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Electronic Mapping Systems, Inc.

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USING AUTOMATED TOOLS TO IMPLEMENT SELECTED INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB) FUNCTIONS

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TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	
101	Purpose	1-1
102	Background	1-1
103	Approach to Implementing NAIs, TAIs, and DPs	1-2
104	Approach of Publication	1-2
105	Importance of Planning	1-3
106	IMMACCS Improvements	1-3
CHAPTER 2	EXAMPLE OF INTEGRATING IMMACCS INTO THE PLANNING PROCESS	
201	Purpose	2-1
202	Background	2-1
203	Overview of Example	2-1
204	Agents Explained	2-1
205	Use of IMMACCS for Planning	2-1
CHAPTER 3	PROCESS TO INTEGRATE PLANNING AND IMMACCS	
301	Purpose	3-1
302	Basic Approach	3-1
303	Creating an NAI or TAI	3-3
304	Creating a Decision Point (DP)	3-10
305	Composite View	3-13
306	Summary	3-13
CHAPTER 4	EXPLOITATION OF NAIS, TAIS, AND DPS WITH IMMACCS	
401	Purpose	4-1
402	Approach	4-1
403	Situation	4-2
404	Activation of NAIs, TAIs, and DPs	4-3
405	Summary	4-5

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

Last Updated August 23, 2001

CHAPTER 1

INTRODUCTION

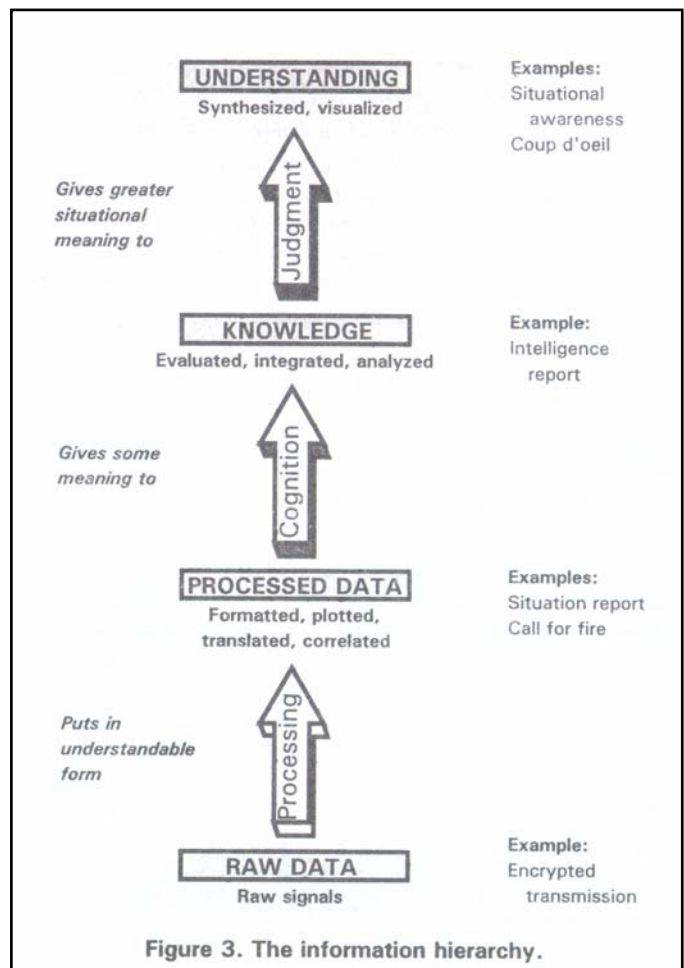
101. Purpose. This manual explains how to apply the techniques and procedures in MCWP 5-1, *Marine Corps Planning Process*, with the Integrated Marine Multi-Agent Command and Control System (IMMACCS) to implement maneuver warfare.

102. Background

a. *Warfighting*, Marine Corps Doctrinal Publication (MCDP) 6, *Command and Control*, *Marine Corps Planning Process*, and IMMACCS, all share a common premise: in this age of large quantities of information, success depends on creating the few pieces of important knowledge that make the situation clear. As *Command and Control* points out, success depends on understanding or situational awareness, and these are derived from knowledge. Further, as Figure 3 in *Command and Control* (reproduced on the right) makes clear, there is a progression from raw data through processed data and knowledge to understanding.

b. *Marine Corps Planning Process* and the supporting documentation on the Intelligence Preparation of the Battlefield (IPB) process lay out methods to reduce large amounts of tactical data to a few pieces of important knowledge. These methods are very flexible. They are intended to help users organize their thoughts. Users of these methods must derive their own answers and knowledge from the raw data and processed data available to them.

c. IMMACCS is a computer-based system that contains, among other things, a database into which data are entered and a series of software routines that perform routine tasks. In IMMACCS, data can be imported from another computer system in digital form. This avoids retyping of the data, but it also increases the amount of data to be processed.



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

d. IMMACCS also has software routines to help users to reduce the large quantities of data that MAGTFs can expect to receive to a few pieces of important knowledge, thereby laying a foundation for situational awareness. The three most important software routines implement three of the most important tasks laid out in *Marine Corps Planning Process*: monitoring named areas of interest (NAI), target areas of interest (TAI), or decision points (DP). These three routines notify IMMACCS users when a hostile unit is detected in a NAI, TAI, or DP.

e. It is important that users understand the significance of these three routines. As has been mentioned before, modern computer-based sensors produce thousands of times as much data as the sensors they are replacing in which humans played a large roll. Ten years ago, the G-2 Section of the I Marine Amphibious Force command element was overwhelmed in Operation Desert Storm when it received more than 6,000 reports and messages in a single day. Because of advances in sensor technology since then, a MAGTF needs to be prepared to process far more reports and messages than the I MEF G-2 received. IMMACCS' routines are designed to process such quantities of data and produce a few well-focused pieces of knowledge.

103. Approach to Implementing NAIs, TAIs, and DPs with IMMACCS

a. The concepts, techniques, and procedures for identifying the information that is important in a particular situation are detailed in Marine Corps Doctrinal Publication (MCDP) 4, *Planning*, and *Marine Corps Planning Process*. In the course of implementing these techniques and procedures, NAIs, TAIs, and DPs, are identified.

b. After the situation has been analyzed, the locations of NAIs, TAIs, and DPs are entered into IMMACCS database. As the tactical situation unfolds, IMMACCS software routines, which are named agents, perform command and control functions now performed by people: scanning the incoming data for reports that place a hostile element in a NAI, TAI, or DP. Not only can a software routine do this analysis much faster than people can, these routines also free people to perform functions software cannot perform.

c. The key then, is to blend the practices documented in *Marine Corps Planning Process* with capabilities of IMMACCS to produce an overall better capability for the Marine Corps. The question is not whether people or computers are better at performing command and control functions, but what how can computers be used to support people in command and control.

104. Approach of Publication. To show how the methods in *Marine Corps Planning Process* can be implemented with IMMACCS, Chapter 2 is a very simple example of a plan being developed. Chapter 3 then builds on Chapter 2 by explaining how the named areas of interest (NAIs), target areas of interest (TAIs), and decision points (DPs) developed in Chapter 2 can be exploited with IMMACCS to provide commanders with better information faster than is possible currently. Because IMMACCS is in its early stages of development, Chapter 3 is a very simple example of how IMMACCS could be used. Chapter 3 is intended to prompt questions and thoughts on better ways to use IMMACCS. Chapter 3 and the rest of this pamphlet are intended only to hint at the potential of IMMACCS when used in conjunction with the classic command and control techniques and procedures.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

105. Importance of Planning. IMMACCS is not a stand-alone tool. It does not replace planning and it will not be an effective tool if used without the classic command and control concepts. IMMACCS is a tool for implementing these concepts. Because of this, the planning done without IMMACCS must continue to be done with IMMACCS.

106. IMMACCS Improvements. The discerning or imaginative reader will see ways that IMMACCS can be expanded and improved to help him or her. The reader must remember, however, that software development, as is true of all fields of endeavor, proceeds with one small step after another. All of the improvements that are possible should be incorporated into IMMACCS eventually, but in using this publication, readers should focus on IMMACCS' first, basic functions.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

Last Updated August 23, 2001

CHAPTER 2

EXAMPLE OF INTEGRATING IMMACCS INTO THE PLANNING PROCESS

201. Purpose. This chapter provides an overview of how the techniques and procedures in MCWP 5-1, *Marine Corps Planning Process* can be implemented with the Integrated Marine Multi-Agent Command and Control System (IMMACCS).

202. Background. As noted in Chapter 1, IMMACCS is a tool to improve command and control. As such, IMMACCS complements and extends *Marine Corps Planning Process*. While some of the processes described in *Marine Corps Planning Process* will be modified or replaced because of the IMMACCS' capabilities, the basic concepts in *Marine Corps Planning Process* are as valid with IMMACCS as without IMMACCS.

203. Overview of Example. This chapter contains eight maps that trace the development of a simple plan. The first map shows a situation with three units, two friendly and one enemy. The enemy's most likely and most dangerous courses of action are then defined and shown. This is followed by the selection of named areas of interest (NAIs), target areas of interest (TAIs), and decision points (DPs). The next map shows all the features. The last map shows how IMMACCS could represent the situation as it develops using agents to screen the incoming messages and identify the information that meets the criteria for the agents.

204. Agents Explained. An agent is a small piece of software, a software routine. An agent for an NAI, TAI, or DP performs three functions:

- a. Places the appropriate icon on the computer map,
- b. Screens incoming data and message to see if they contains information that meets the criteria established for the agent's activation, and
- c. If the incoming message contains information that meets the criteria, the agent takes the designated action.

205. Use of IMMACCS for Planning

- a. Systems such as IMMACCS are developed incrementally. Because of this, the identification of the most dangerous and most likely course of action and the NAIs, TAIs, and DPs are now done outside of IMMACCS. That is, IMMACCS' software does not presently include agents to assist in identifying these features. NAIs, TAIs, and DPs, are entered into IMMACCS as in a manner to be described only after they have been identified without any assistance from IMMACCS.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

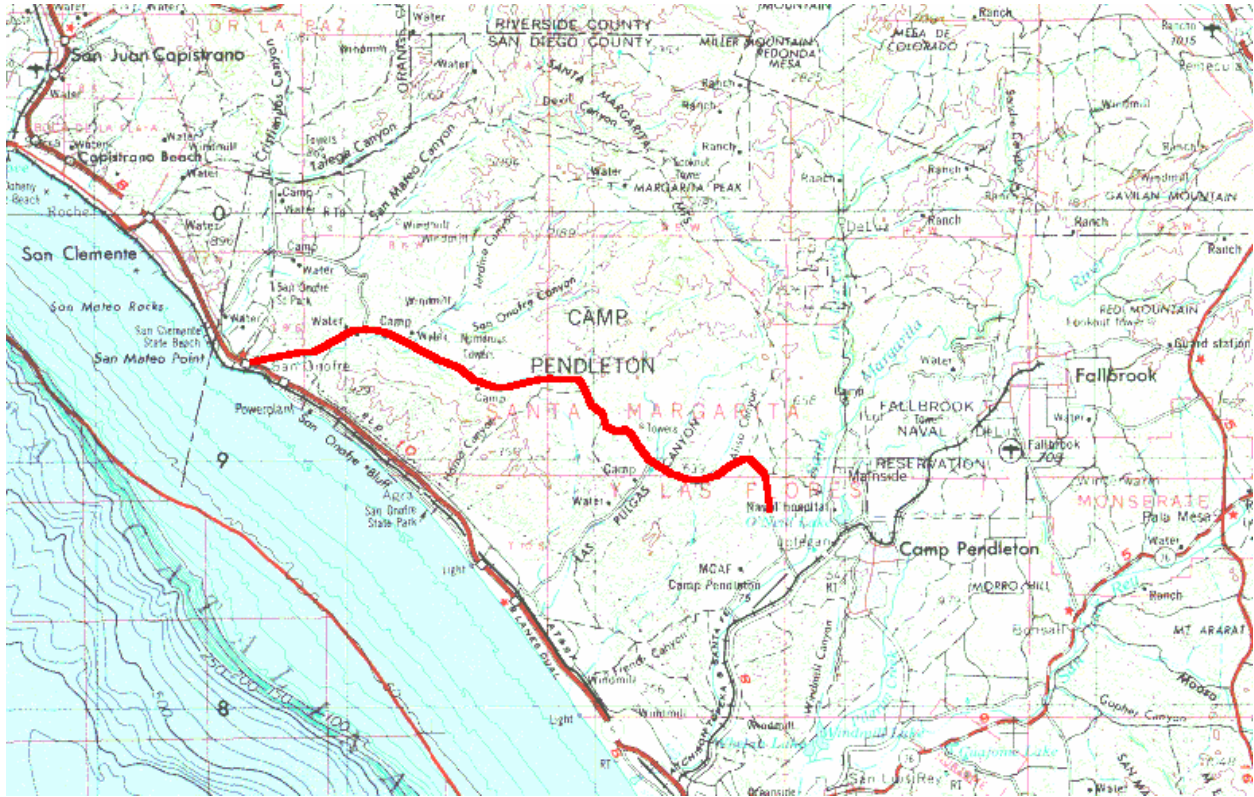
b. As planning unfolds, selected elements are recorded in IMMACCS. Items such as possible enemy course of action graphically and NAIs, TAIs, and DPs will be active objects that trigger agent alerts.



STARTING SITUATION

A Marine infantry battalion is operating east of Las Pulgas Canyon and south of Basillone Road. Enemy units are operating northwest of this area and may advance on the Marines. Planning is underway.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions



MOST LIKELY ENEMY COURSE OF ACTION

An analysis of the situation leads the commander and his staff to conclude that the enemy's most likely course of action is to advance southeast along Basilone Road to Camp Pulgas at the head of Las Pulgas Canyon and then continue on Basilone Road to the head of Aliso Canyon. There, the enemy will deploy to attack the Marines.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

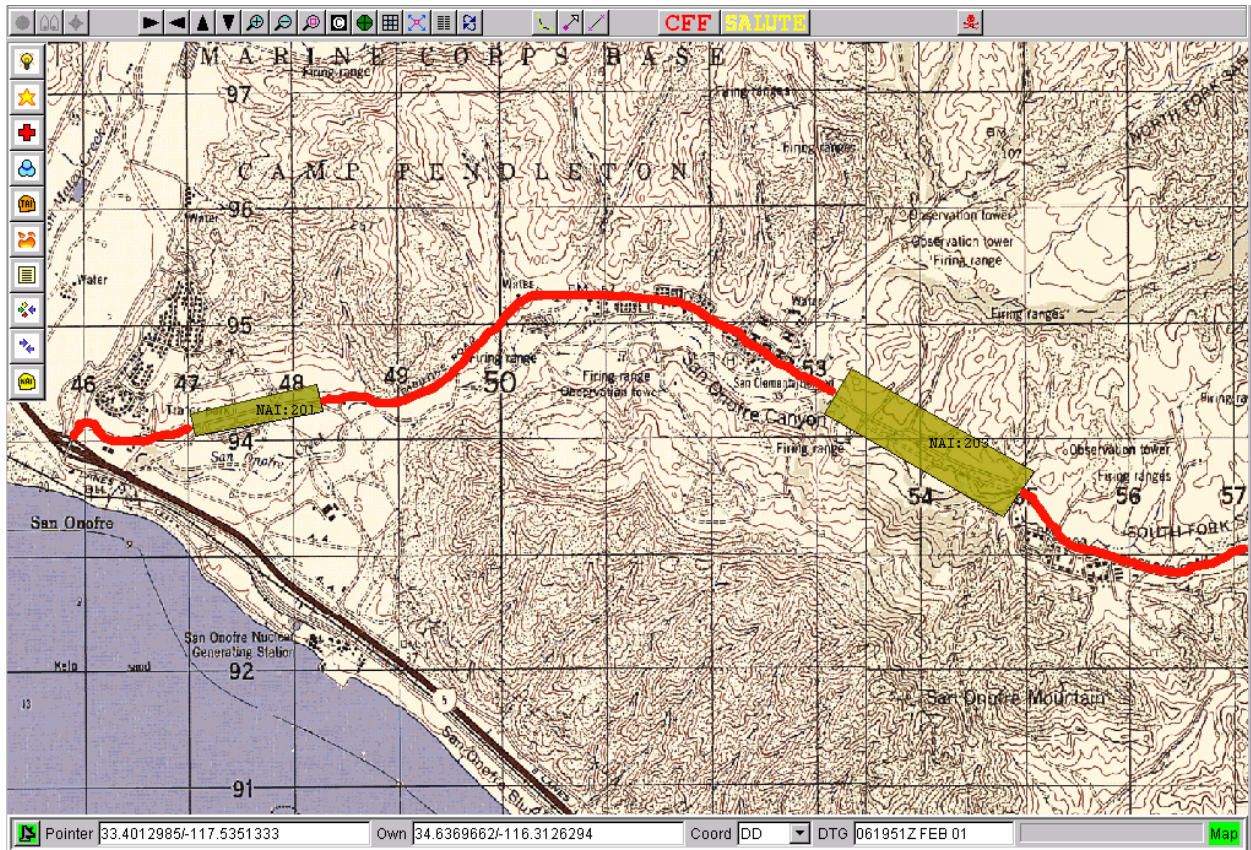


MOST DANGEROUS ENEMY COURSE OF ACTION

From this analysis, the commander and his staff have also concluded that the most dangerous course of enemy action would be an advance along Basilone Road and then turn south and go down Las Pulgas Canyon at Camp Pulgas. This could lead the enemy to the Marine's rear.

Another dangerous course of action is for the enemy to advance down the coast. This would place the enemy in the Marine's rear. Such a course of action appears unlikely because the advance could be observed from the sea, with fires being directed by observers afloat.

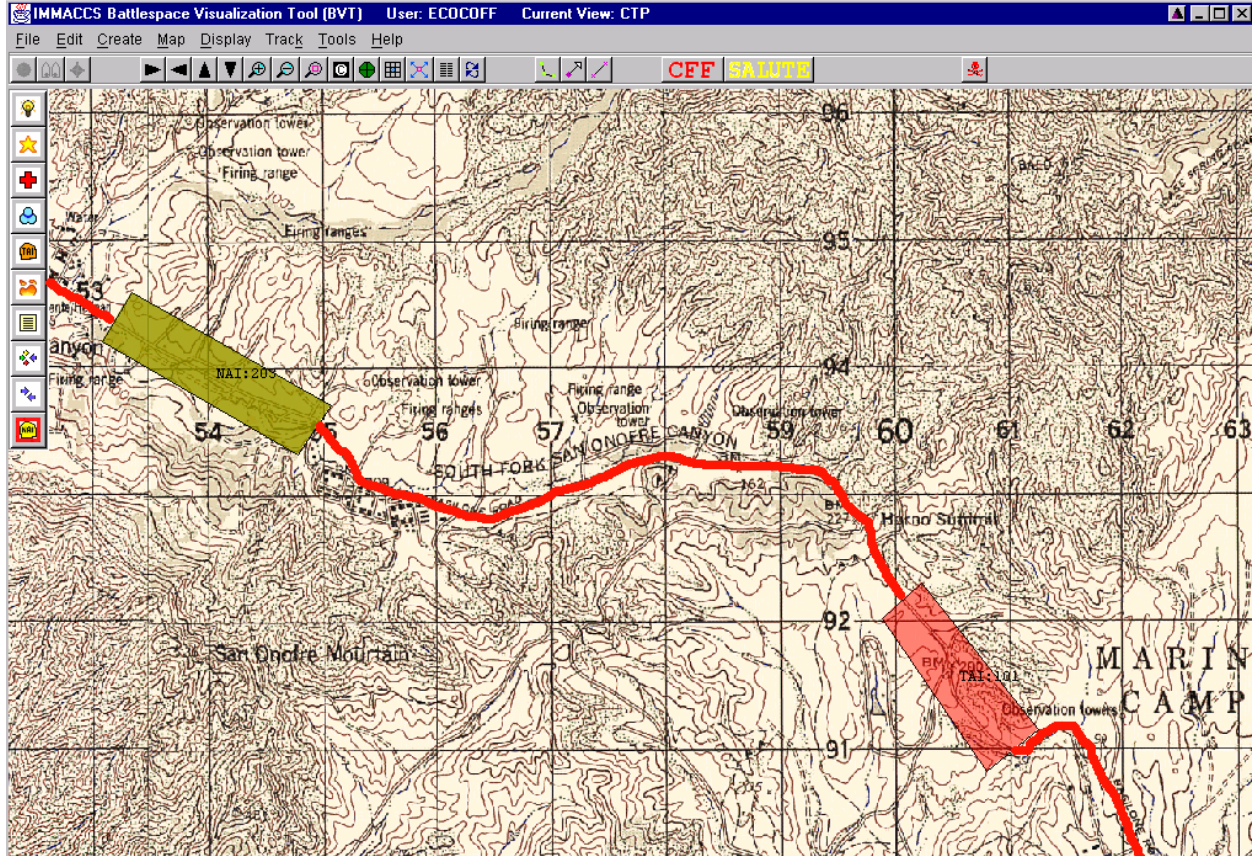
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions



DESIGNATING NAMED AREAS OF INTEREST

Based on further analysis, the commander decides the critical place in an enemy advance will be the road junction at Camp Pulgas. There the enemy will turn down Las Pulgas Canyon or continue down Basilone Road. Two named areas of interest (NAIs) are designated. Intelligence collection will be focused on these NAIs.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

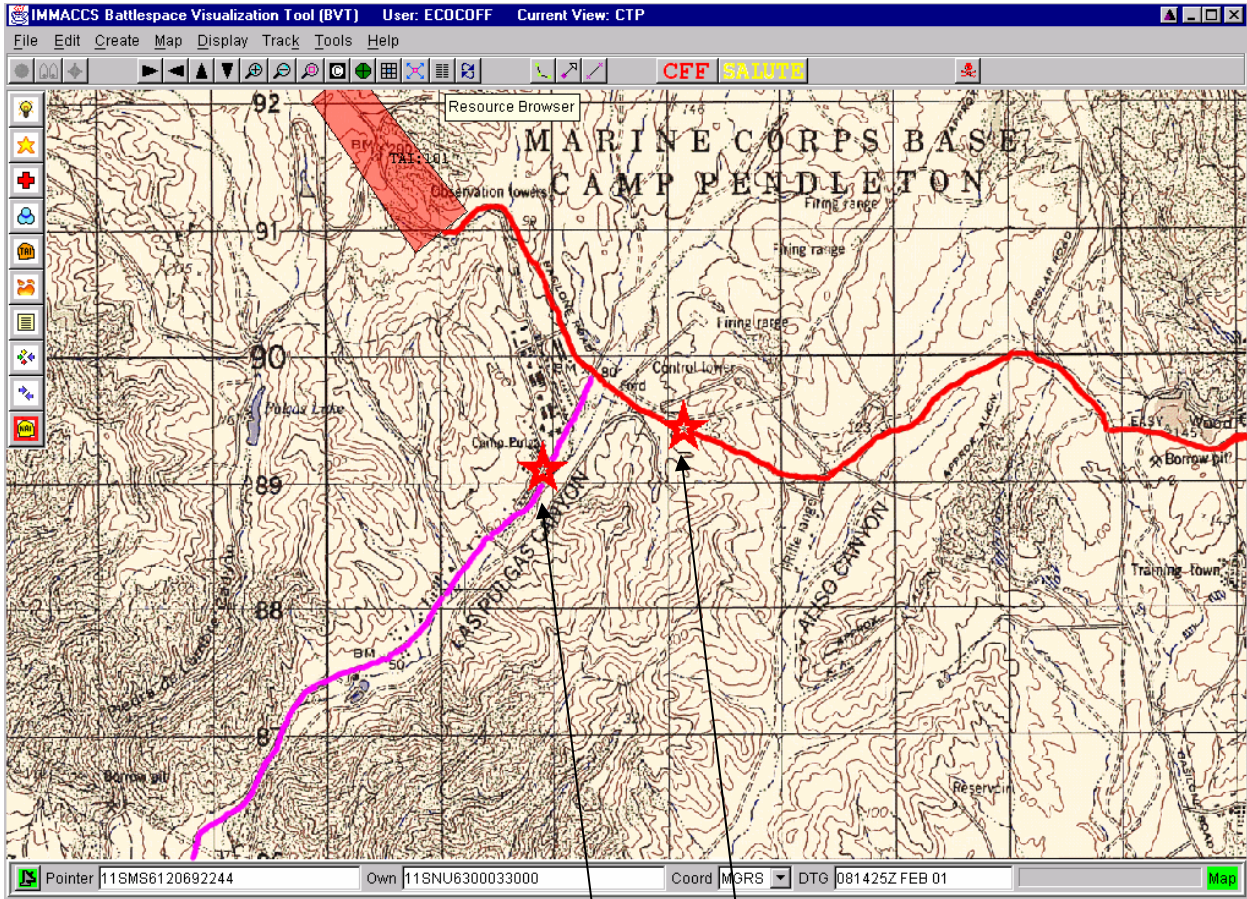


TARGET AREA OF INTEREST (TAI)

Having selected NAIs, the commander turns his attention to selecting areas where fires can be used particularly effectively. One was selected and is shown above. In this place, the canyon walls keep traffic on or close to the road; the enemy cannot move out of the impact area easily.

Note also that an NAI is located up the avenue of approach from the TAI. The NAI warning can be used to alert the fire support assets.

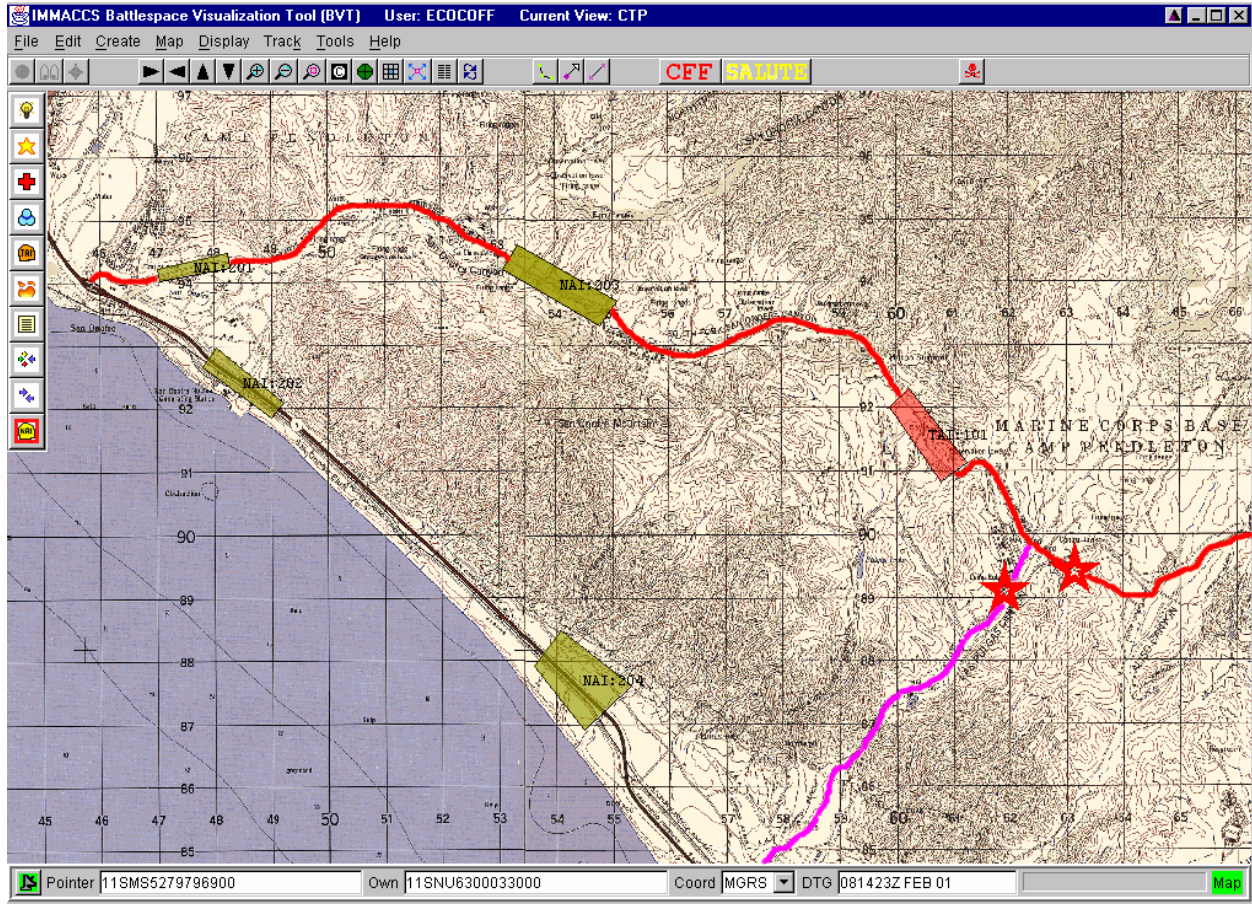
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions



SELECTING DECISION POINTS

The commander now determines that he must make important decisions shortly after the enemy passes the head of Las Pulgas Canyon on Basilone Road. He sites two decision points short distances after the crossroads where the enemy must commit to either the most dangerous or the most likely course of action.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions



COMPOSITE MAP DISPLAY

When all of the features discussed in the previous pages are displayed, the map display above is created.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

Last Updated August 23, 2001

CHAPTER 3

PROCESS TO INTEGRATE PLANNING AND IMMACCS

301. Purpose. This chapter builds on Chapter 2 by explaining how NAIs, TAIs, and DPs identified earlier in can first be entered into the Integrated Marine Multi-Agent Command and Control System (IMMACCS).

302. Basic Approach

- a. Using the techniques and procedures laid out in *Marine Corps Planning Process*, the named areas of interest (NAIs), target areas of interest (TAIs), and decision points (DPs), (along with the other significant control features) are determined. NAIs, TAIs, and DPs, are treated as part of intelligence preparation of the battlefield (IPB) in *Marine Corps Planning Process*. Their development is discussed in Chapters 1-6. Page D-18 has a sample decision support template (DST) with NAIs, TAIs, and DPs.
- b. When implementing the techniques and procedures for NAIs, TAIs, and DPs, remember that the purpose is to help those overseeing the execution of an operation to get the important information quickly. Modern sensors and other collection assets and national agencies can produce information far faster and in far larger volume than any MAGTF staff can process and exploit it during the execution of an operation. This is not an entirely new situation, just a situation that gets worse with each year and each improvement in communications and sensors.
- c. The planning phase of an operation has always been intended to provide a commander and his staff with an opportunity to review large quantities of information, determine the probable course of future events, and develop plans. Often these plans included a scheme of defense and fire support plan. While NAIs, TAIs, and DPs have always been helpful, they are becoming more important with each advance in communications and sensors. Indeed, they are now as important as a scheme of maneuver and fire support plan because of their potential to help prevent information overload.
- d. Considerations when Planning NAIs, TAIs, and DPs:
 - (1) Use decision points to indicate where enemy hostile activity will require a reaction.
 - (2) If hostile elements can be detected approaching the decision points, locate named areas of interest (NAIs) along the routes to these points where sensors will be able to collect data. NAIs can provide decision makers with warning that hostile forces are developing the situation in such a manner that a decision may be required soon.
 - (3) Target areas of interest are placed where (a) they can be observed by humans or sensors, (b) fires can be delivered, and (c) movement of those being fired on will be

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

restricted. If movement is not restricted, a force that is being fired on in a TAI will quickly shift their route and bypass the NAI area.

(4) NAIs can be located along avenues of approach to provide warning of a hostile force's approach.

e. With the BVT, tinting (transparency and color) and line width, can be varied for NAIs and TAIs and color and line width can be varied for DPs. The tinting of the areas and symbols on the maps that represent the NAIs, TAIs, and DPs is very important. Tinting determines whether the viewer of the map will be able to see the NAI, TAI, or DP quickly and easily during the execution of an operation, a time when events can happen very rapidly and decisions may need to be made quickly.

(1) On the one hand, standardization of tinting makes it easy to understand the information being represented on a map. If icons representing the hostile units are red and icons representing friendly units are blue, it is easy to tell who is who when looking at a map.

(2) On the other hand, color contrast is important. If a red icon is placed in an area of a map that is red, the icon will be difficult to see. Changing the color slightly will help users of the map to comprehend the situation much better than would otherwise be possible. With the BVT, such changes can be made.

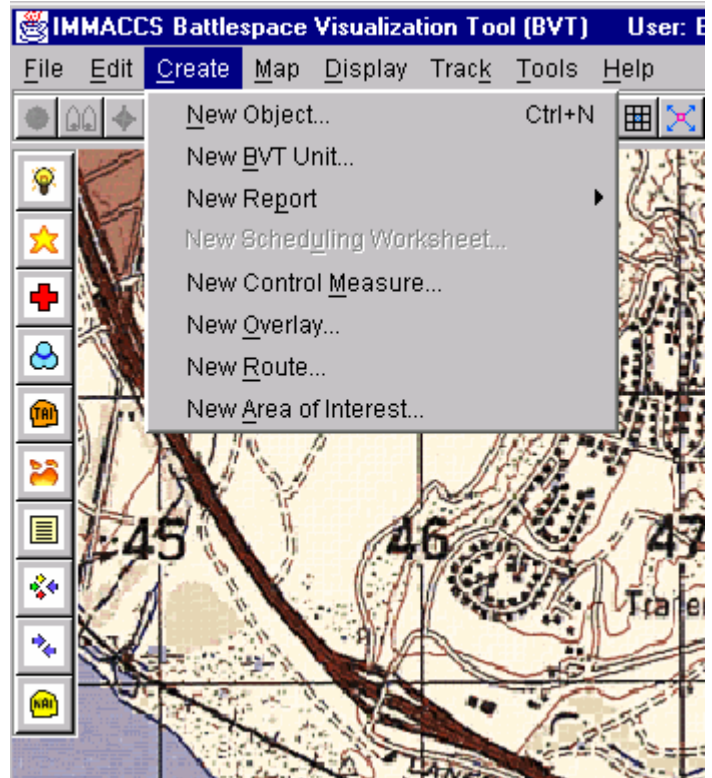
(3) Transparency can also be used to set an NAI, TAI, or DP apart from its background. The less the transparency, the brighter the NAI, TAI, or DP on the map. The greater the transparency, the less the contrast of the NAI, TAI, or DP with its background. When setting transparency, remember that transparency also indicates how much of the base map is visible through the NAI, TAI, or DP.

f. Once the locations and other attributes of NAIs, TAIs, and DPs have been determined, they are entered into IMMACCS. IMMACCS will use this information first to create the appropriate display and then screen for data and information. Icons representing relevant data and information appear on the map as indicated by the agent. With agents, people continue to play the most important role, making decisions. Since the agents for NAIs, TAIs, and DPs are inserted individually, their actions or output be controlled individually.

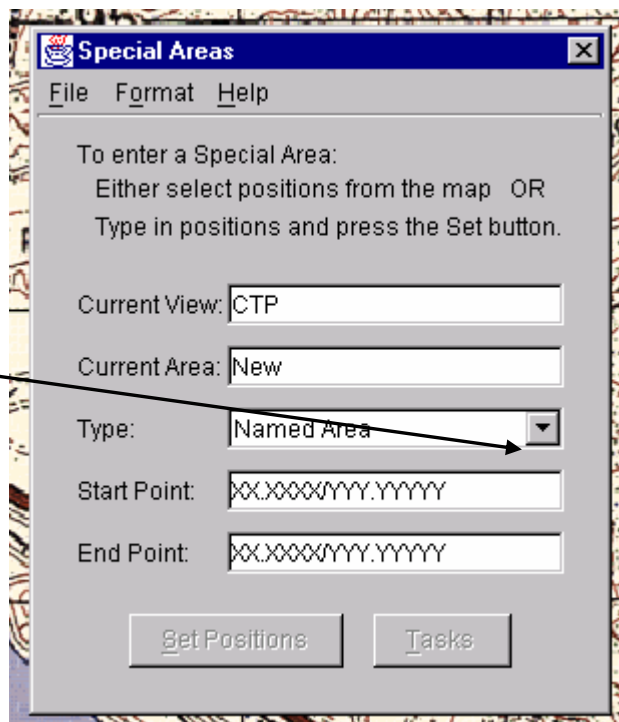
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

303. Creating an NAI or TAI. Creating an agent to implement an NAI or a TAI in IMMACCS is done with the BVT graphic user interface. The steps for opening and using this device are as follows:

- a. Step 1. Open the IMMACCS agent graphic user interface by clicking on “Create” in the menu bar. This will produce the drop-down menu shown on the right.



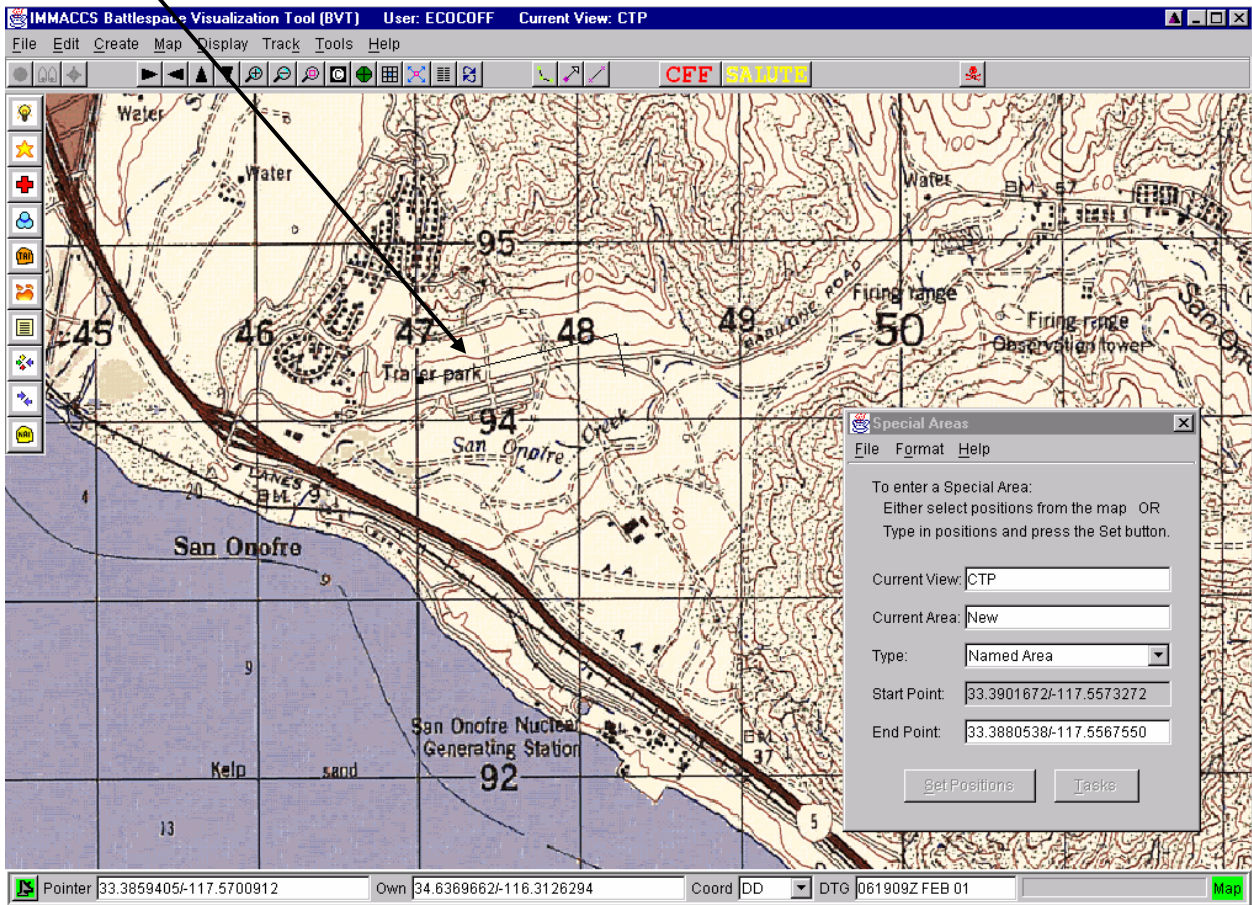
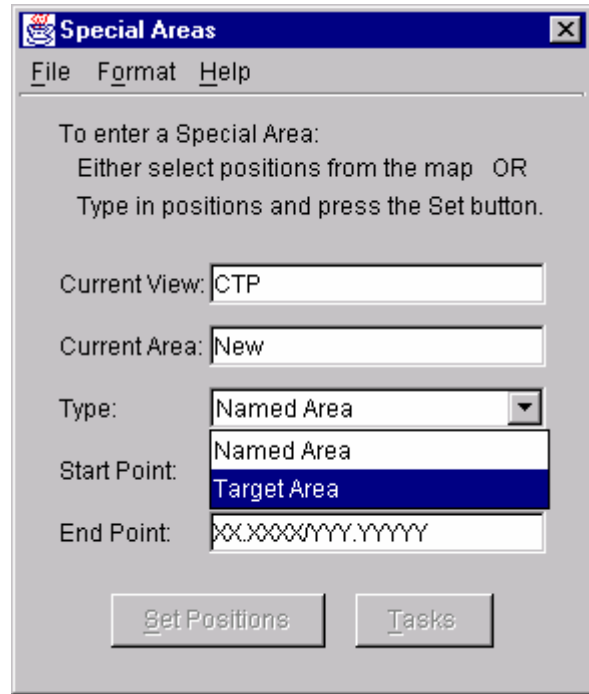
- b. Step 2. Click on “New Area of Interest..” in the “Create” drop-down menu. This will produce the following menu. If Named Area is left in the “Type” window, a representation of an NAI will be created. If the arrow is clicked, a drop-down menu will appear. (See the first figure on the next page.)



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

If “Target Area” is selected (clicked), a TAI will be created.

- c. Step 3. Draw the area of interest. Place the mouse pointer where one of the corners of the NAI is to be and click the left mouse key. Move the mouse to the third corner and click left mouse key again. The result will be similar to this.



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

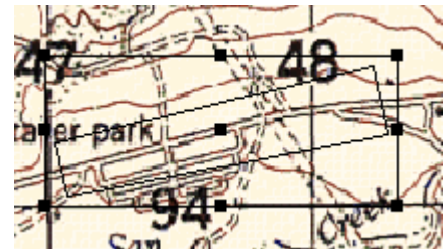
d. Step 4. Complete drawing of NAI

(1) The BVT and IMMACCS do not react as fast as many graphics programs do. Either draw slowly enough that the software can keep up with you or realize that your corners are being saved even if this is not immediately obvious. Because of this characteristic, those who plan to use the BVT to enter NAIs and TAIs should practice creating NAIs and TAIs during some quiet time.

(2) The last action in drawing an NAI or TAI with the mouse is to place a point at the first point in the NAI or TAI. The first point is marked with a small black square.

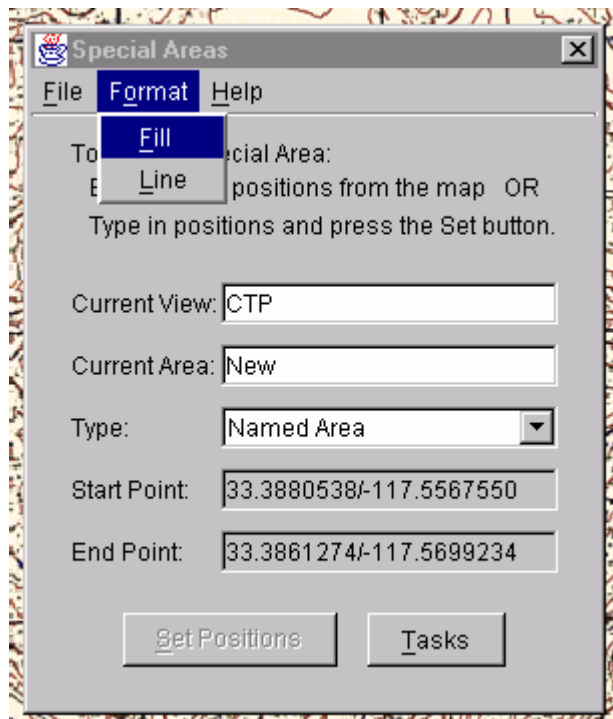


(3) When the NAI or TAI has been completed, the small black square will disappear and the NAI will be represented as shown on the right. The outer and larger rectangle surrounding the NAI will also disappear.



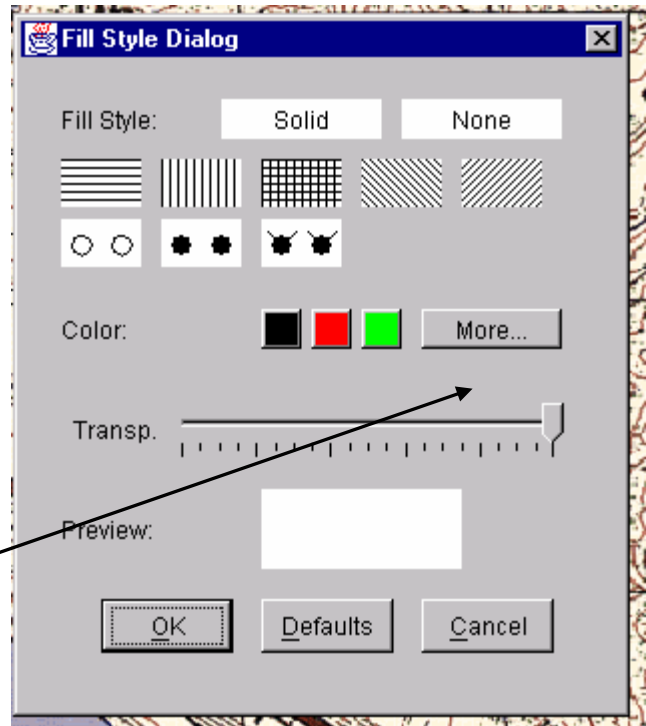
e. Step 5. Tint the NAI or TAI. This is required so viewers can see an NAI or TAI readily when they look at the map.

(1) Tinting the NAI will be done by modifying the “fill” of the NAI. To modify the fill, click on “Format” on the menu bar. The drop-down menu shown on the right will appear. See paragraph 302e for guidance on tinting.



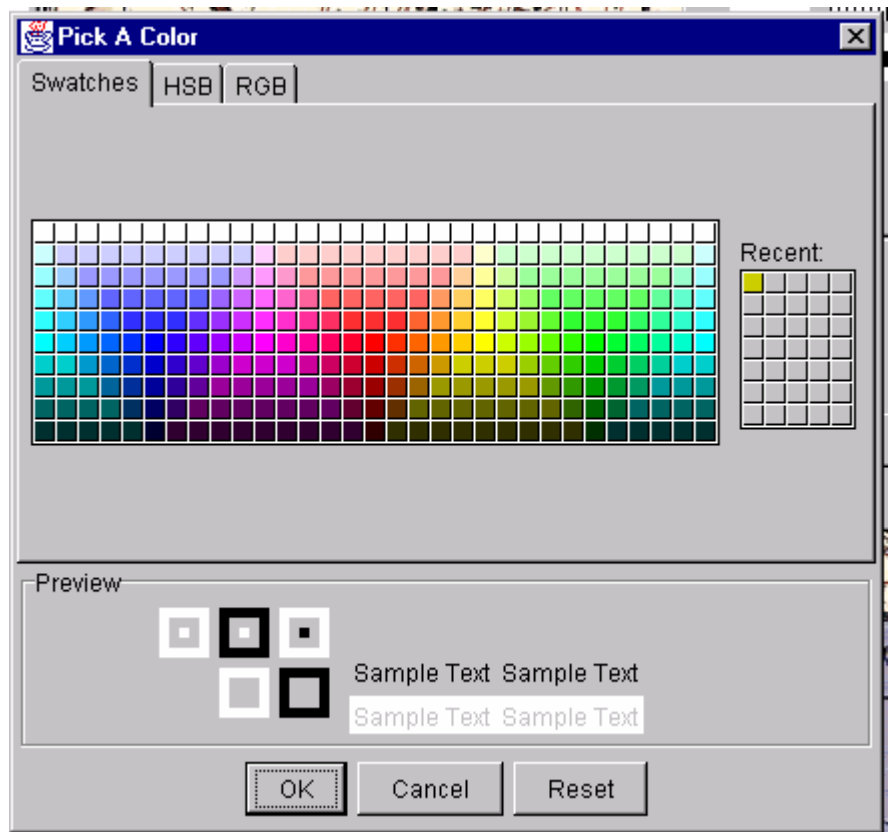
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

(2) When “Fill” is clicked, the “Fill Style Dialog” (shown on right) appears.



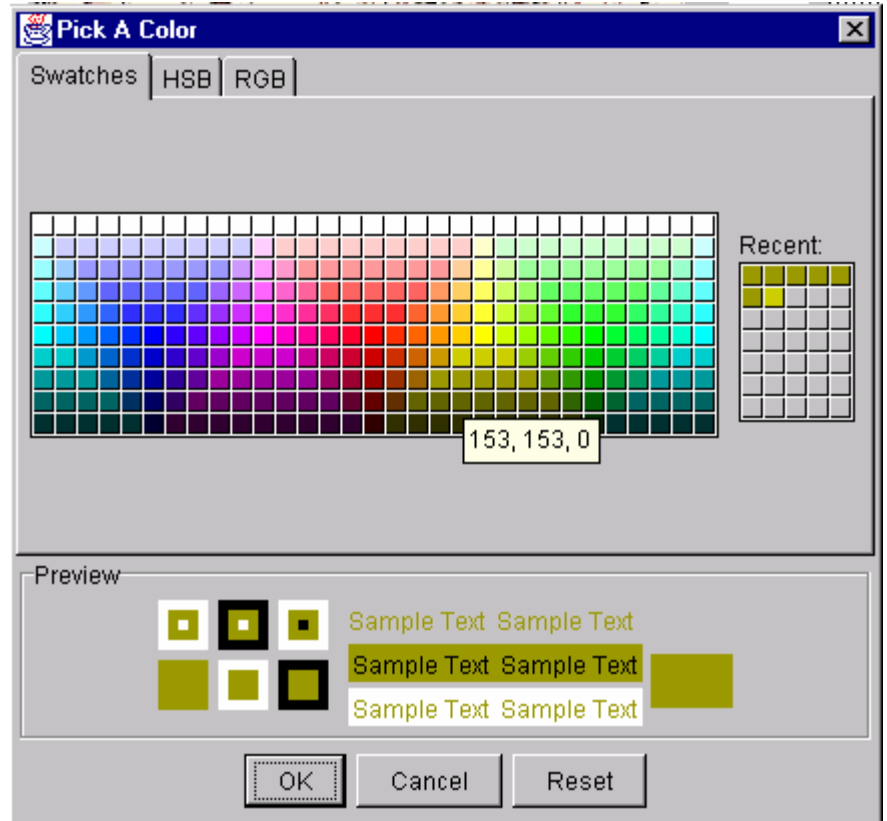
(3) To select a color, click on the “More...” button to the right of the black, red, and green squares. This will cause the “Pick a Color” box to appear. The pick a color feature is being used because red is being saved for TAIs and green implies the situation is good rather than hazardous.

(4) To select a color, place the mouse pointer on the color desired and left click the mouse.



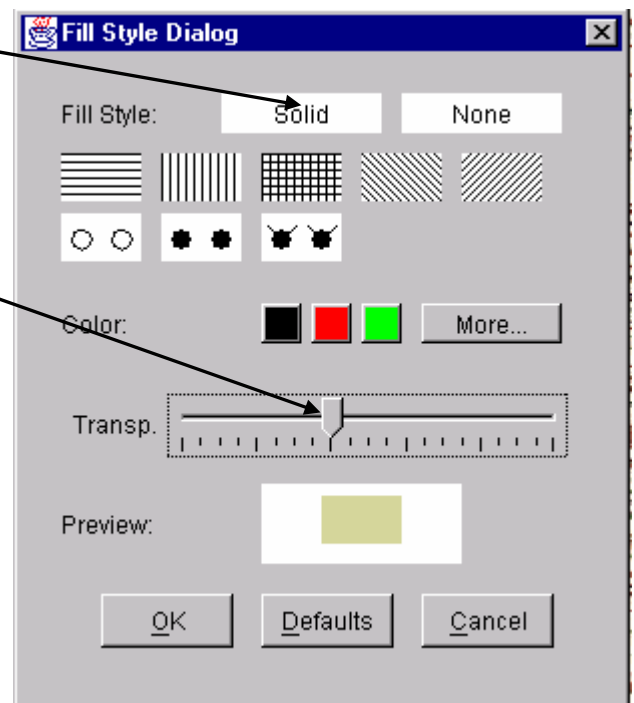
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

(5) When a color is clicked, the “Preview” feature at the bottom of the “Pick a Color” window will turn the color selected.



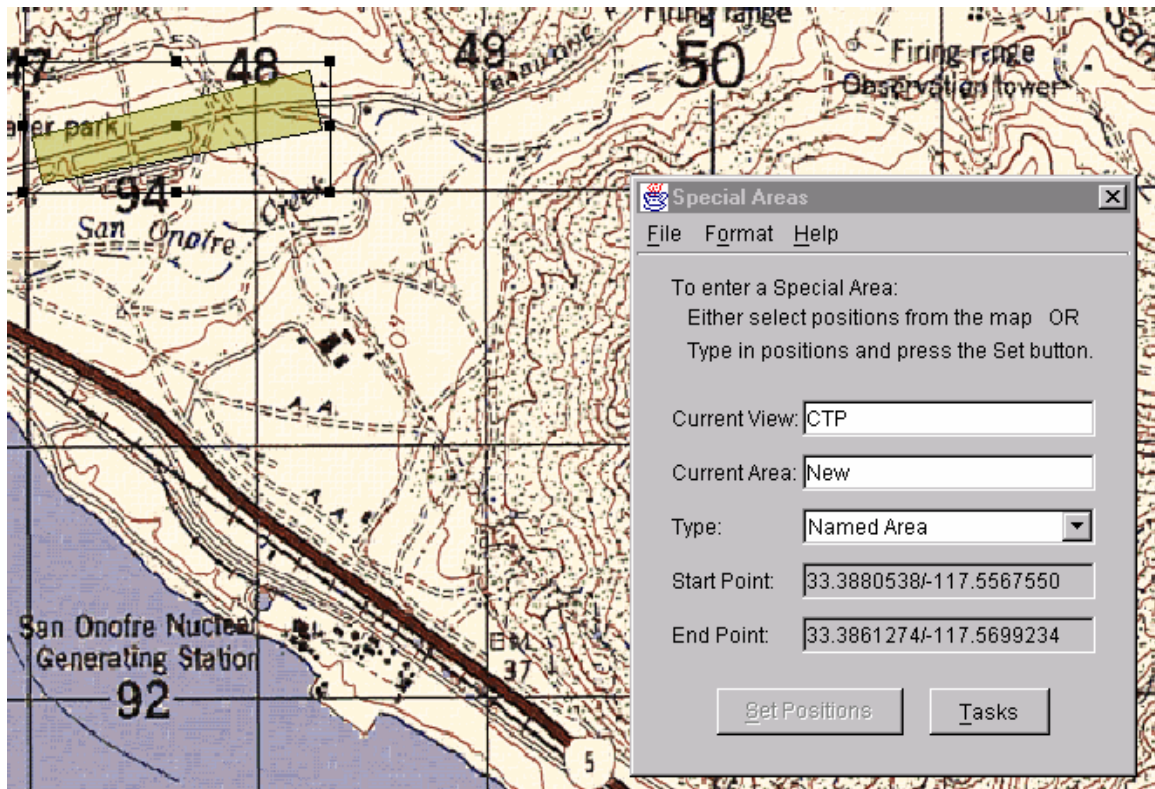
(6) After the color has been selected, click on the white “Solid” button at the top of the “Fill Style Dialog.”

(7) Use the transparency feature to make the NAI or TAI transparent. The more the lever is moved to the left, the more transparent the NAI or TAI will be. (Note: The aim of adjusting the color is to create a map display in which the important features such as the NAI and TAI stand out. Care taken in the creation of the NAIs and TAIs can save much time during the execution of an operation when the press of events requires the right decisions as rapidly as possible. Care in creating the NAIs and TAIs during planning can shorten a commander’s OODA loop during the execution phase.)

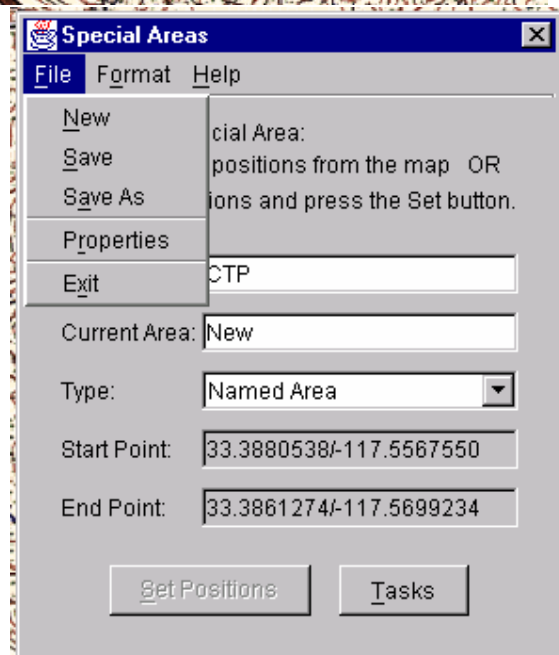


Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

f. Name an NAI or TAI. After the NAI or TAI has been created and tinted, the computer screen will appear similar to that below, and the NAI or TAI needs to be named and saved. Because the BVT appends “NAI” or “TAI” at the beginning of each NAI or TAI represented on a BVT map display, it is suggested that NAIs and TAIs not be given a name that includes the words NAI or TAI. Rather, it is suggested that TAIs be given three digit numbers starting with 1 (e.g., 101) and NAIs be given three digit numbers starting with 2 (e.g., 201).



To name a TAI or NAI, click on "File" in "Special Areas" window. This will prompt the drop-down on the right to appear. Click "Save" on the drop-down menu.



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

Click “Save” on the drop-down menu will cause the “Special Area Properties” window on the right to appear.

Special Area Properties

Reference Name: TBD

Map Center: 33.3827133/-117.5565109

Operation: Operation

Security: UNCLAS

Date Effective: 061937Z FEB 01

Organization: USMC

Title: UNKNOWN

OK Cancel

Type in the name of the NAI or TAI, 201 in this example.

Then click the “Ok” button.

Special Area Properties

Reference Name: 201

Map Center: 33.3827133/-117.5565109

Operation: Operation

Security: UNCLAS

Date Effective: 061937Z FEB 01

Organization: USMC

Title: UNKNOWN

OK Cancel

When “Ok” is clicked, the window on the right will appear. Click the “Yes” button.

SpecialAreas to view

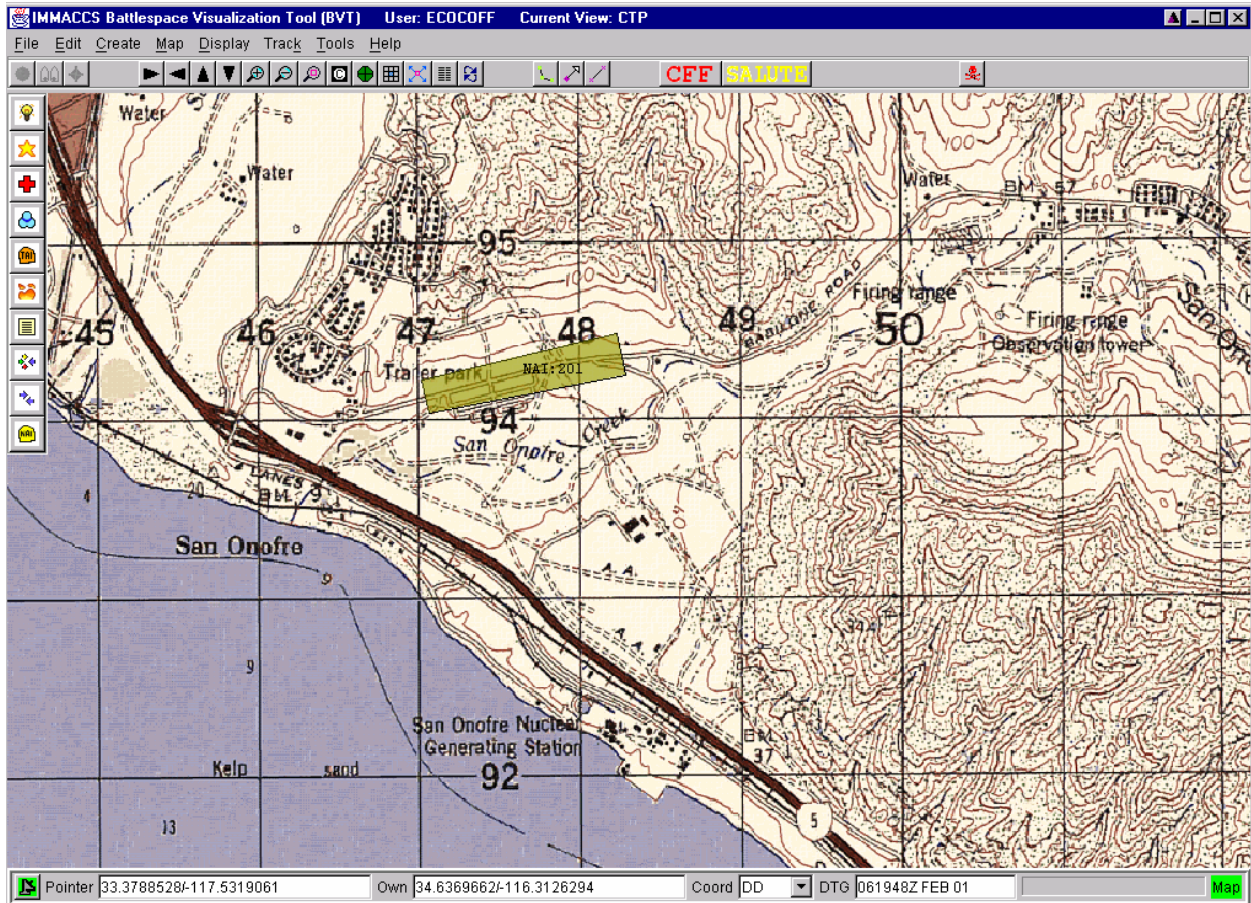
Would you like to add 201 to the list of SpecialAreas to view so it will be displayed after exiting the editor?

Yes No

Complete the NAI or TAI by click “Exit” on the File drop-down menu in the “Special Areas” window.

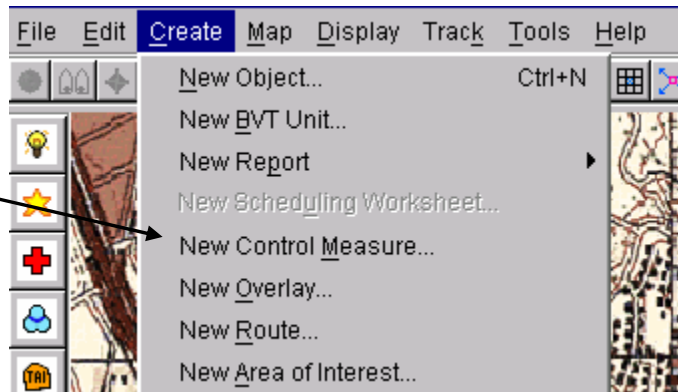
Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

The resulting image is shown below.



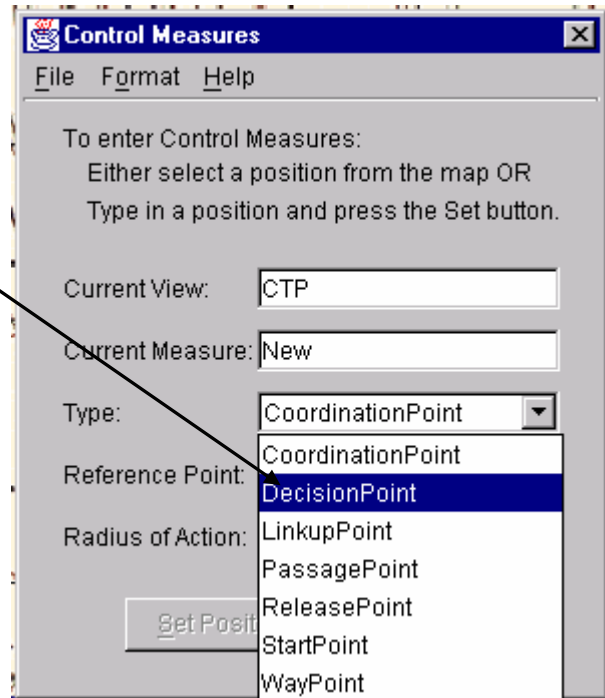
304. Creating a Decision Point (DP).

a. Step 1. Decision Points are created by first clicking on “Create” on the menu bar and then selected “New Control Measure..” when the create drop-down menu appears.



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

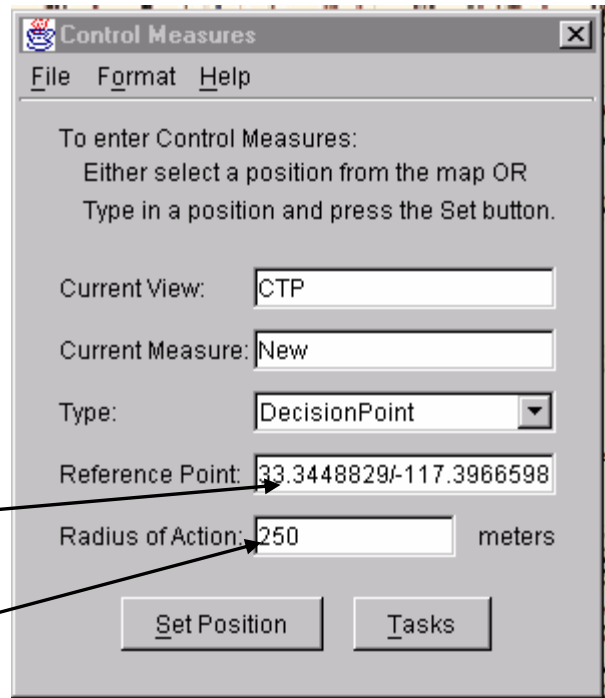
b. Step 2. When “New Control Measure..” is clicked, the drop-down menu to the right will appear. Select “DecisionPoint”.



c. Step 3. Clicking “DecisionPoint” will produce the menu to the right. A decision point is not an area in the way that an NAI or TAI is an area. The perimeter of a decision point cannot be defined the way that the edge of an NAI or TAI is drawn. Rather, a center point must be designated and a radius given. A decision point is a circle.

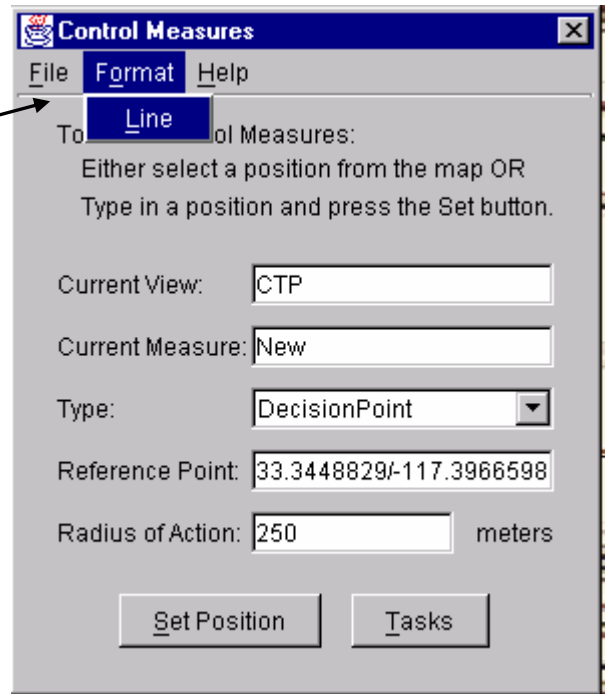
To designate the center of the circle, click on the point on the map where the decision point is to be located. This will cause the location of the decision point to be displayed in the “Reference Point” window.

To define the size of the decision point, type the radius in the “Radius of Action” window.

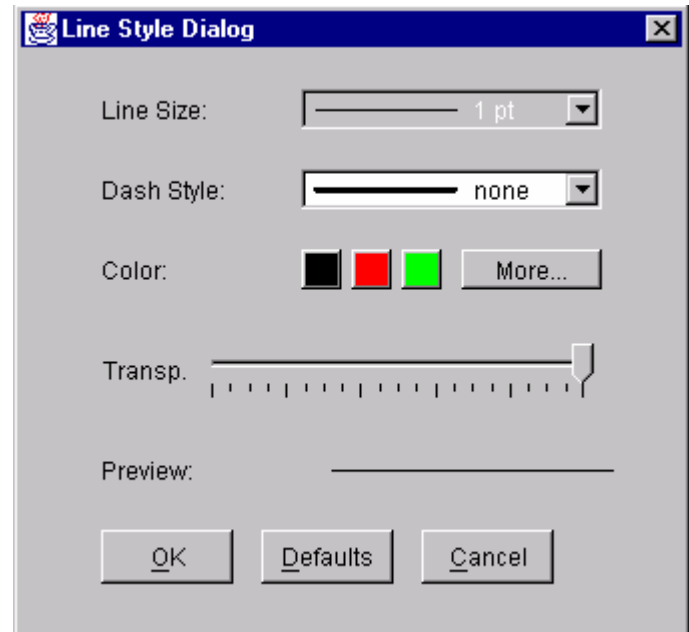


Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

d. Step 5. Give Color to the Decision Point.
A decision point has no fill. It is only an outline. Therefore, to give color to a decision point, one must first click on “Format” and then “Line”.



Clicking on “Line” produces the following window. This is the same interface for giving color to an object that is used for the NAI and TAI. If guidance is needed refer to paragraph 303e earlier in this chapter.

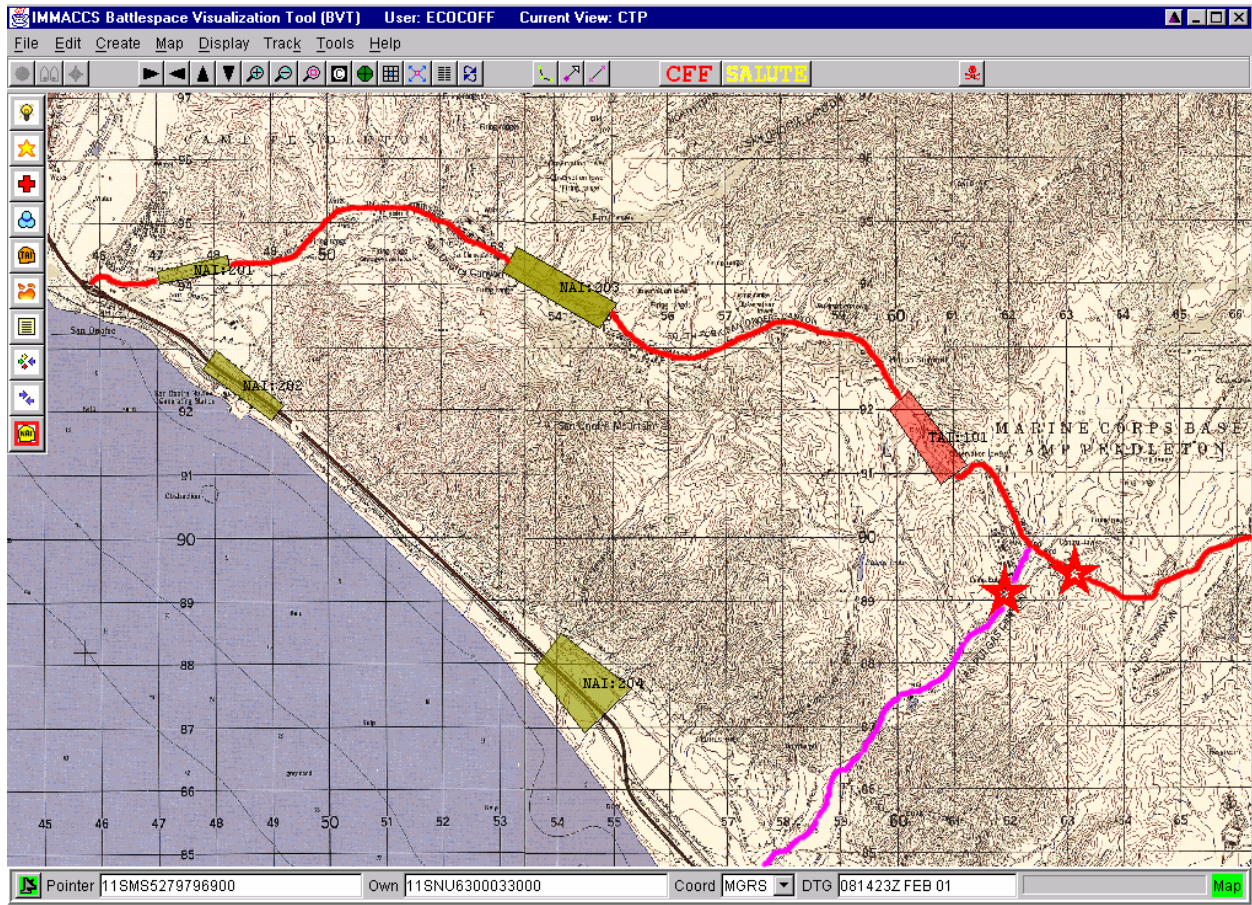


Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

e. The result of the effort will look similar to the figure on the right.



305. Composite View. The image below shows a map with NAIs, TAIs, and DPs.



306. Summary

a. With each year and each new sensor or collection asset, the information that is generated by a MAGTF or passed to a MAGTF by higher headquarters or a national agencies increases even more. The experiences of the I MEF G-2 section in Operation Desert Storm showed that ten years ago that MAGTFs need computer-based tools to process large quantities of information and find or produce the few important pieces of data or knowledge. IMMACCS with its software aids and BVT provides tools that can identify the important data as it comes

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

in and produce important knowledge from the flood of information that characterizes modern warfare.

b. Most of the concepts, processes, techniques, and procedures needed to make IMMACCS an effective tool already exist, are taught in military schools, and practiced in the field. A few new concepts (adjusting the color and transparency of NAIs and TAIs, for example) need to be added to the store of concepts needed by those manning combat operations centers.

c. Those who would use IMMACCS to better implement the processes laid out in doctrinal publications need to remember that the specific procedures require some new skills, both in the use of the software and in matters like the selection of colors and the degree of transparency.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

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CHAPTER 4

EXPLOITATION OF NAIS, TAIS, AND DPS WITH IMMACCS

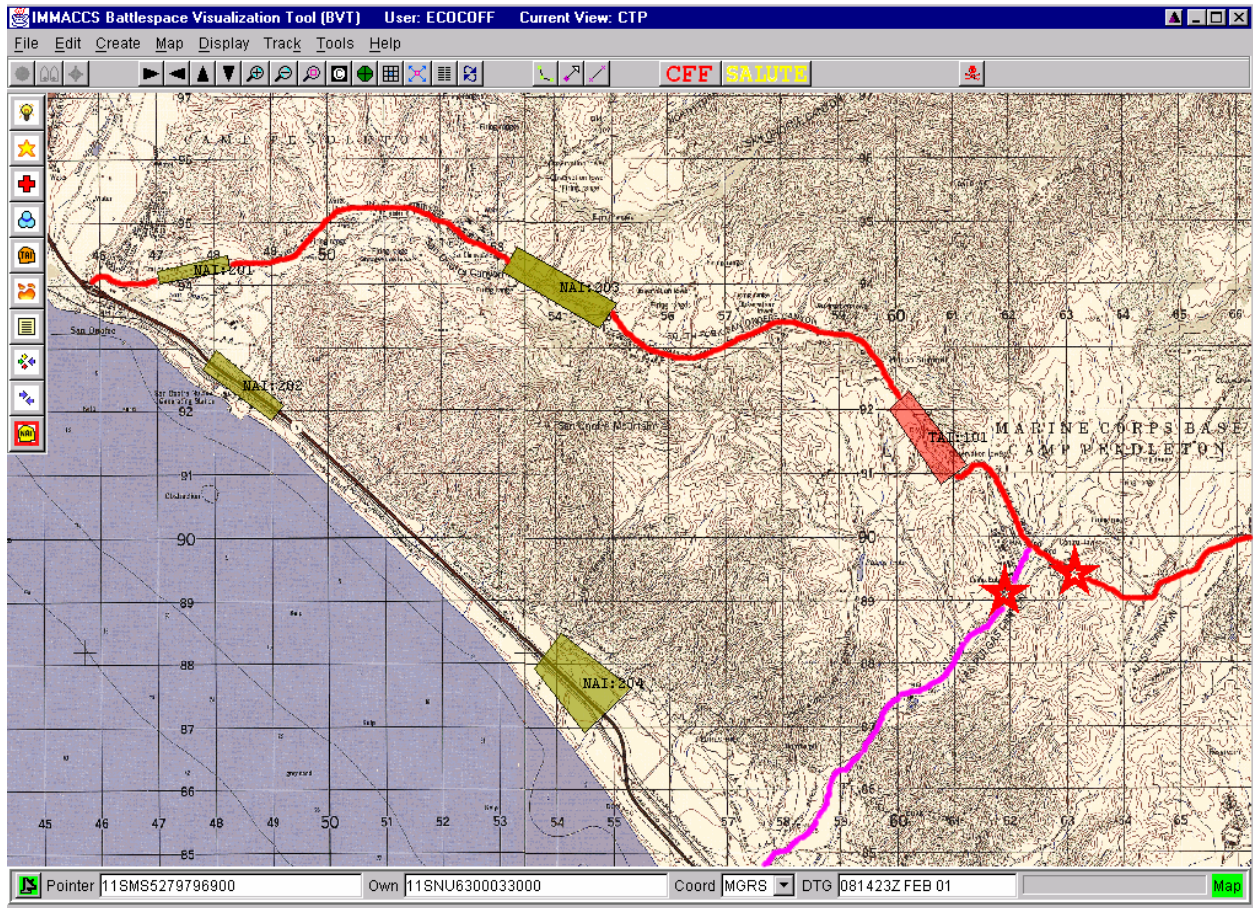
401. Purpose. This chapter builds on Chapter 3 by explaining how NAIs, TAIs, and DPs function during the execution phase of an operation as the Integrated Marine Multi-Agent Command and Control System (IMMACCS) is receiving and processing data.

402. Approach

- a. As data is received by IMMACCS, software routines scan the data to:
 - (1) Identify important data, and
 - (2) Process data to produce information of greater value than the data that was processed. The resulting information is often characterized as knowledge.
- b. The software routines are called agents in the software trade. This name often causes confusion for individuals with a military background because they learned early in their military experience that agents are individuals who collect information. The use of agent by the computer industry as a name for a type of software is an unfortunate development, but it cannot be reversed. The term is used too widely by those outside the military.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

403. Situation. The map below shows an area with NAIs, a TAI, and DPs.

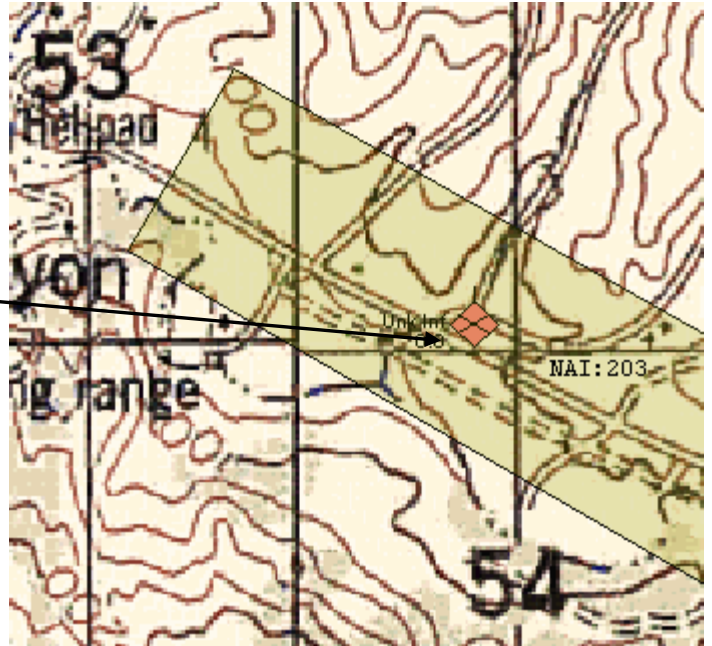


As was noted in Chapter 2, hostile forces are in the northwest corner of the map and the friendly forces are to the southeast of the decision points (red stars). It is anticipated that hostile forces will move through NAIs 201 and 203 and TAI 101 to either of the two decision points.

Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

404. Activation of NAIs, TAIs, and DPs

a. If a report is received indicating that hostile unit has entered an NAI, TAI, or DP, IMMACCS will detect the presence of the hostile unit and activate a warning. The diagram to the right shows a hostile element in an NAI.

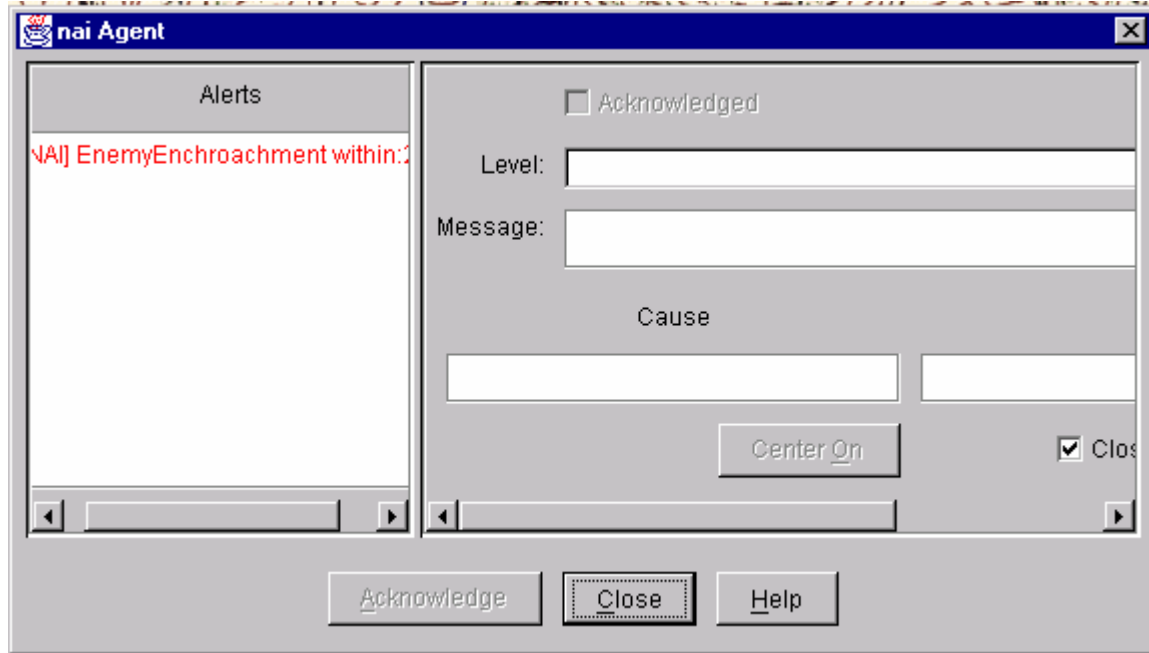


b. When IMMACCS detects the hostile element in the NAI, the edge of the symbol for the NAI agent will turn red.

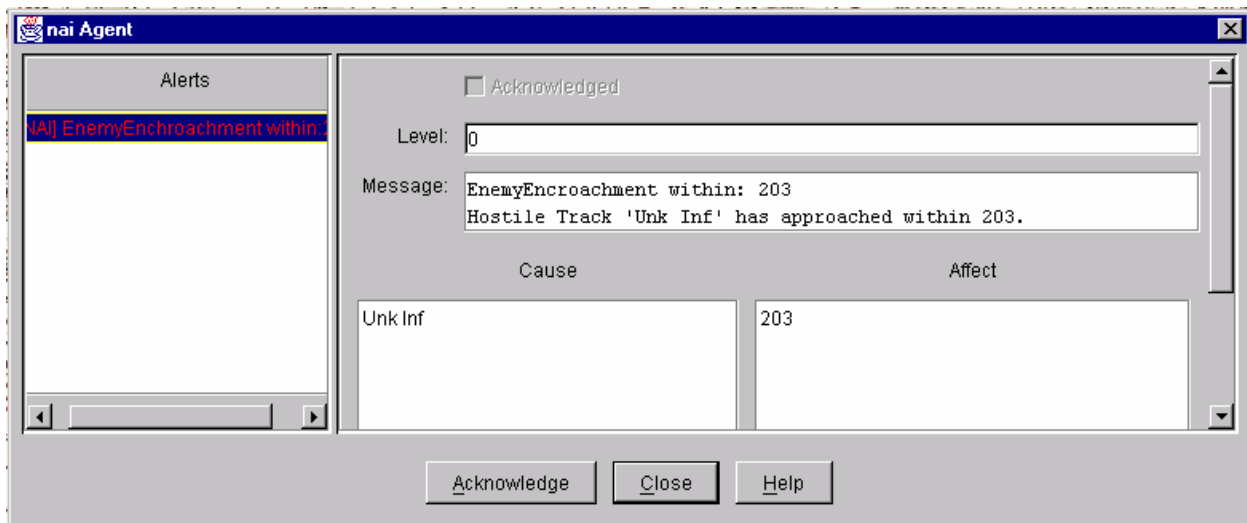


Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

c. When the NAI icon is clicked, the following window will open. The red letters indicate an alert that has not been acknowledged. Click on the line of text to acknowledge the alert.

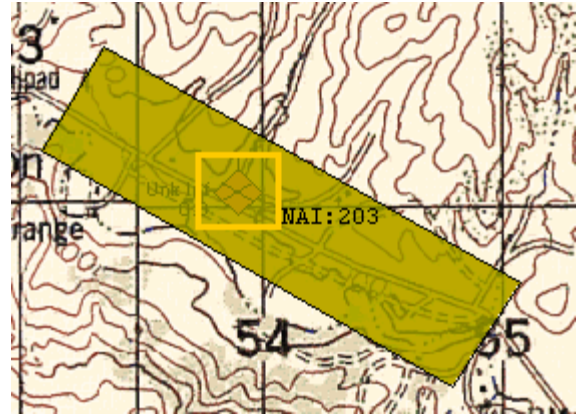


d. Clicking on the red letters with the mouse will produce the following window. Notice that this window provides information on the action that activated the NAI agent.



Using Automated Tools to Implement Selected Intelligence Preparation of the Battlefield (IPB) Functions

In addition to the window that provides a text description of what activated the NAI, TAI, or DP, the BVT will place a box around the hostile activity that activated the agent. See the image to the right.



405. Summary. With the BVT and the rest of IMMACCS, software routines named agents (specifically NAI, TAI, and DP agents) can be created during the planning phase of an operation and then used to monitor incoming data during the execution of an operation. Used skillfully, the NAI, TAI, and DP agents can be used to first screen and then process those few important reports and pieces of data that will be among the thousands that a MAGTF can expect to receive during each day of heavy activity.