
TRITON HISTORICAL TARGET PROCESSING - USER GUIDE -

1.0 OVERVIEW

The Triton Historical Target Processing software provides two capabilities. The first is the display of historical targets in the Isis waterfall when replaying newly collected sidescan or SAS data. Targets are represented as icons that are in the correct geo-location in the waterfall display displayed on top of the newly acquired data. This capability allows operators to easily distinguish between new objects and objects that have previously been identified and acquired as targets with either the Triton TargetPro software or with another targeting system that stores target images as GeoTIF images.

The second capability of the Historical Targeting software is the ability for historical targets to be imported into Triton Map. Imported historical target icons are shown at their correct geo-location in the Triton Map display.

The combined ability to view historical targets in the waterfall display of newly collected data and in the overview map display of Triton Map provides an effective change-detection system that will aid operators in the identification of new objects when resurveying known areas.

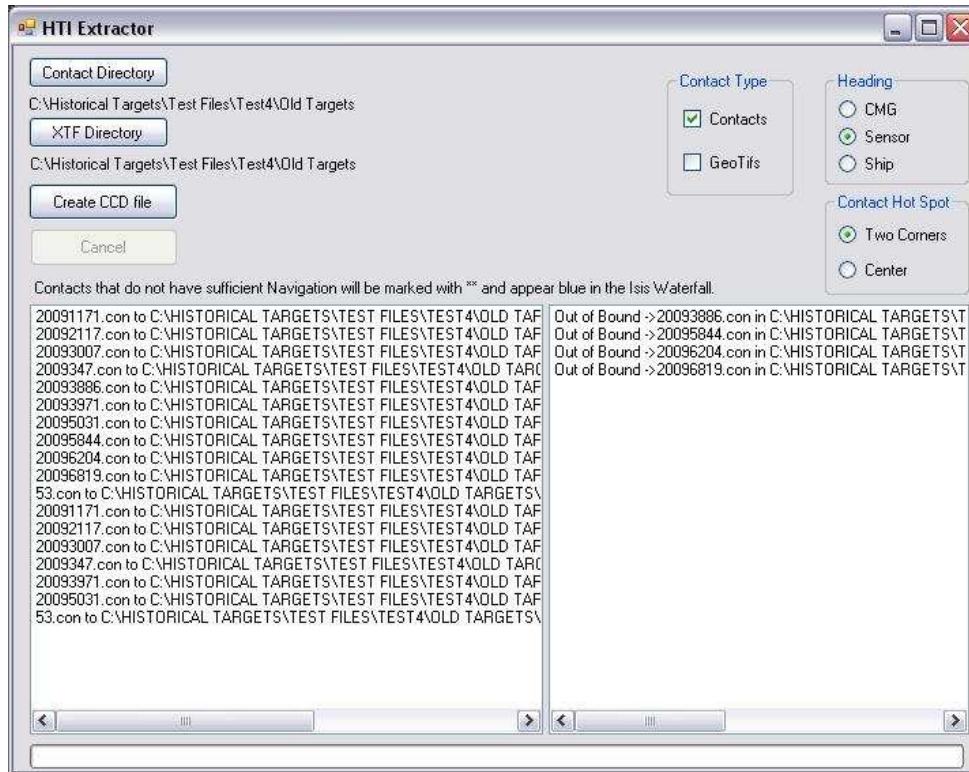
The individual programs that are involved in the operation of the Triton Historical Target processing software are: the HTI Extractor, Isis, and Triton Map. The operation of each of these programs is described below.

2.0 HTI EXTRACTOR

Running the HIT Extractor program is required as a preprocessor to enable Isis to display historical target icons in the waterfall. Operation consists of specifying the folder containing the historical CON and GeoTIF target files to be processed and the folder containing the XTF files of the newly acquired data. The program compares the position of each target with that of the coverage of each XTF file and determines if the XTF file coverage includes the location of the target. If a match is found an entry is made in a file associated with the XTF file that records the position (ping and sample) of the target in the XTF as well as other data about the target. This associated file is called the CCD file. This file has the same name as the associated XTF file with a CCD extension.

2.1 Program Operation

The program is started by selecting the “Triton HTIExtractor” from the Triton Imaging program group. The user interface shown below is displayed:



1. Use the two buttons to select the directory containing the Historical Target CON files and/or GeoTIF files and the folder containing the XTF files to be processed.
2. Specify if the program is to process only CON files in the selected directory, only GeoTIFs, or both.
3. Select a heading determination method that the HTI algorithm will use in its conversion from the geo-coordinates of the targets to ping-coordinates in the XTFs:
 - *CMG* is to be used if the navigation updates in the CON files and/or in the XTF files are of low frequency. This mode uses the position information in the ping data and interpolates between the navigation updates to derive the heading of individual pings. *CMG* should not be used if the navigation updates are of high frequency as in AUV data that has undergone accurate navigation processing.
 - *Sensor* is to be used if the heading values in the XTF and the CON files are of high accuracy such as with AUV data.
 - *Ship* will use the ship gyro to determine the heading
4. Select Contact Hot Spot type. This determines what icons will be drawn in the waterfall for the historical targets:
 - *Two Corners* will result in a box defined by the location and size of the contact
 - *Center* will result in one point at the center of the Historical Target location.
5. Press the *Create CCD* file button.

6. The position of each contact is searched for in each XTF file. If the contact is found to lie within the coverage of an XTF file, a record is written to the CCD file for that XTF file and an associated entry is added to the list on the left at the bottom of the HTI Extractor display. A CCD file is a text file with the same path and name of the XTF file it pertains to but with the extension changed to .CCD. The format of the .CCD file is detailed in Appendix A of this document.

7. If a contact's position cannot be identified to lie within an XTF file, the list on the right side of the display reports this. One reason a contact may not be found in an XTF file is a units mismatch. Both the contact and the XTF file being searched must store positions in the same units, meters or degrees.

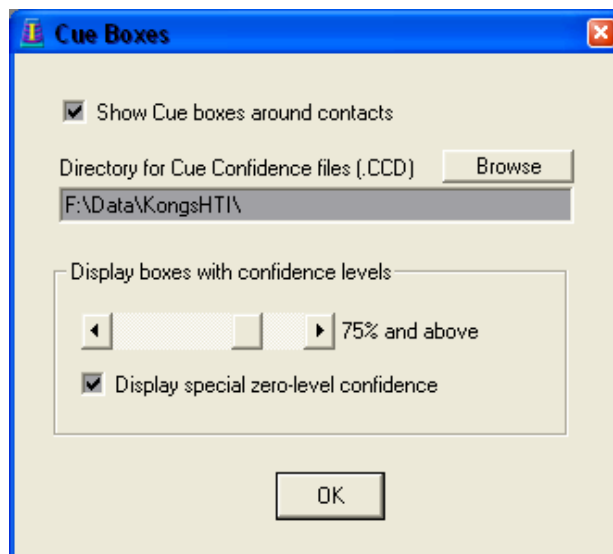
8. To be accurately processed, a CON contact must have a sufficient number of pings with unique and valid navigation. If this is not the case, the positioning of the associated icon in the Isis waterfall display may be inaccurate. The icons for Historical Targets with insufficient navigation for accurate representation will be drawn in blue in the Isis waterfall.

3.0 DISPLAYING HISTORICAL TARGETS IN ISIS

After the HTI Extractor program has been run, and the CCD files containing the required information have been created, Isis is then used to replay the XTF files that were processed by the HTI Extractor. When these files are replayed, the historical target icons will be displayed at their correct location in the Isis waterfall.

Operation is as follows:

1. Select the Configure / Cue Boxes menu selection. Check the "Show Cue boxes around contacts" box.



2. Use the Browse button to point to the directory containing the XTF files to be played back and their associated CCD files.

3. Use the slider to select the confidence threshold of the targets to be displayed. The confidence level comes from the target CON file and is transferred to the .CCD file. GeoTIF targets are always given a confidence level of 100%. Contacts that were generated before the implementation of confidence levels will always have a confidence level of 0. For these to be displayed, “Display special zero-level confidence” must be checked.

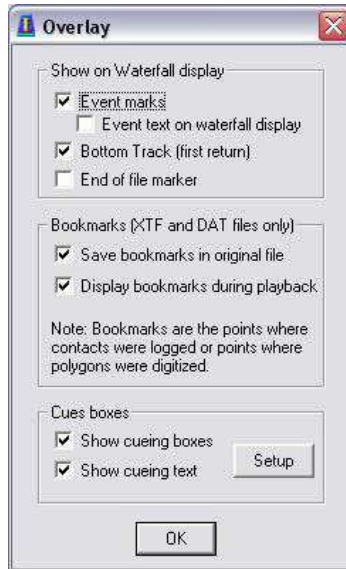
4. Close the Cue Boxes dialog with the OK button.

5. Playback an XTF file in the directory selected in the Cue Boxes dialog. The waterfall display will show the Historical Targets icons at their correct location. An example is shown below.



In this example, the four corners representation was selected in the HTI Extractor resulting in the square boxes being drawn indicating the position and size of the original contact. If the “Center” option had been selected, a point would be drawn at the center location of each target. Below each box will be one or two lines of text. One line will show the target number if the target was from a CON file target, and an incremental number starting at one for GeoTIF targets, followed by the target confidence. The second line will display the annotation for the target from the CON file.

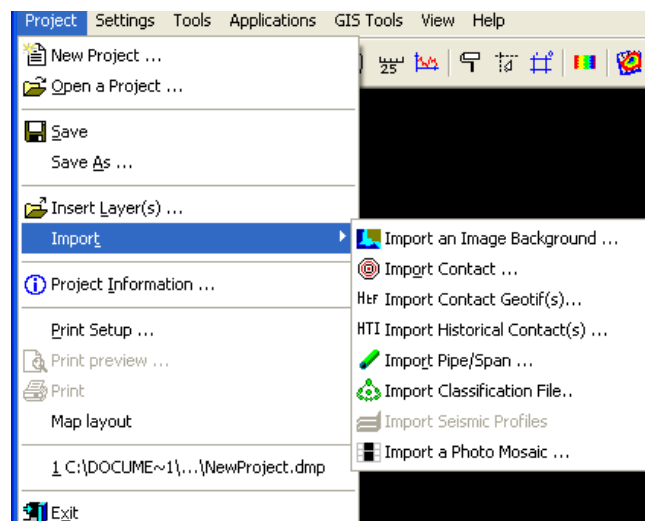
Control over whether or not the icons and/or text are displayed is provided by the *View/Overlay* menu option in Isis. The Cue Boxes section at the bottom of the Overlay dialog, shown below, allows this selection.



Another important feature of the HTI Extractor is that if one clicks on an entry in the list on the left at the bottom of the HTI Extractor display, a section of the XTF file that contains the Historical Target represented by the list item will be displayed in the Isis waterfall. Note that this function will not automatically launch Isis. Isis must be already running.

4.0 IMPORTING HISTORICAL TARGETS INTO TRITON MAP

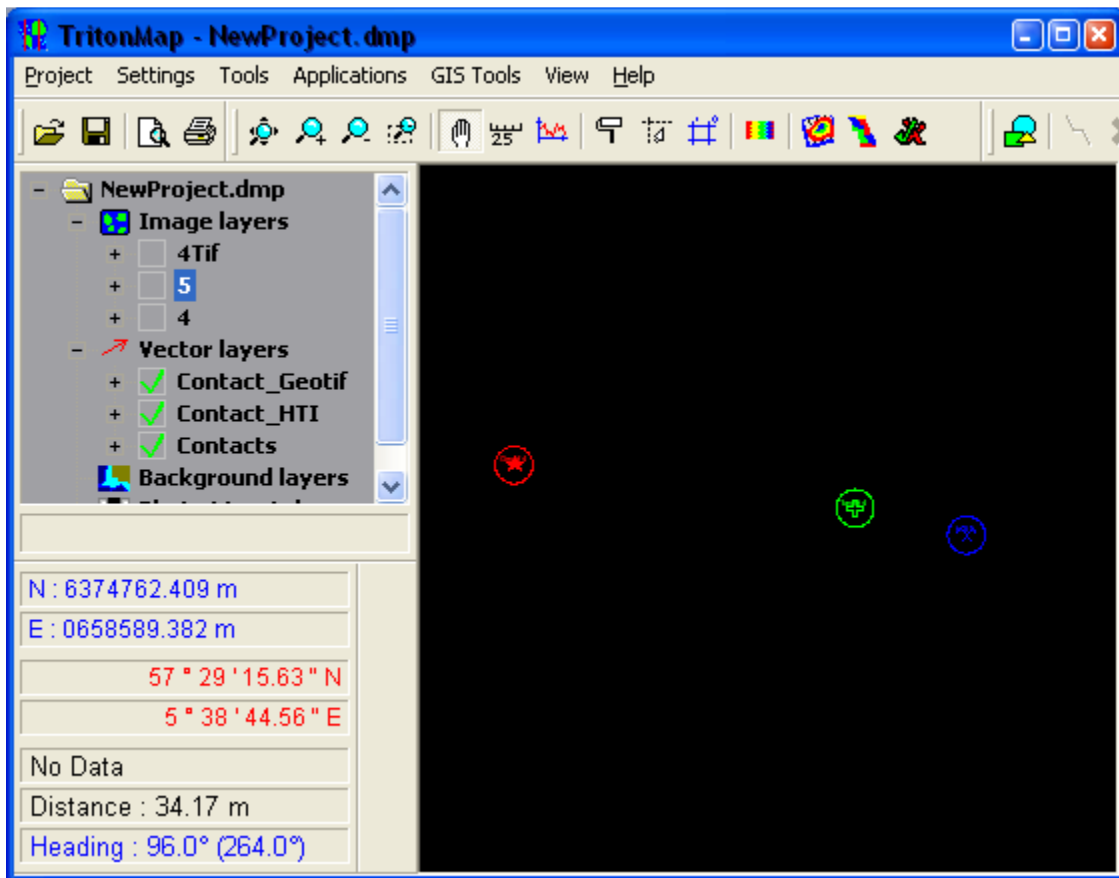
Historical target CON files and GeoTIF files may be imported into Triton Map using the Import menu as shown below:



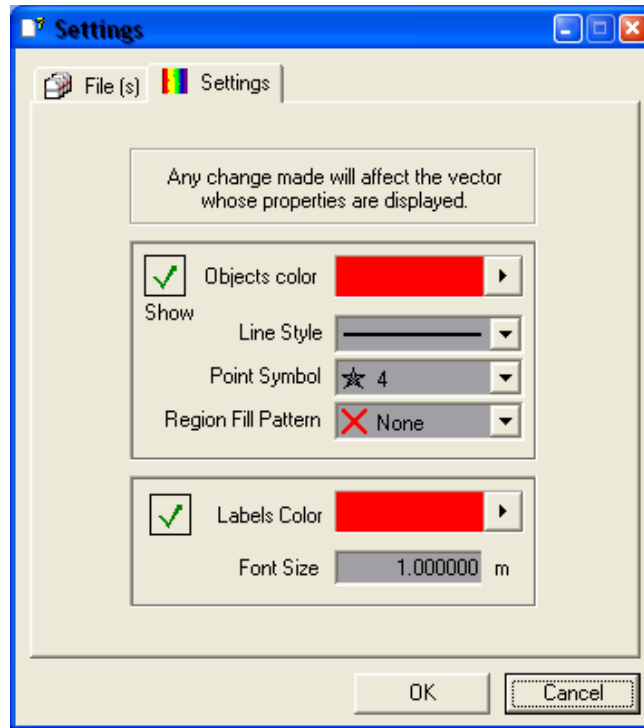
Import Historical Contact(s) provides a way to classify and separate historical contacts from other contacts imported into Triton Map. These contacts are treated almost the same as normal contacts but are allocated to a different vector layer to allow independent control over their display in Triton Map.

Import Contact GeoTIF(s) allows the import of GeoTIF contacts. GeoTIF contacts imported into Triton Map do not display an image. They display a symbol and text at the correct geo-location in the Triton Map display.

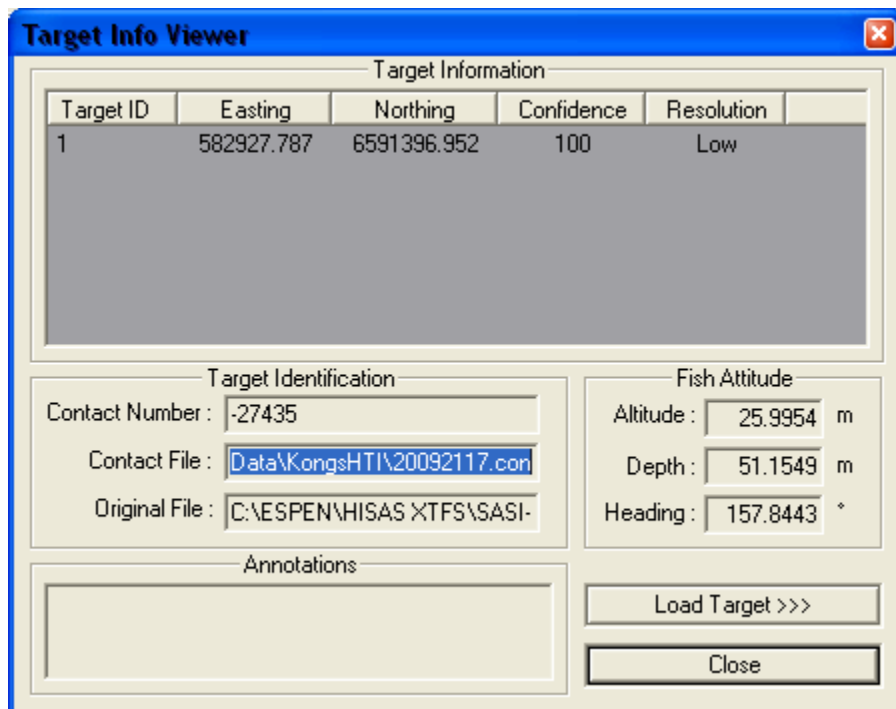
The following image shows one of each kind of contact in the Triton Map display, normal contacts, historical contacts, and GeoTIF contacts. Note that each contact belongs to a different vector layer. The vector layer controls the symbols and text for all the contacts associated with it.



The symbol and text color for each vector layer may be changed independently by right clicking on the layer node in the tree view, selecting Properties from the displayed menu, and selecting the Settings tab. The symbol is the selected Point Symbol and the text color is the Label Color.



As with normal targets, a right click on the icon in the display for a historical or GeoTIF target will invoke the Target Info or Target GeoTIF Info Viewer. The *Load Target* button will invoke TargetPro and the image of the selected target will be displayed.



Appendix A: CCD FILE FORMAT

The .CCD file created for each XTF file is an ASCII text file in which each line has information for each historical CON file or GeoTIF contact that was found in the XTF file.

The space separated fields are as follows:

HtiID: This is the number that appears in the Isis waterfall next to the cue box. For CON files it is the contact number from the file. For GeoTIF files it is a sequential number beginning at 1 and incrementing for each GeoTIF contact processed.

Channel: P for Port, S for Starboard

Navigation: C for sufficient navigation in the contact file, B for insufficient. If the navigation is insufficient, the cue box will be blue instead of red in the Isis waterfall.

First corner ping number

First corner Date and time: year.month.day.hour.minute.second.centiseconds

First corner sample number

First corner longitude or easting

First corner latitude or northing

Second corner ping number

Second corner Date and time: year.month.day.hour.minute.second.centiseconds

Second corner sample number

Second corner longitude or easting

Second corner latitude or northing

Annotate= : after the equal (=) sign will be the annotation from the CON file. Blank for GeoTIF contacts.

The following is an example of a CCD file record.

```
9999 P C 1037 2009.4.23.7.54.9.40 1503 10.46589992 59.45420475 1305
2009.4.23.7.54.14.78 1771 10.46580581 59.45408784 100 Annotate=
```