention	Misc
215	Sponsoring journalist training & professionalization	Intervention	Misc
215.1	Sponsoring journalist training & professionalization	Intervention	Misc
216	Reducing likelihood of population movements	Intervention	Movement
217	Coordinating NGO activities	Intervention	Needs
218	Prepositioning humanitarian relief stocks	Intervention	Needs
218.1	Prepositioning humanitarian relief stocks	Intervention	Needs
219	Establishing confidence-building and security measures	Intervention	Security
219.1	Establishing confidence-building and security measures	Intervention	Security
220	Providing security assistance to the host nation	Intervention	Security
220.1	Providing security assistance to the host nation	Intervention	Security
221	Safeguarding institutions of governance and key officials	Intervention	Security
221.1	Safeguarding institutions of governance and key officials	Intervention	Security
222	Negative impact of intervention (rapes, etc.)	Intervention	Misc
232	Providing security for HA activities	Intervention	Security
233	Providing security for PO activities	Intervention	Security
234	Providing security for Stability activities	Intervention	Security
235	Providing force security	Intervention	Security
237	Health infrastructure repair	Intervention	Needs
237.1	Health infrastructure repair	Intervention	Needs
239	Rebuild railroads	Intervention	Physical
239.1	Rebuild railroads	Intervention	Physical

Table 3-4 lists the remaining external inputs, inputs that control connections between some of the other external inputs as variable and reversible factors. The Analysts' Guide contains extensive descriptions of each of these inputs and information on how to decide the value to use for each one.

Table 3-4. ISSM Main Variable and Reversible External Inputs

FromNode	ToNode
18	7
24	7
24	10
24	29
24	41
24	46
24	52
28	8
39	7
44	42
50	24

You may input all of your external inputs as described below or you may use the UserWorksheet for some of the inputs. This worksheet is described in section 3.6 and the instructions for its use are contained in the Analyst's Guide. If you are using DIAMOND outputs as inputs to the ISSM, you will be using an extra worksheet for some of the external inputs. This process is described in section 3.6 and in the Analyst's Guide.

3.3.1 Slow Response

The external inputs sheet is very large and the response to your data entry may be unacceptably slow. You may increase the speed by changing the Excel recalculation from automatic to manual. You do this from the Tools/Options menu on the Calculation tab. While you are in manual recalculation mode, you should press the F9 key occasionally to force a recalculation. When you are finished entering data into the external inputs sheet, you will want to reset the recalculation option to automatic.

3.3.2 Preparation

Several actions are required to set up the ISSM to use external inputs. Most obviously, the control to activate the use of external inputs must be set. Less obviously, the user must define the dates, intervener labels, intervention units of measure, and time delays for intervention impact.

3.3.2.1 Select intervention

The first action required is to set the ISSM to use the External Inputs (Intervention) data. The user should set the radio button on the Controls sheet for "Intervention," as shown in Figure 3-4. If for some reason the user desires to examine the situation without using any intervention inputs, the radio button for "Observation" should be chosen on the Controls sheet, as in Figure 3-2, above.

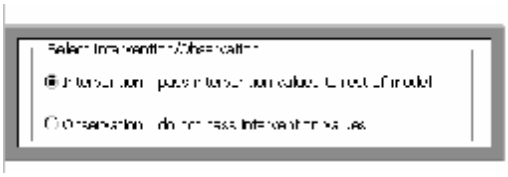


Figure 3-4. Choose to use External Inputs data

3.3.2.2 Define dates

Figure 3-5 contains the beginning of the External Inputs sheet. Red alphanumerics indicate input areas; black alphanumerics indicate protected cells. (The blue label that reads "From DiamondWorksheet" in the figure, may also read "From UserWorksheet" or "Other," depending on the user's choice of the Connect/Disconnect control in the Controller.)

The first input required is the date interval (normally seven days, shown in this figure as "30" days). This input determines the interval between the input dates for the external inputs. It is independent of the intervals for the internal inputs. For real situations, seven or 14 days are best; whereas for simulated situations, 30 days or longer are normal choices when things don't change very quickly.

The second input required is shown in the figure by the date "03/28/03." The user should enter the first intervention date for the particular scenario in this cell. The dates to the right of the first intervention date will show succeeding seven day intervals.

Direct Aid Activities			Date Interval in Days	30	Date Activity Started	
Node #	Sector	Activity	Value Definition	Units	03/20/03	04/19/03
		Normal Factors				
		Coalition Forces			0	
		Other US Depts & Agencies			1000	0
		UN Depts & Agencies				
		NGOs & PVOs			0	0
		From DiamondWorksheet				
150	Needs	Medical treatment	Quantity Treated, Max 100000000	People	1000	0
150.1	Needs	Medical treatment	Quantity Needing Treatment, Max 100000000	People	5000	20000
		Coalition Forces				
		Other US Depts & Agencies				
		UN Depts & Agencies				
		NGOs & PVOs			0	0
		From DiamondWorksheet				
237	Needs	Health infrastructure repair	Quantity finished in 8.57142857142857 wks, Max 100000000	units	0	0
237.1	Needs	Health infrastructure repair	Quantity Needed, Max 100000000	units		

Figure 3-5. Section of External Inputs sheet

The choice of the first intervention date is important because of the time delay inherent in many intervention impacts. The concept is simple, the user inputs the action when it occurs and the model makes sure that the impact occurs at the proper time. However, if the observations in the Internal Inputs part of the scenario take place after interventions have begun, some interventions may show incorrect values until the time delays have expired.

For example, in the scenario used to produce this user's guide, the impact of medical treatment is presumed to be immediate. If 20% of the people needing treatment receive treatment in a given week, the impact of that fact is passed to the non-intervention part of ISSM for evaluation in that same week. However, food importation is set to have a seven day delay in impact. Thus the delivery of 5% of the need for imported food in the first week does not show up until seven days later, in this case in the week where 40% of the need is met. If the first observation date in the Internal Inputs sheet were 04/04/03, and the first intervention date were 04/04/03, then there would be no entry to show that 5% of the imported food need was met on 04/04/03. The model would have a blank for that item and the total calculations would be incorrect until the next week. In this case, the first observation date should be on or after 04/04/03, given that the first intervention date is 03/28/03.

In general, the first intervention date should precede the first observation date by the longest time delay for any active intervention. However, the general rule is modified by saying that the first intervention date need not precede the earliest active intervention. Note that the interventions listed represent things that can be done, not things that are always done. Only those interventions that are actually done are active. And only active interventions enter into the calculations, with one exception. Zero interventions enter into the calculations. Zero interventions are those that the user has determined represent needs that

are unfilled, rather than potential interventions that are not needed in this scenario. Zero interventions will be discussed later in the Data Entry section.

3.3.2.3 Define labels

Intervener labels are defined at the beginning of the External Inputs sheet, as shown in Figure 3-5. In this case the following labels were defined:

- Coalition Forces,
- Other US Depts & Agencies,
- UN Depts & Agencies,
- NGOs & PVOs, and
- Do Not User This Row.

The first set of these labels appear in red or blue and represent the input cells. Succeeding appearances are programmed copies and appear in black, as they cannot be changed directly. The cells to the right of the labels, under the dates, are the input cells for the quantities supplied by each intervener. The "do not use" row is reserved for automatic inputs from either the UserWorksheet or the DiamondWorksheet.

3.3.2.4 Define units

Each intervention requires its own unit of measurement. In many cases, there may be only one meaningful unit and the user can leave the suggested unit label unchanged. However, in other cases, the unit of measurement may depend on the scenario, e.g., people vs thousands of people (KPeople), or the data source, e.g., pounds vs kilograms. Two examples are shown in Figure 3-5. As will be seen later, not all interventions have two parts, as shown in these two examples: quantity supplied and quantity needed. However, whenever the intervention does have two parts, the units for both should be the same, as the program will not compensate for any differences.

3.3.2.5 Define time delays

The time delay values (in days delay) are entered on the External 2 sheet, as shown in Figure 3-6. Note the correspondence between the interventions (or activities) shown in Figure 3-5 and the Activity shown here. The terminology used in the model is that the raw interventions reported on the External Inputs sheet are called activities and that these activities feed into the interventions that are reported to the observational part of the ISSM. More than one activity may feed into an intervention.

Direct Aid Activities					Date Interval in Days	7		Date Activity Started	
	Sector	Activity	Node #	To Node #	Name	Time Delay in Days	Weight	03/28/03	04/04/03
		Activity Amount Section							
	Needs	Medical treatment	150	141	Intervention health	0	1	0.20	0.06
	Needs	Food importation	151	136	Intervention food	7	1		0.05

Figure 3-6. Part of External 2 sheet

In fact, a single activity, may also feed into more than one intervention, as shown in Figure 3-7. Here the activity is "create local governments." This one activity has an impact on justice, the central authority, and social services. Note that in this example the time delays can vary. Here the user has determined that

the impact of creating local governments will take 56 days to impact the quality of the central authority, even longer before the quality of social services changes, and even longer before the quality of justice changes.

Direct Aid Activities					Date Interval in Days	7		Date Activity Started	
	Sector	Activity	Node #	To Node #	Name	Time Delay in Days	Weight	03/28/03	04/04/03
	Govt	Create local governments	162	127	Intervention justice	84	0.5		
	Govt	Create local governments	162	129	Intervention central authority	56	0.5		
	Govt	Create local governments	162	144	Intervention social services	70	0.5		

Figure 3-7. Another part of External 2 sheet

Note that while the entries under the Weight column are shown in red, these are not included in this section as data changes. These weights are part of the model and changes to them change the model. Model changes are not discussed in the User's Guide, but are reserved for the Analyst's Guide.

3.3.2.6 Define start points for intervention data

The external input fractions of the External 2 sheet are converted to scaled values on the External 3 sheet, shown in Figure 3-8. A fractional value of 1.0 will be converted to a +3, or very positive scaled value; however, the proper value for the lowest fractional value, 0.0, depends on the situation.

							To Node #
					Lookup Node		127
				Lookup Date Column			9
Node #	Node Name	Start Point Min=-3	Scale Factor	Total Weight	Scaled Weight	Num	12/07/12
127	Intervention justice	-2.00	5	4.75	0.95	6	#N/A
128	Intervention agriculture	-2.00	5	3.00	0.60	3	#N/A
129	Intervention central authority	-2.00	5	11.75	2.35	13	#N/A
130	Intervention LE corruption	-2.00	5	2.00	0.40	2	#N/A
131	Intervention critical industries	-2.00	5	1.00	0.20	1	#N/A
132	Intervention displaced pop	-2.00	5	2.00	0.40	2	#N/A

Figure 3-8. Part of the External 3 sheet

Because your interventions may not start on the same date as your observations, particularly if you have been observing the situation for some time before the interventions begin, you will not want a zero intervention to suddenly make the situation dramatically worse or better than if you had the intervention function turned off. In Figure 3-8, you see that the first intervention date is 12/7/12. You should check the value for the Output value (Civil stability and durable peace exists) for this date with intervention turned off and use that value as your low value, or Start Point. You can find this value on the ScenarioHistory sheet at about row 123. Rounding of the value is permissible. In the example, the actual value was -1.89 and a value of -2.00 was entered as the first Start Point. The formulas in the following rows copy this value for all the other intervention variables. The result is that a fractional value of 0.0 will be converted to a scaled value of -2.00; a fractional value of 1.0 will be converted to a scaled value of 3.00; and intermediate fractional values will be converted linearly to intermediate scaled values.

3.3.3 Data Entry

Data entry is performed in the External Inputs sheet, illustrated in Figure 3-5. All data are entered in the date columns, using the appropriate date for the activity starting time. Data may be entered in any of the

five intervener categories. The ISSM does not distinguish among the categories at any later stage of processing. The categories are strictly for user convenience in recording data and providing a history for later use.

3.3.3.1 Normal factors - input 'completed' and 'needed'

Most factors are like those shown in Figure 3-5, having two kinds of input. The intervener category rows represent the amount of completed (or started) intervention. These amounts are totaled in the first row containing the name of the factor, identified by the integer node number, e.g., nodes 150 and 151 in the figure. The other input that is required is the amount needed in that time period. These data are input in the second row containing the name of the factor, identified with a fractional node number, e.g., nodes 150.1 and 151.1.

These two inputs are combined in the External 2 sheet by dividing the totals by the needs to get a fraction. There are three special cases:

- No entries. If no entries are made either in the intervener's row or in the needed row, the factor has no impact on the ISSM results. Thus, if an intervention factor is not important for a scenario, the lack of input for that factor has the appropriate result. For example, if no roads need to be repaired and none are repaired, do not put any data in for that factor.
- Zero in the needed row. A zero in the needed row has the same effect as no entry, the factor has no influence for that time period; however, it makes a visible statement. This can be useful in emphasizing the lack of impact of a factor. It is probably more useful for times when the situation changes. For example, if an intervention has been taking place and has been so successful that no need remains, a zero in the needed row from that time on, as long as the situation lasts, is appropriate. The zero has this effect even if there are inputs in the intervener rows, indicating work is still proceeding. Because this represents unneeded work, a representation of no impact is basically correct.
- No intervener inputs, but positive needed inputs. In some cases, no intervention is taking place; however, a real need exists that should have an impact on the ISSM calculations. In this case, the user should enter data in the needed row and leave the interveners' rows blank (or enter zeros). The result is that a fraction equal to zero is passed along, yielding the most negative possible input for this factor.

3.3.3.2 Normal factors - input 'fraction completed'

Some factors have only one type of input, the interveners' rows. There is only one row containing the name of the factor and it has an integer node number. Unlike the case above, the input values do not represent amounts of something, but fractions of something (between zero and one, inclusive). The fraction is the part of the problem named by the factor that is being successfully addressed by the intervener at that time. The value definition cell of the row containing the factor name describes whether the combination of intervener values is a sum or an average.

There is only one special case. If the user determines the factor should not enter the calculations, all intervener inputs must be left blank.

3.3.3.3 Special factors - multipliers

There are several factors that enter into the ISSM calculations as multipliers, rather than as parts of weighted averages. These factors are segregated toward the bottom end of the External Inputs sheet and consist of one needs intervention and four security interventions.

The four Security factors are much like the input fraction factors. The combination is by summing and leaving the intervener cells blank leaves the total blank. They differ in permitting fractional values greater than one. Nodes 232, 233, and 234 act as multipliers for the intervention values computed by the various interventions affecting Humanitarian Assistance (HA), Peace Operations (PO), and Stability, respectively. The rationale is that providing security, whether adequate or not (as indicated by the fraction), affects these other interventions. The fourth Security factor, node 235, is similar; however, it is limited to a value of 1.0 and is a multiplier (later) of nodes 232, 233, and 234. The rationale is that insufficient force security is deleterious to other security interventions, and thus to interventions in general.

The needs factor concerns coordination of NGO efforts. Its inputs (in sum) range from 1.0 to 1.25. If no inputs are entered, the combination defaults to 1.0. Thus there are no special cases. The rationale is that coordination can lead to more effective distribution of NGO intervention efforts (reduced wastage, duplication, etc.). This factor is a multiplier of the Food, Health, Housing, and Water interventions.

3.3.3.4 Special factors - weights

A second category of special factors are those that consist of the weights that are used in weighted averages, rather than the values to be averaged. There are two in the model, one for benign public information operations, in which the value is assumed to be a +3.0 (or most positive input); however, the effectiveness of the operation is in question. This effectiveness is translated into the weight to accord this high valued input. The second weight factor refers to messages with negative impacts. It works the same as the first; however, the assumed value is -3.0 (or most negative input).

3.3.3.5 Special factors - reversible and variable

The final category of special factors are those factors that may pass positive values to another factor when they are themselves positive during some situations, but in other situations pass negative values when they are themselves positive. An example is the factor "displaced population decreases" and its relationship to "changes in population composition improve outlook." Generally, this will be a positive relationship because the decrease in displaced population is the result of resettlement activities. However, if the decrease is due to genocide, the relationship would be negative.

In its simplest mathematical implementation, this may be represented as changing the sign of the appropriate weights between the factors from positive to negative, while leaving the absolute value (or strength of the relationship) alone. However, it seems that if a relationship can change in that manner, in many cases it ought to be allowed to change continuously from the positive to the negative value.

Thus the final section of the External Inputs sheet (prior to a repeat of all the rows with zero valued inputs to permit initializing the model easily) consists of an area for entering the current values for these relationships. Column E contains the standard values for these inputs. If no values are entered in the dated columns, the standard values will be used.

3.4 USING THE TIME CHARTS

The ISSM provides several different data plotting charts to support the user in understanding its operations. Some charts support input verification and others support analysis of the results.

3.4.1 Selecting Data to Display on the Charts

All charts automatically graph the data from the earliest dated input to the last dated input. The user can also restrict the timeline to start or end at intermediate dates. To activate manual dates, the user enters the desired dates on the "Select Date Axis Method" control on the Controls sheet, as shown in Figure 3-9. The line above the entry cells for manual dates shows the current earliest and latest dates for reference. The user then clicks the radio button for "Manual Dates." To revert to automatic dates, simply click the radio button marked "Automatic Dates." Selecting a date axis method controls the date's axis on all charts.

Figure 3-9. Choose between automatic dates and manually selected dates

Manual dates must be entered before selecting that method, as the selection sends the manual date values to the charts. If you accidentally select manual dates before entering the desired date values, simply enter the date values and select automatic dates and then re-select manual dates.

You may also decide whether to display the vertical, or Y, axis scale on the charts. Omitting the scale may be useful when presenting the material to senior leaders, as it avoids discussions on the meaning of the numbers on the scale. To make this choice (or reverse it), select the appropriate radio button on the "Select Value Axis Display" control on the Controls worksheet, as shown in Figure 3-10.

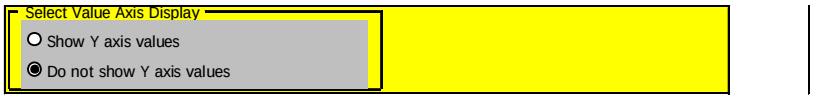


Figure 3-10. Choose to display or omit Y axis values

3.4.2 TimeChart1 - Internal Inputs and Core Values

The first chart sheet, TimeChart1, is labeled "Time Chart: Internal Inputs." It can display any one of eight different charts, including the major ISSM outputs and the various input variables. The user makes a choice by selecting from the pull-down list at the upper right. The second choice is shown in Figure 3-11. Each choice is preceded by the name of the scenario. The list below describes the eight charts.

- Stability and Peace: this choice displays only the values of the final output variable, "Civil stability and durable peace exists."
- Core values: this choice displays the final output variable and the seven core variables that are the last intermediate variables that feed into the measure of stability and peace.
- Conflict inputs: this choice displays the output variable and the eight inputs that are in the conflict sector.
- Economy inputs: this choice displays the output variable and the two inputs in the economy sector.
- Govt inputs: this choice displays the output variable and the eleven inputs in the government sector.
- Misc inputs: this choice displays the output variable and the six miscellaneous sector inputs.
- Movement inputs: this choice displays the output variable and the five movement sector inputs.

- Needs inputs: this choice displays the output variable and the two needs sector inputs.

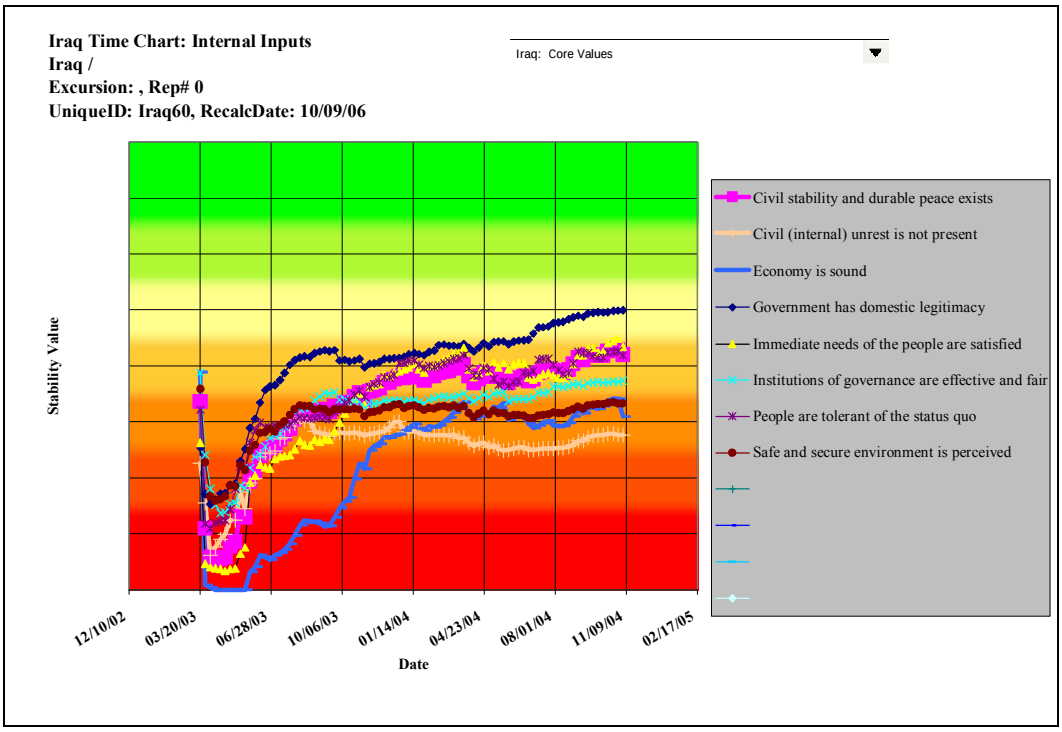


Figure 3-11. TimeChart1 showing Core Values

A brief examination of each of the input oriented charts will usually be sufficient to verify that the internal inputs have been entered correctly. The examination of output results may be rapid or may involve examination of other charts to understand important or subtle changes.

3.4.3 TimeChart2 - Intervention Values

The second chart sheet, TimeChart2, is labeled "Time Chart: Intervention." It can display any one of seven different charts relating to the various external input variables. The user makes a choice by selecting from the pull-down list at the upper right. The sixth choice is shown in Figure 3-12. Each choice is preceded by the name of the scenario and, as in the first chart sheet, all choices will include the output variable. The list below describes the seven charts.

- Conflict intervention: this choice displays the four conflict sector interventions.
- Economy intervention: this choice displays the nine economy sector interventions.
- Govt intervention: this choice displays the nine government sector interventions.
- Misc intervention: this choice displays the four miscellaneous sector interventions.
- Movement intervention: this choice displays the one movement sector intervention.
- Needs intervention: this choice displays the five needs sector interventions.
- Security intervention: this choice displays the four security sector interventions.

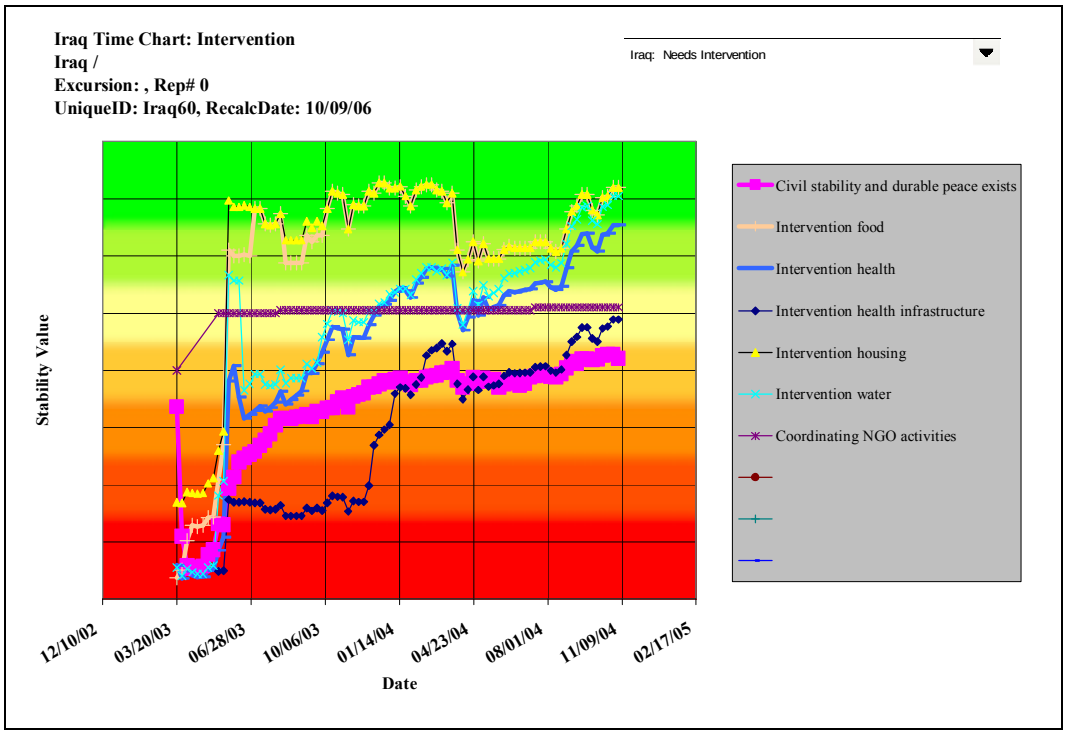


Figure 3-12. TimeChart2 showing Needs Interventions

A brief examination of each of the charts will usually be sufficient to verify that the external inputs have been entered correctly.

3.4.4 TimeChart3 - Intermediate Variables

The third chart sheet, TimeChart3, is labeled "Time Chart: Intermediate Vars." It can display any one of six different charts relating to the various intermediate variables. The user makes a choice by selecting from the pull-down list at the upper right. The sixth choice is shown in Figure 3-13. Each choice is preceded by the name of the scenario and, as in the first chart sheet, all choices will include the output variable. The list below describes the six charts.

- Intermediate Conflict vars: this choice displays the six conflict sector intermediate variables.
- Intermediate Economy vars: this choice displays the eleven economy sector intermediate variables.
- Intermediate Govt vars: this choice displays the nine government sector intermediate variables.
- Intermediate Misc vars: this choice displays the two miscellaneous sector intermediate variables.
- Intermediate Movement vars: this choice displays the six movement sector intermediate variables.
- Intermediate Needs vars: this choice displays the five needs sector intermediate variables.

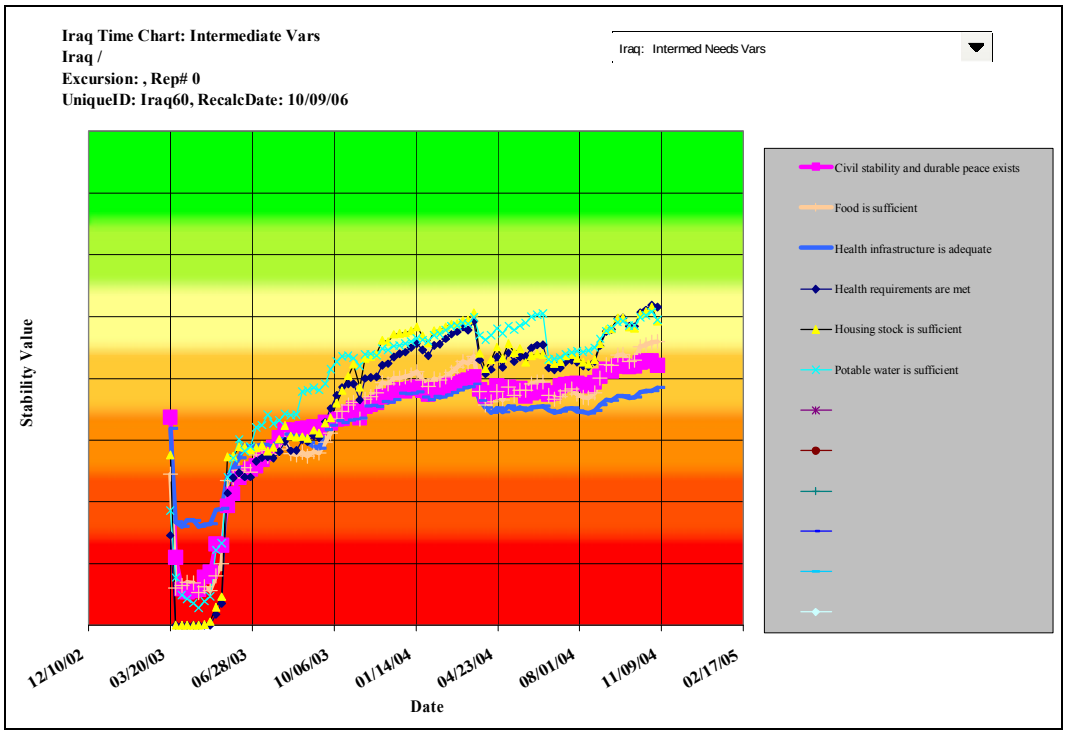


Figure 3-13. TimeChart3 showing Intermediate Needs Values

These charts may be useful in understanding how the input values flow through to the core variables and the output.

3.4.5 TimeChart4 - Custom Selections

The fourth chart sheet, TimeChart4, is labeled "Time Chart: Custom Data." Unlike the other charts, there is no pull-down list. This chart permits the user to select any 12 variables from the list of all internal input, external input, intermediate, and output variables. These selections are made on the Controls sheet, using the 12 pull-down lists shown in Figure 3-14.

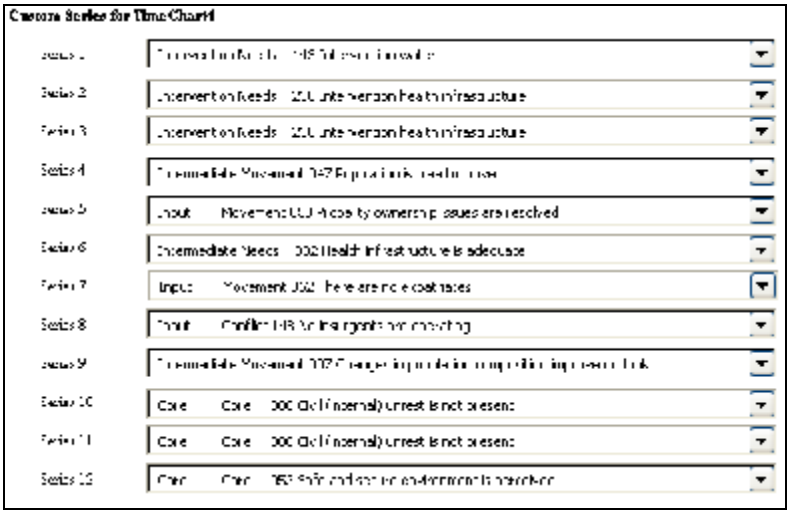


Figure 3-14. Pull-down selection boxes for the 12 custom series in TimeChart4

The user may display any collection of 12 variables desired, based on any rationale. This chart provides the flexibility that may be needed for presentations in which particular variables need to be compared, without being distracted by extraneous (for the particular purpose) variables. Null choices exist; however, the user may also choose to duplicate choices if fewer than 12 variables are desired for a particular graph. This chart does not require that the final output variable be included.

One choice is shown in Figure 3-15. The apparent logic is to connect the needs interventions to particular intermediate variables that are influenced by these interventions and then to the core variables and the output variable. This graph also shows how the angular traces of the externally input interventions are converted into nearly smooth traces as the influence of multiple variables is felt.

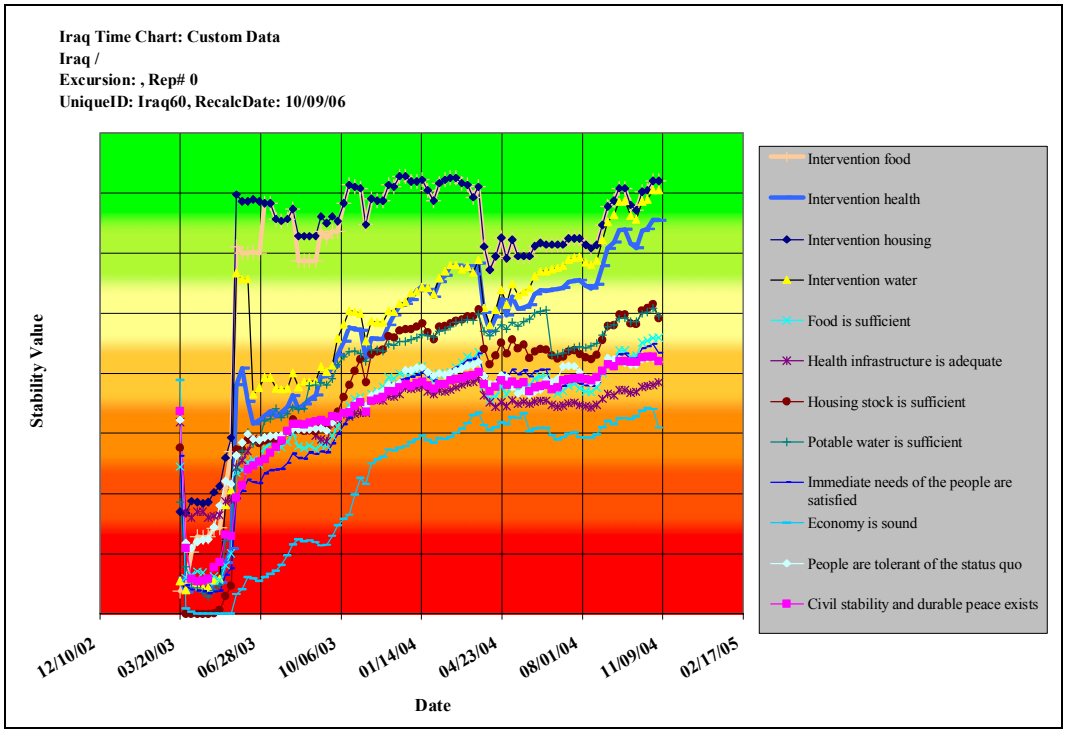


Figure 3-15. TimeChart4 showing selected custom variables

3.5 MODIFYING HISTORY

In the ISSM, you can change history. All of the inputs and intermediate results are recorded for plotting. Hence, if you change the inputs for a given date and recalculate all the intermediate results, you will have a new, consistent history. Naturally, this should be done to correct various types of errors, not to make the status look better.

3.5.1 Scenario Name

Change the scenario name on the Internal Inputs sheet. This change takes effect immediately. However, to make the change lasting, it is better to save the workbooks using the Controller, using a new scenario name and new common designator.

3.5.2 Internal Inputs History

A global historical data editing function is provided on the Scenario History worksheet. The cells with red contents contain the historical input data (that you entered). These cells are found in rows 5 & 7-40, columns F-BZ (Figure 3-16). The data below these rows consists of the history of the intermediate variables, which will be recalculated by the program.

					Initial	Dates			
			09/18/03	Iraq, Test Scenario	3/22/03	3/28/03	4/4/03	4/13/03	4/20/03
Group	**Sector**	**Nd#**	**VALUE**	**NODE Name**					
Input	Conflict	4	-1.00	Armed forces are well structured	2.00	0.00	-3.00	-3.00	-3.00
Input	Conflict	11	-1.00	Competing groups resolve differences	-1.00	-2.00	-3.00	-3.00	-3.00
Input	Conflict	59	-1.00	Opposition party does not espouse force	-1.00	-1.00	-3.00	-3.00	-3.00
Input	Conflict	60	-2.00	There haven't been any paramilitary forces	-1.00	-2.00	-3.00	-3.00	-3.00
Input	Conflict	61	1.50	There haven't been any regime-sponsored, non-military armed forces	-3.00	-3.00	-3.00	-3.00	-3.00
Input	Conflict	74	-1.00	There are no factional disputes	-2.00	-2.00	-3.00	-3.00	-3.00
Input	Conflict	148	0.00	No insurgents are operating	0.00	0.00	0.00	0.00	0.00
Input	Conflict	149	-1.50	No terrorists are operating	0.00	0.00	0.00	0.00	0.00
Input	Economy	124	-2.00	Foreign investment is available	0.00	-3.00	-3.00	-3.00	-3.00
Input	Economy	71	-2.00	Financial system is solid	-1.00	-3.00	-3.00	-3.00	-3.00
Input	Govt	35	1.00	Human rights are protected	-3.00	-3.00	-3.00	-2.00	-2.00
Input	Govt	45	1.50	Police are distinct from the military	-3.00	-3.00	-3.00	-3.00	-3.00
Input	Govt	49	-1.00	Prison structure is adequate	-2.00	-3.00	-3.00	-3.00	-3.00
Input	Govt	121	-2.00	Corruption in public office is not part of culture	-2.00	-2.00	-2.00	-2.00	-2.00
Input	Govt	122	1.00	Central government exists	3.00	2.00	0.00	-2.00	-3.00
Input	Govt	65	3.00	Drug cultivation is not a problem	3.00	3.00	3.00	3.00	3.00
Input	Govt	66	3.00	Drug manufacture is not a problem	3.00	3.00	3.00	3.00	3.00
Input	Govt	67	3.00	Drug transshipment is not a problem	3.00	3.00	3.00	3.00	3.00
Input	Govt	72	3.00	Drug use is not a problem	3.00	3.00	3.00	3.00	3.00
Input	Govt	69	0.00	Organized crime is not a problem	-1.00	-1.00	-1.00	0.00	0.00
Input	Govt	73	-1.50	Common crime is not a problem	1.00	0.00	0.00	-2.00	-2.00
Input	Misc	126	0.50	Education infrastructure is adequate	2.00	-3.00	-3.00	-3.00	-2.50
Input	Misc	21	-1.00	Educational system is tailored toward jobs	-1.00	-3.00	-3.00	-3.00	-3.00
Input	Misc	125	2.00	Government does not control domestic media's reporting of events	-3.00	-3.00	-3.00	-3.00	-3.00
Input	Misc	38	3.00	International media have open access to the reporting of events	-3.00	-3.00	-2.00	0.00	2.00
Input	Misc	43	0.50	People perceive that their interests are represented	-2.00	-3.00	-3.00	-3.00	-3.00
Input	Misc	44	2.00	People's spiritual needs are met	-1.50	-1.50	-1.50	-1.50	-1.50
Input	Movement	50	-0.50	Property ownership issues are resolved	-1.50	-1.50	-1.50	-1.50	-1.50
Input	Movement	54	1.00	Stress migration is not present	-2.00	-2.50	-3.00	-2.50	-2.50
Input	Movement	62	1.50	There are no expatriates	-2.00	-2.00	-2.00	-2.00	-2.00
Input	Movement	63	0.00	There is no displaced population	-3.00	-3.00	-3.00	-3.00	-3.00
Input	Movement	64	0.00	There are no migrants	-2.00	-2.00	-3.00	-2.00	-2.00
Input	Needs	5	0.00	Basic natural resource management is in place	-1.50	-3.00	-3.00	-3.00	-3.00
Input	Needs	58	0.50	Water distribution infrastructure is sufficient	-1.50	-3.00	-3.00	-3.00	-3.00
Intermediate	Conflict	16	-0.52	Demobilized armed forces are integrated into society	-0.5563	-1.182813	-2.332813	-2.332813	-2.332813
Intermediate	Conflict	17	-1.04	Disarmament is effective	-1.7604	-2.026042	-2.671875	-2.671875	-2.671875
Intermediate	Conflict	31	-0.37	Government-run military is effective	0.20833	-0.567708	-1.692708	-1.692708	-1.692708

Figure 3-16. Part of Scenario History sheet

If you find the need to modify the input data that has already been entered, you simply find the correct cells in the Records sheet, change their values, and press the Recalculate Data button (Figure 3-17) on the Controls sheet. The progress meter (Figure 3-18) will show the status of the recalculation. (The end point of the progress meter bar will not always coincide with the end point of the surround, depending on the number of dates you have input, because of rounding.) Typical reasons for needing this function include discovery of information that corrects prior inputs, realization that there has been an input error, or discovery of a systematic scaling problem.

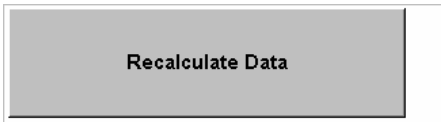


Figure 3-17. Recalculate control

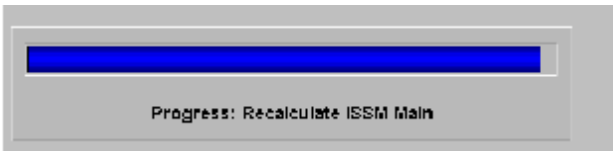


Figure 3-18. ISSM Main progress meter

The scaling problem will be frequently discovered in a first use of the ISSM. The user will discover after entering several sets of data that the cumulative improvement (or worsening) is too large, caused by using too large an increment of change (e.g., 1.00 vs 0.50) from one period to the next. The solution is to use the Time Chart to view the input variables, identifying the ones with too optimistic changes. As changes are made to the Records sheet, they will be reflected in the input data curves in the Time Chart. However, the calculated variables, Core and Output, will not change until the Recalculate Data button is used.

If you are using the Preprocessor, this process will work; however, your changes will be overlaid with the old data the next time you "copy data" from the Preprocessor to the ISSM Main. To avoid this, make the changes in the Preprocessor, then perform the "copy data" function.

3.5.3 Interventions History

To change interventions, simply change the data in the External Inputs sheet and push the Recalculate Data button on the Controls sheet (Figure 3-17).

3.5.4 Implementing Changes

Because the ISSM only works on one date/observation at a time, changes to the history require sequential recalculation of any dates with changed data. Rather than attempting to keep track of data changes, the model is designed to recalculate all data when the Recalculate Data button on the Controls sheet is pushed (Figure 3-17).

3.6 USING THE USER AND DIAMOND WORKSHEETS

The ISSM Main workbook contains two structured, but essentially blank, worksheets, named "UserWorksheet," and "DiamondWorksheet." These worksheets allow the user to calculate the values to be used for the external inputs (Table 3-3) within the ISSM itself and allow the user to retain metadata within the model, rather than in external files. For example, if the user has multiple sources for the data, he may annotate which data comes from each source before passing it on for use in the model. The user may also manipulate the data in any desired fashion in the worksheet prior to passing it on. These manipulations may be as simple as summing data from two sources or as complex as applying non-linear utility functions to the data so that the resulting scaled values reflect the correct relationships within the model.

3.6.1 The UserWorksheet

Figure 3-19 illustrates the concept. In the top half of the worksheet, the user builds in the worksheet a form that allows him to enter the data from available sources, then creates any needed computations based on these data.

The first row must contain the dates for the interventions and these dates must be exactly the same as the dates in the ExternalInputs worksheet.

In this example, the planned statuses (with time offset data noted for manual coordination) of three airports are combined to yield a single airport-reconstruction status on the row containing the value "171" in the first column. The "171" is a user created memorandum to the effect that the data in this row will be needed by node 171 in the ExternalInputs worksheet. For inputs requiring two nodes (as this one does), the user may create a separate row labeled, for example "171.1," or the user may select a cell to hold a constant goal value (note the value "3" in the "Goal" column of the "171" row) and take care of the propagation of this goal in the bottom half of the worksheet. There is a column labeled "units" (not shown) that you may use to define the units for the node.

	Area	Goal	Description	10/1/03	10/7/03	10/16/03	10/20/03	10/27/03	11/3/03	11/10/03	11/18/03	11/25/03	12/9/03
167	**Electricity**	**6000**	**MW (subtract start**	**3927**	**4518**	**4518**	**4518**	**3500**	**3600**	**3800**	**3800**	**3600**	**3600**
		75	percent of Iraqis by 2004		75	75	75	65	70	75	75	70	70
		902	MW hydropower	905	905	905	905						
		2	Hartha boilers	1	1	2	2	2					
	1wk	60	repair activity	1	2	3	4	5	6	7	8	9	10
							LPG pipeline sabotage						
	Airport	2	Baghdad	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.8
	7wks	2	Mosul	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
		2	Basrah	0.8	0.8	0.9	1	1	1	1	1	1.2	1.3
171	**7wks**	**3**		**0.9**	**1**	**1.1**	**1.2**	**1.25**	**1.25**	**1.3**	**1.4**	**1.55**	**1.65**
	Bridges	2	Al-Mat	1 done	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
		2	Khazir	0.5	1	1	1	1	1	1	1	1	1
		2	Tikrit	0.5	1	1	1	1	1	1	1	1	1
		0.36	other bridges			0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
170	**6wks**	**3.36**		**1**	**1.5**	**2.11**	**2.11**	**2.11**	**2.11**	**2.11**	**2.11**	**2.11**	**2.11**
		1	Concrete fabricatior	1	1	1	1						
239	**13mon**	**72**	**km railroad**				**58**	**72**	**72**	**72**	**72**	**72**	**72**
169	**6wks**	**240**	**roads, km**	**60**	**70**	**80**	**90**	**100**	**110**	**110**	**110**	**110**	**110**
172	**Seaport**	**1**	**Umm Qasr**	**0.75 done**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
	Telecom	21	cities fiber optic link	0.10	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4
	6wks	1	million lines operati	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19
		2000	miles cable by Nov	0.10	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
		12	switch sites	0.00	8	8	9	8	8	8	8	8	8
177	**12wks**	**47**		**1.1002**	**9.2002**	**9.3002**	**10.4002**	**9.5002**	**9.7002**	**9.9004**	**10.0004**	**10.1004**	**10.3004**

Figure 3-19. UserWorksheet with sample entries

In the bottom half of the worksheet (Figure 3-20), the user collects all of the entries that will connect to the ExternalInputs worksheet.

The first step is to place formulas in the "dates" box to copy the dates from the top of the worksheet. Make sure that the resulting dates correspond exactly to the dates in ExternalInputs, including the number of dates, so that the last date in this worksheet corresponds with the last date in ExternalInputs.

The inputs should be in numerical order of the nodes that will be connected. If additional rows are needed, use the Excel "insert row" function to insert rows within the light orange section, which defines the area that will be connected. The user should start the first row of data below the double lines separating the instructions and dates, leaving at least one blank row in case nodes with smaller numerical values need to be inserted later.

Use this block for memo items, such as date offset. No links allowed.	You must identify the Node #	Insert as many rows as desired in the shaded area below the double line and above the last shaded row. You may not insert columns. Put dates in box below - Column positions **MUST CORRESPOND** with dates in ExternalInputs, with dated data in the area below the double line													
		Units	3/20/2003	3/27/2003	4/3/2003	4/10/2003	4/17/2003	4/24/2003	5/1/2003	5/8/2003	5/15/2003	5/22/2003	5/29/2003	6/5/2003	6/12/2003
	158	fraction													
	158.1	whole							1	1	1	1	1	1	1
	159	schools													
	159.1	schools								4400	4400	4400	4400	4400	4400
	160	units													
	160.1	units										33.2815	33.2815	33.2815	33.2815
	161	teachers													
	161.1	teachers												71320	71320
	162	fraction													
	162.1	whole								1	1	1	1	1	1
	163	fraction													
	163.1	whole								1	1	1	1	1	1
	164	units													
	164.1	units					800	800	800	800	800	800	800	800	800
	165	people								500	500	500	500	500	1000
	165.1	people								10000	20000	20000	20000	20000	20000

Figure 3-20. Section of the bottom half of the UserWorksheet

In the "Node #" column, place a formula that copies the node number from the top half of the worksheet. If you used a constant goal, use a formula that adds 0.1 to the value for the node number. If you defined the units in the top half, place a formula that copies its value, otherwise, type the definition into the "Units" column. Note that nodes 158 and 158.1 use "fraction" and "whole" because the logic in the upper half has taken care of the ratio of intervention to goal, whereas nodes 165 and 165.1 both use "people" because this ratio will be calculated in ExternalInputs.

Within the body of the section, place formulas that copy the values of the proper row, beginning at the desired date (see Figure 3-20 for examples). The column identification of the formula will be the same as the column into which the formula is being placed.

When the user selects the "Connect/Disconnect" control in the Controller workbook, it will create the formulas in ExternalInputs to use these values in the proper places. The Analyst's Guide contains more explicit instructions on the use of this worksheet, including the use of Excel "copy," rather than "cut" to correct errors.

3.6.2 The DiamondWorksheet

To use the ISSM with DIAMOND, you should use the DiamondWorksheet, rather than the UserWorksheet. The DiamondWorksheet has the same structure; however, it contains pre-built logic to convert DIAMOND outputs to ISSM inputs. You will also need to use the Preprocessor, as some DIAMOND outputs require conversion to create the ISSM observations (internal inputs).

The DIAMOND outputs are entered into the DiamondWorksheet and the manual inputs are entered into the ExternalInputs worksheet. When the user selects the "Connect/Disconnect" control in the Controller workbook, it will create the formulas in ExternalInputs to use these values in the proper places. The Analyst's Guide contains more explicit instructions on the use of this worksheet.

3.7 CHANGING THE MODEL

See Analysts' Guide for details.

3.8 SAVE YOUR WORK FREQUENTLY

At intervals, you should return to the Controller and use the Save control to save your work. You may then return to the Postprocessor to continue.

4. PREPROCESSOR V4.0 OPERATING INSTRUCTIONS

These instructions assume that all of the custom Preprocessor logic has been built. See the Analyst's Guide for instructions on constructing and modifying the logic.

4.1 PREPARE FOR A NEW SCENARIO

If the new scenario is a variant of an old scenario, do not clear the old data, make any changes that are required manually. If you are using the UserWorksheet or DiamondWorksheet, you will also have to make manual changes to reflect the proper connections from it to the RawData worksheet. Do not clear the old data. Refer to the Analyst's Guide, section 7.16 for instructions. Otherwise, use the "Erase Old Data" button on the Controls worksheet (Figure 4-1). Note that the scenario name and the file name of the ISSM Main workbook are entered by the Controller. Enter the new Scenario Name by shifting to the ISSM Controller workbook and using the Save procedure to create the new name and save the files to a new location.

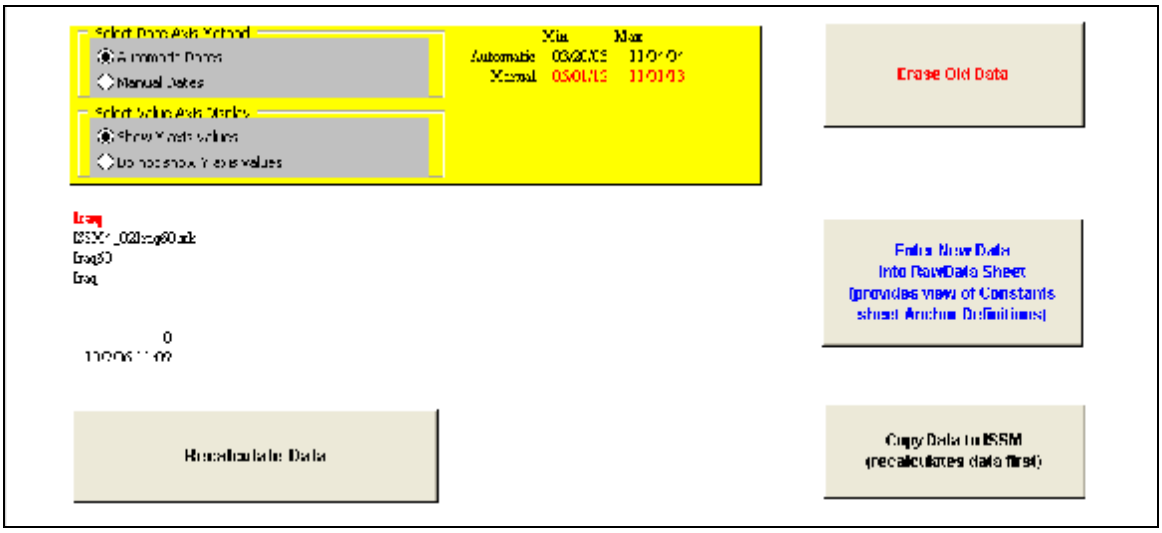


Figure 4-1. Top half of Preprocessor Controls worksheet

4.2 ENTERING DATA

The data entry process for the Preprocessor is relatively simple once the logic has been defined. The difficult part is obtaining the data to enter. For each Preprocessor output (ISSM Main input) there will be one "Expert …" input and zero or more other inputs. The "other" inputs represent relatively quantitative data that are available, while the "Expert …" inputs represent the expert opinion(s) available. There are restrictions on the node numbers that can be created in the Preprocessor (and Postprocessor). Table 4-1 shows the allowed values for the various uses. See the Analyst's Guide for more information on this topic.

Table 4-1. Node Range Restrictions

Program and type	Node Range	Subtype
ISSM Main Input (internal & external)	1-999	Program Defined Inputs
Preprocessor Input	1001-1100	Program Defined Expert Input
Preprocessor Input	1101-1400	Custom Input
Preprocessor Input	1401-1500	Diamond Input
Preprocessor Middle Node	1501-1900	Custom Middle Node
Preprocessor Middle Node	1901-1999	Diamond Middle Node
Postprocessor Output	2001-2400	Custom Output
Postprocessor Output	2401-2500	Standard Output
Postprocessor MOMs	2501-2900	Custom MOMs
Postprocessor MOMs	2901-2999	Standard MOMs

4.2.1 Preparation

Figure 4-2 shows a portion of the RawData worksheet. If this is a brand new scenario and you have used the Erase control, the date columns (including the date) will be empty. The only preparation necessary is to make sure that you enter the date for each column of data.

Raw Observations					Measurement Dates	
Node #	Sector	Activity	Value Definition	Units	3/22/03	3/28/03
		Normal Factors				
		Insert rows following this row				
1001	Conflict	Equivalent battalion sized units	Well organized & trained battalion sized units	#Units	350	200
1001.1	Conflict	Total battalion sized units	All units	#Units	400	400
1002	Conflict	Equivalent competent generals	Competent generals	#	35	20
1002.1	Conflict	Total generals	All generals	#	40	40
1003	Conflict	Civilian control of military	rating -3 to +3	rating	2	0
1004	Needs	Natural resource infrastructure	rating -3 to +3	rating	-1	-1.5

Figure 4-2. RawData worksheet

4.2.2 Data Entry

As shown in Figure 4-2, there are only two types of data to be entered, pairs of numbers representing actual versus desired quantities, and ratings on a scale of -3 to +3.

If you desire help in anchoring your choices on the rating inputs, you may click on the "Enter New Data" button on the Controls sheet of the Preprocessor. This will create two Preprocessor windows and arrange all of the open workbooks "horizontally" (meaning the windows are stacked vertically).

Once you are finished entering data, you may close either window and maximize the other one. If, by accident, you close both windows, you will be asked if you wish to save the second one. Navigate to the correct folder and save it. Then return to the Controller and use the Open control to reopen it. You should use the Recalculate button on the Preprocessor Controls sheet to complete the calculations.

At any time, you may use the "Enter New Data" control in the Preprocessor to continue entering data.

4.3 MODIFYING DATA

Modifying data is simple, simply change the desired numbers in the RawData worksheet (see Figure 4-2). Once you are satisfied with your changes (or at any time, for that matter), click on the "Recalculate" button on the Preprocessor's Controls worksheet (see Figure 4-1). The recalculation process will update all of the preprocessor output. Figure 4-3 shows the progress meter that shows the status of the recalculation. (The end point of the progress meter bar will not always coincide with the end point of the surround, depending on the number of dates you have input, because of rounding.)

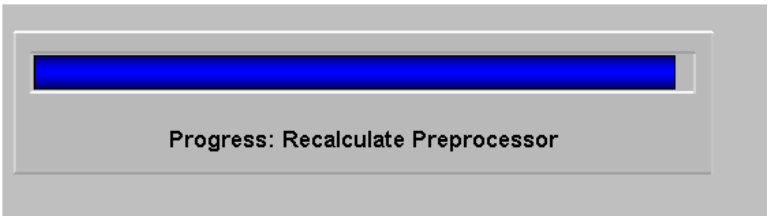


Figure 4-3. Preprocessor progress meter

4.4 VIEWING DATA GRAPHICALLY

Because the Preprocessor does not produce any final ISSM output results and its internal logic is user-defined, there are no pre-designed charts.

4.4.1 TimeChart - Custom Selections

The charting process that is available is meant to support your verification of your inputs and your logic. It permits you to select any set of 12 variables from the scaled variables (created directly from you input, see the Analyst's Guide for more details), intermediate variables, and Preprocessor output variables for viewing. You may reselect your choices as many times as necessary to ensure that what you meant to do is what was done. These selections are made on the Controls sheet using the 12 pull down controls as shown in Figure 4-4.

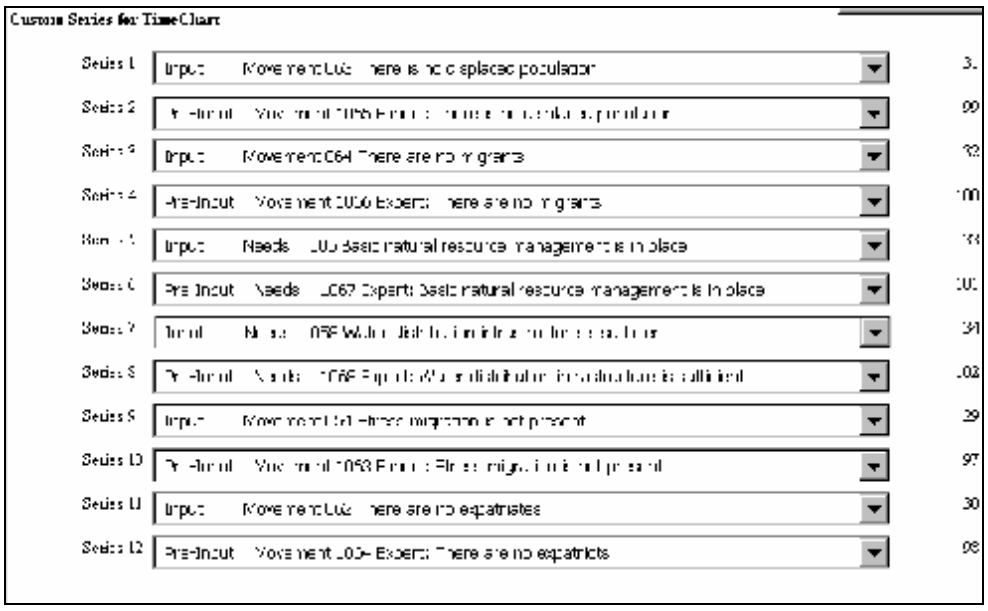


Figure 4-4. Bottom half of the Preprocessor Controls sheet

Figure 4-5 shows the results of one selection.

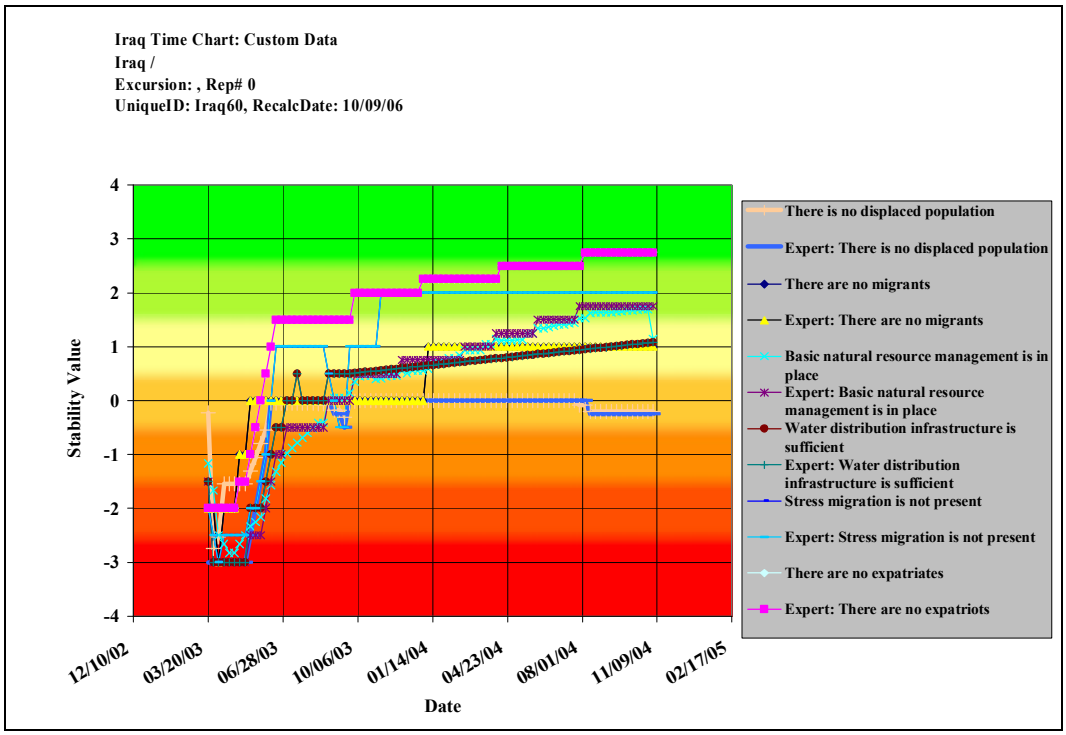


Figure 4-5. Preprocessor TimeChart

4.4.2 Selecting Data to Display on the Charts

All charts automatically graph the data from the earliest dated input to the last dated input. The user can also restrict the timeline to start or end at intermediate dates. To activate manual dates, the user enters the desired dates on the "Select Date Axis Method" control on the Controls sheet, as shown in Figure 4-1. The line above the entry cells for manual dates shows the current earliest and latest dates for reference. The user then clicks the radio button for "Manual Dates." To revert to automatic dates, simply click the radio button marked "Automatic Dates." Selecting a date axis method controls the date's axis on all charts. Manual dates must be entered before selecting that method, as the selection sends the manual date values to the charts. If you accidentally select manual dates before entering the desired date values, simply enter the date values and select automatic dates and then re-select manual dates.

You may also decide whether to display the vertical, or Y, axis scale on the charts. Omitting the scale may be useful when presenting the material to senior leaders, as it avoids discussions on the meaning of the numbers on the scale. To make this choice (or reverse it), select the appropriate radio button on the "Select Value Axis Display" control on the Controls worksheet, as shown in Figure 4-1.

4.5 USING THE USER- AND DIAMOND- WORKSHEETS

The Preprocessor workbook contains two essentially blank, but structured, worksheets, named the "UserWorksheet" and the "DiamondWorksheet." These worksheets allow the user to calculate the values to be used for the ISSM internal inputs (Table 3-1) within the ISSM system itself and allow the user to retain metadata within the model, rather than in external files. For example, if the user has multiple

sources for the data, he may annotate which data comes from each source before passing it on for use in the model. The user may also manipulate the data in any desired fashion in the worksheet prior to passing it on. These manipulations may be as simple as summing data from two sources or as complex as applying non-linear utility functions to the data so that the resulting scaled values reflect the correct relationships within the model.

4.5.1 The UserWorksheet

Figure 4-6 illustrates the concept. In the top half of the worksheet, the user builds in the worksheet a form that allows him to enter the data from available sources, then creates any needed computations based on these data.

The first row must contain the dates for the interventions and these dates must be exactly the same as the dates in the RawData worksheet.

In this example, a node for a scaled rating for displaced persons has been defined with the number 1130. Actual numbers of displaced persons are placed in the worksheet and converted to scaled values (-3.00 to +3.00) in the next row. The node number is placed in the first column of this row, the node name in the fourth column and the units (in this case, "rating") in the fifth column. The second example in the bottom of the figure has a node number of 1126 and represents a scaled investment value. Actual dollars invested are entered in columns representing dates beyond those shown in the figure and are converted by a formula that uses the constant ("4560," shown in column 1); however, these data were not available for the earlier dates shown in the figure. The numbers shown for node 1126 are user created extrapolations from the dates with data.

ISSM Preprocessor UserWorksheet				Use the area below for data input and calculations. Insert as many rows as des Use the shaded area below the input and calculation area to copy final results f						
node					3/20/03	3/27/03	4/3/03	4/10/03	4/17/03	4/24/03
			Displaced			300.00	246.00	13.00	13.00	13.00
1130			**Displaced**	**rating**	**2.55**	**-2.50**	**-2.05**	**-0.11**	**-0.11**	**-0.11**
	max=0	Invest $								
4560										
		Invest scaled								
1126			**Invest sca**	**rating**	**0.00**	**-3.00**	**-3.00**	**-3.00**	**-3.00**	**-3.00**

Figure 4-6. UserWorksheet, upper part, with sample data

In the bottom half of the worksheet (Figure 4-7), the user collects all of the entries that will connect to the RawData worksheet.

The first step is to place formulas in the "dates" box to copy the dates from the top of the worksheet. Make sure that the resulting dates correspond exactly to the dates in RawData, including the number of dates, so that the last date in this worksheet corresponds with the last date in RawData.

The inputs should be in numerical order of the nodes that will be connected. If additional rows are needed, use the Excel "insert row" function to insert rows within the light orange section, which defines the area that will be connected. The user should start the first row of data below the double lines separating the instructions and dates, leaving at least one blank row in case nodes with smaller numerical values need to be inserted later.

ISSM Preprocessor UserWorksheet		Use the area below for data input and calculations. Insert as many rows as des Use the shaded area below the input and calculation area to copy final results f						
Use this block for memo items No links allowed.	You must identify the Node #	Insert as many rows as desired in the shaded area below the double line and ab Units	Put dates in box below - Column positions **MUST CORRESPOND** w 3/20/2003	3/27/2003	4/3/2003	4/10/2003	4/17/2003	4/24/2003
	1101	EffBatallior	175	50	10	0	0	0
	1101.1	EffBatallior	200	200	200	200	200	200
	1102	EffBatallior	175	40	0	0	0	0
	1102.1	EffBatallior	200	200	200	200	200	200
	1104	rating	-1.00	-1.00	-1.50	-2.00	-2.50	-2.50
	1105	rating	-1.00	-1.00	-3.00	-3.00	-3.00	-3.00

Figure 4-7. UserWorksheet, lower part, with sample data

In the "Node #" column, place a formula that copies the node number from the top half of the worksheet. If you used a constant goal, use a formula that adds 0.1 to the value for the node number. If you defined the units in the top half, place a formula that copies its value, otherwise, type the definition into the "Units" column.

Within the body of the section, place formulas that copy the values of the proper row, beginning at the desired date. The column identification of the formula will be the same as the column into which the formula is being placed.

When the user selects the "Connect/Disconnect" control in the Controller workbook, it will create the formulas in RawData to use these values in the proper places. The Analyst's Guide contains more explicit instructions on the use of this worksheet, including the use of Excel "copy," rather than "cut" to correct errors.

4.5.2 The DiamondWorksheet

To use the ISSM with DIAMOND, you should use the DiamondWorksheet, rather than the UserWorksheet. The DiamondWorksheet has the same structure; however, it contains pre-built logic to convert DIAMOND outputs to ISSM inputs.

The DIAMOND outputs are entered into the DiamondWorksheet and the manual inputs (such as the variables labeled "Expert …") are entered into the RawData worksheet. When the user selects the "Connect/Disconnect" control in the Controller workbook, it will create the formulas in RawData to use these values in the proper places. The Analyst's Guide contains more explicit instructions on the use of this worksheet.

4.6 COPYING RESULTS TO THE ISSM

When you are ready to copy your results to the ISSM, first use the Save button on the Controller to save all of the ISSM workbooks prior to the copy process (in case the computer crashes). Then use the "Copy Data to the ISSM" button on the Preprocessor Controls sheet, shown in Figure 4-1. You will see the data being copied to the ISSM ScenarioHistory sheet. Once the copy process has finished, the main ISSM workbook will be active. Go to its Controls sheet and click on the Recalculate button. Once this process is complete, you will be ready to check your external inputs for completeness. Your ISSM workbook is now up to date.

4.7 SAVE YOUR WORK FREQUENTLY

At intervals, you should return to the Controller and use the Save control to save your work. You may then return to the Preprocessor to continue.

5. POSTPROCESSOR V4.0 OPERATING INSTRUCTIONS

These instructions assume that all of the custom Postprocessor logic has been built. There are restrictions on the node numbers that can be created in the Postprocessor (and Preprocessor). Table 4-1 shows the allowed values for the various uses. See the Analyst's Guide for instructions on constructing and modifying the logic.

5.1 PREPARE FOR A NEW SCENARIO

You prepare the Postprocessor for a new scenario by clicking on the "Erase Old Data" button on the Postprocessor Controls sheet (Figure 5-1). Note that the Controller has entered the current scenario name and file name for the main ISSM.

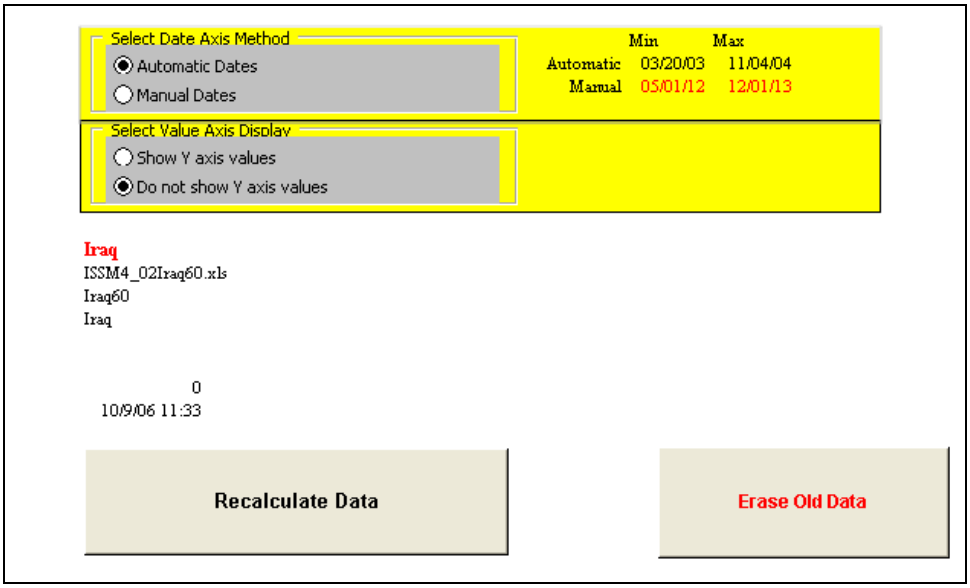


Figure 5-1. Top half of Postprocessor Controls sheet

5.2 ENTERING DATA

There is no data to enter for the Postprocessor once the logic has been defined. The Postprocessor automatically copies the output data from the main ISSM workbook (which is one reason it must be open whenever the Postprocessor is used). However, the Postprocessor logic is only exercised automatically for the current data. To insure that all the data has been run through the logic, you should click the "Recalculate Data" button on the Postprocessor Controls sheet (Figure 5-1). The progress meter (Figure 5-2) will indicate the status of the recalculation. (The end point of the progress meter bar will not always coincide with the end point of the surround, depending on the number of dates you have input, because of rounding.)

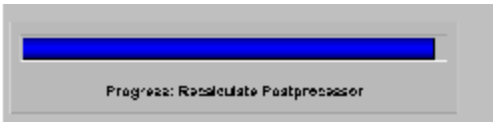


Figure 5-2. Postprocessor progress meter

5.3 MODIFYING DATA

There is no data to modify in the Postprocessor. Any time the data in the main ISSM has been modified, either directly or through the Preprocessor, you should click the "Recalculate Data" button on the Postprocessor Controls sheet (Figure 5-1).

5.4 VIEWING DATA GRAPHICALLY

Because the Postprocessor produces only custom outputs, there are no pre-designed charts.

5.4.1 TimeChart - Custom Selections

The charting process that is available is meant to support your custom outputs and to check your logic. (see the Analyst's Guide for details on creating and modifying the logic.) It permits you to select any set of 12 variables from the intermediate variables and Postprocessor output variables for viewing. You may reselect your choices as many times as necessary to ensure that what you meant to do is what was done. These selections are made on the Controls sheet using the 12 pull down controls as shown in Figure 5-3. The results are shown in Figure 5-4.

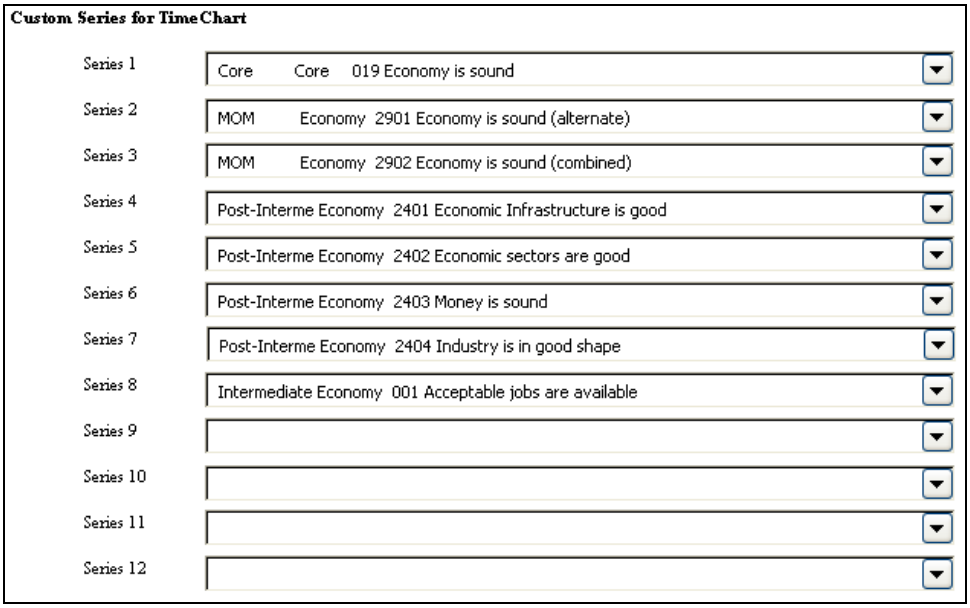


Figure 5-3. Bottom half of Postprocessor Controls sheet

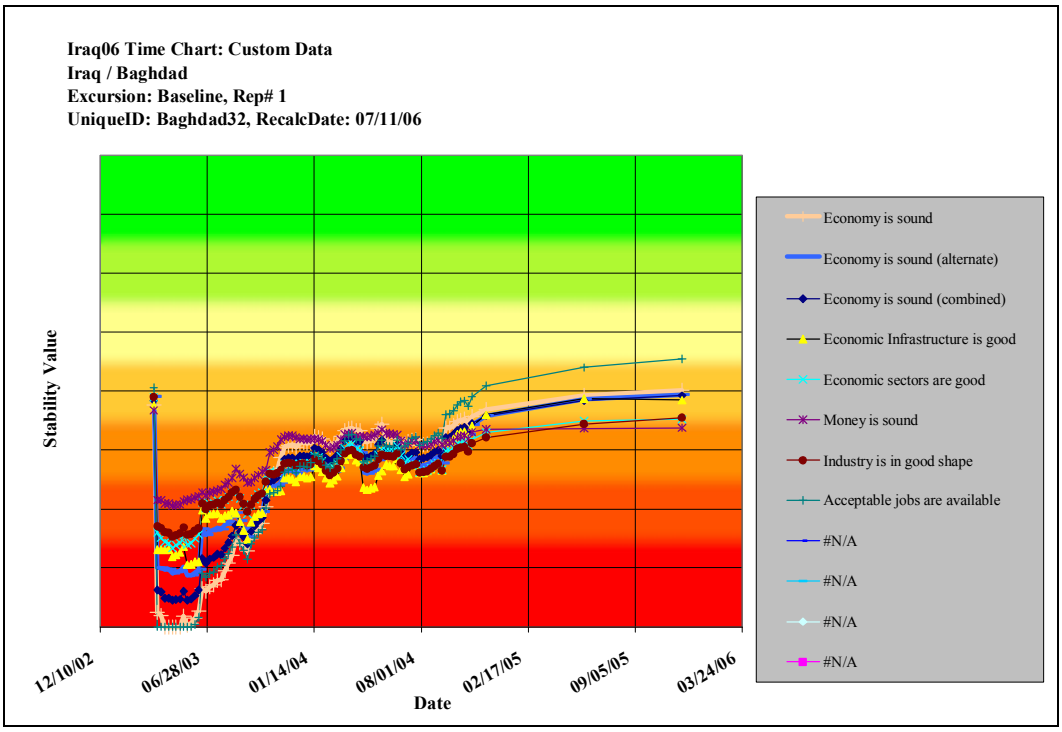


Figure 5-4. Postprocessor custom TimeChart

5.4.2 Selecting Data to Display on the Charts

All charts automatically graph the data from the earliest dated input to the last dated input. The user can also restrict the timeline to start or end at intermediate dates. To activate manual dates, the user enters the desired dates on the "Select Date Axis Method" control on the Controls sheet, as shown in Figure 5-1. The line above the entry cells for manual dates shows the current earliest and latest dates for reference. The user then clicks the radio button for "Manual Dates." To revert to automatic dates, simply click the radio button marked "Automatic Dates." Selecting a date axis method controls the date's axis on all charts. Manual dates must be entered before selecting that method, as the selection sends the manual date values to the charts. If you accidentally select manual dates before entering the desired date values, simply enter the date values and select automatic dates and then re-select manual dates.

You may also decide whether to display the vertical, or Y, axis scale on the charts. Omitting the scale may be useful when presenting the material to senior leaders, as it avoids discussions on the meaning of the numbers on the scale. To make this choice (or reverse it), select the appropriate radio button on the "Select Value Axis Display" control on the Controls worksheet, as shown in Figure 5-1.

5.5 USING THE POSTPROCESSOR WITH THE DIAMOND SIMULATION

There is no difference in using the Postprocessor with DIAMOND and using it without DIAMOND.

5.6 SAVE YOUR WORK FREQUENTLY

At intervals, you should return to the Controller and use the Save control to save your work. You may then return to the Postprocessor to continue.