

DEBRIEF 3 ANALYSIS DOCUMENT

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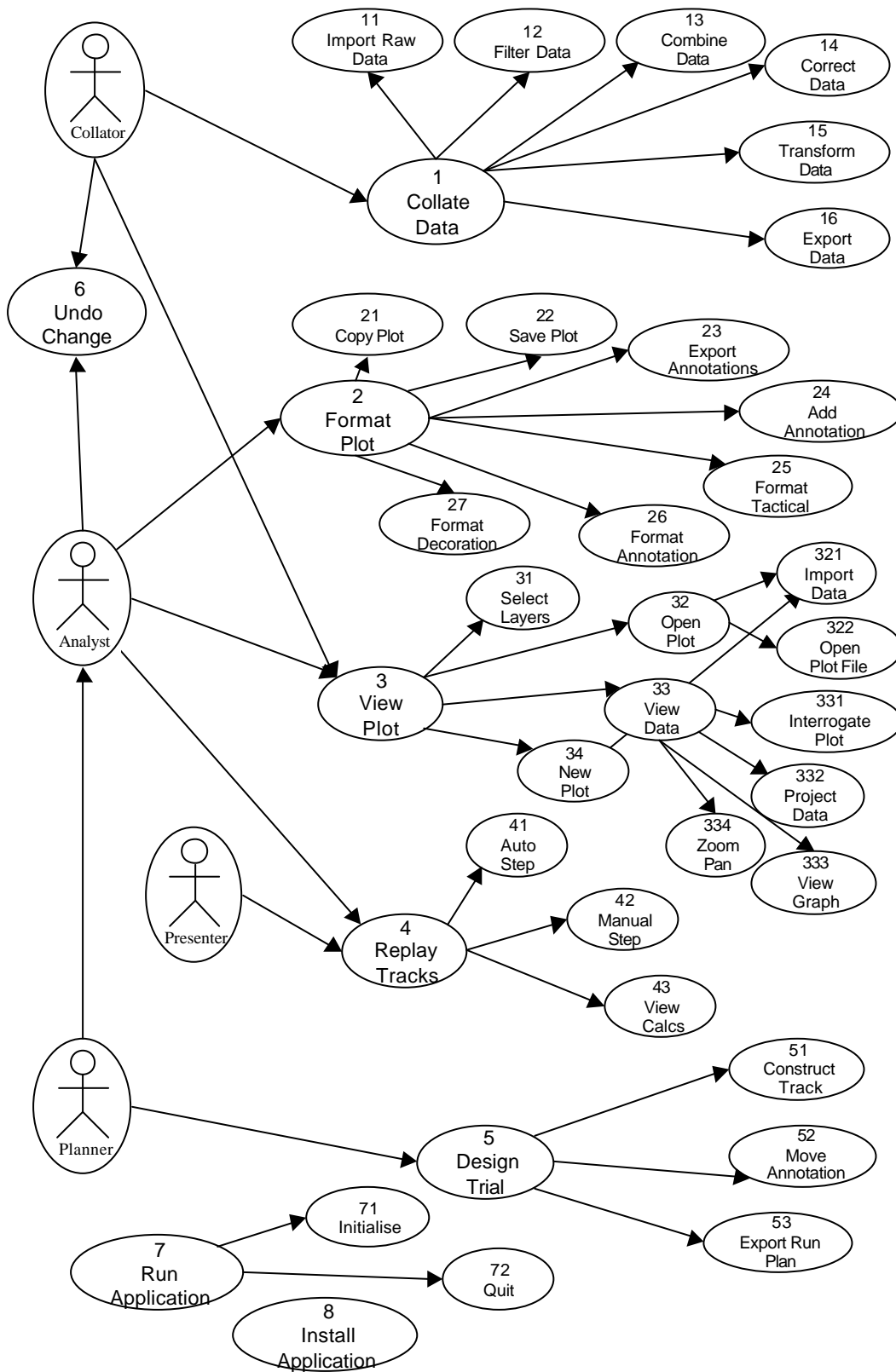
1. This document forms the summary of the analysis phase of the Debrief 3 Development. This document is covered by the Debrief 3 Project Plan, 11/D3/22.
2. The analysis is broken down into the following sections:
 - a. **Use Case Diagram** – a breakdown of the ways in which the application is to be used: its responsibilities.
 - b. **Use Cases** – expanded details of the use cases described above. These use cases are formed from analysis of the requirements document together with the current functionality delivered by Debrief, and may be used to support final acceptance testing.
 - c. **Functional Areas** – a list of functions performed by the application, ordered by immediate usefulness to the MWC.
 - d. **Implementation Groupings** – a table of use-cases required to fulfil functional areas described above, from which time-estimates may be calculated in the future.
 - e. **Concept Model** – an illustration of the information to be stored/handled by the application, together with its relationships.
 - f. **User Interface Prototypes** - these diagrams are an initial estimate of the type of user interface and level of functionality required.
3. All of the analysis performed is subject to change during the design/implementation stages of the project, and this document is to be updated as necessary.

Use Case Diagram

4. See the Debrief glossary document for explanation of roles contained in diagram.

Use Cases

5. The following table extends the definitions of the use cases to be implemented within Debrief



6. Where a use case may be clearly broken down into separate areas on functionality, these are explained. Potentially these areas may be implemented separately, but they must be acknowledged in the design phase of the development

ID	Use Case	Description
1	Collate data	The process of creating tracks to be used in TD exercise analysis.
11	Import raw data	Read in data in raw form from data files. This data will not normally be in Replay format, as each datum may carry many more fields. This is to be implemented as a number of stages: <ol style="list-style-type: none"> 1. Import text data (in format to be specified) 2. Import text data (in unknown format) using text import wizard.
12	Filter data	Manually/automatically select data points from tracks, removing unwanted data as necessary.
13	Combine data	Algorithmically combine selected portions of track.
14	Correct data	Apply operations to one or more selected track data points.
15	Transform data	Apply operations to one or more selected tracks or track sections.
16	Export track data	Save the collated track to file in Replay format.
2	Format plot	The process of changing presentation aspects of items on screen, then storing this information. The format processes also signify assigning graphic elements to layers within the current plot.
21	Copy plot	Copy the plot currently displayed to the Windows clipboard as image.
22	Save plot file	Save the current plot to disk as Debrief file
23	Export annotation data	Save one or more selected annotations to disk in Replay format.
24	Add annotation	Add (then display) an annotation to the plot, in several ways: <ol style="list-style-type: none"> 1. Agree list of annotations to use 2. Import Replay file 3. Open dialog for text entry of values for spatial annotation 4. Import & plot coastline data 5. Open dialog for text entry of values for vessel annotation 6. Open dialog for GUI entry of values
25	Format track	Select one or more tracks, and apply formatting. Track colour/symbology may be changed, label position/frequency may be changed.
26	Format annotation	Select one or more annotations of the same type and amend their colour / font / size / symbol. For spatial annotations this does not cover the movement of the annotation, but for a vessel annotation such

		<p>characteristics may be modified.</p> <ul style="list-style-type: none"> • Labels positioned relative to datum in pixels
27	Format plot decoration	<p>Select which plot decorations are visible, change their settings (grids & scale) and move them (legend) as applicable.</p> <ul style="list-style-type: none"> • Scale not draggable (mtg early July, SM6, SM61) • Scale has min, max, step size, corner of screen • Key allows grouping of entries
3	View plot	The process of viewing the track data, spanning from opening the files through to interrogating the data.
311	Layers strategy	Agree/document strategy & naming convention for layers – what is put where by default & how is it named/manipulated
312	Select layers	The process of naming the layers available within Debrief, plus indicating which ones are currently visible.
32	Open plot	The process of loading data into Debrief
321	Import data	Import indicated Replay files (which may contain track or annotation data) into current plot
322	Open plot file	Open existing Debrief plot file
33	View data	The process of accessing analytical information from the plot
331	Interrogate plot	<p>This covers a number of areas:</p> <ol style="list-style-type: none"> 1. find more detail regarding screen entities 2. measure range/bearing across an area
332	Project data	<p>The translation of world co-ordinates (lat/long/depth or x/y/z) to the x-y co-ordinate system necessary for on-screen representation of data. This covers a number of types of projection:</p> <ol style="list-style-type: none"> 1. earth projection (lat/long → x/y) 2. relative-plot (show all positions relative to a participant) 3. flat-earth projection (plotting of x/y data) 4. Flat-earth 3-d projection (plotting of x/y/z data)
333	View graph	The production of a graph of time (x) against a vessel variable (crse/spd/depth) or a calculated variable based on more than one vessel/spatial annotation (range/bearing/rel bearing)
334	Zoom/pan plot	<p>Change the current view on the data. Contains a number of features:</p> <ol style="list-style-type: none"> 1. Zoom in/out of the plot 2. Fit the current data to the screen 3. Pan around the current data

34	New Plot	The process of creating a new plot, for data to be imported into.
4	Replay tracks	The process of stepping through vessel tracks in time, and viewing a dynamic display. The user-configuration of data time moved forward each step. The updating of all views based on the current file.
41	Step automatically	Configure an acceleration factor and start an automatic stepping through the data. Also the start/stop/restart/fwd/back controls
42	Step manually	The user controlled stepping fwd/back through a scenario, with the step size configuration, plus the 'step-to-time' functionality.
43	View calculated data	The dynamic display of calculated data based on two vessel statuses.
5	Design trial	The process of experimentation with vessel tracks and spatial annotations used in the design of a detailed trial/exercise order, culminating in the export of the trial details.
51	Construct track	The manual creation of a vessel track, implemented as a number of stages: 1. Indicating a start-point then extending using rng/brg or speed/time pairs to build up a track. 2. Indicating a start-point then extending it using mouse-clicks with a text-entered speed/time value. 3. Moving a track/datum around the plot, potentially retaining range/bearing between points.
52	Move annotation	The movement/resizing of a spatial annotation
53	Export run plan	The export of completed track and/or annotation data to the Windows clipboard as text.
6	Undo change	The process of undoing a change made by a user. The types of command for which undo are as follows: 1. View area changes (zoom/fit, etc) 2. Track formatting changes (colour, style, symbology) 3. Annotation formatting changes (colour, style, font) 4. View layer changes (naming, making visible) 5. Plot decoration changes (colour, setting, font) 6. Annotation movements (location, size) 7. Operations applied to tracks (reconstruction)

System Use Cases

7. This section records Use Cases which do not respond to functionality explicitly identified in the requirements phase. The System Use Cases mostly relate to system functionality which is not visible to the operator.

ID	System Use Case	Description
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7	Run Application	The process of the application starting and appearing on screen
71	Initialise Application	Load environment, Initialise working variables
72	Quit Application	Remove temporary variables, check saving 'dirty' documents.
8	Install Application	The functionality required to install the application on a target machine

Functional Areas

8. The following functional areas correspond to useful groupings of the use cases described above.

Functional Area	Description
Application 1	Main application (menus, toolbar), plus import of simple Replay track into new plot, simple globally flat-earth projection.
Analysis 1	Core functionality required to conduct track analysis: zoom/pan, earth projection, interrogate data, measure range/bearing, save plot, undo view change.
Formatting 1	Format track, symbols & labels, copy plot image to clipboard, extended save plot, extended undo.
Presentation 1	Step through tracks in time, manual, tote data (not calculated).
Annotations 1	Create (via text boxes & importing) existing annotations, save them singly to file, extended save plot, extended undo.
Formatting 2	Assignment of tracks/annotations to layers, name layers, indicate visible layers, format plot decorations, extended save, extended undo.
Analysis 2	Import sensor data from file, format presentation of sensor data, include calculated data in tote, extended save plot, extended undo, extended tote, extended step in time.
Application 2	<i>Opportunity to update application/GUI environment, Window control, application installation</i>
Annotations 2	Graphically create spatial & vessel annotations, attach to vessels, configure characteristics, extended save, extended undo.
Planning 1	Interactively create vessel track, move annotations / track sections, export run plans, create/move annotations, extended undo.

Reconstruction 1	Import text data-files into application, filter data to specified time-period, interpolate to produce new file, export as Replay file, extended undo.
Analysis 3	Creation of Time/Variable plots, extended save plot, extended undo, 2/3-D view of x/y data, relative view of plots
Reconstruction 2	Graphic rectification/reconciliation of data, adding supporting operations, automatic step through tracks

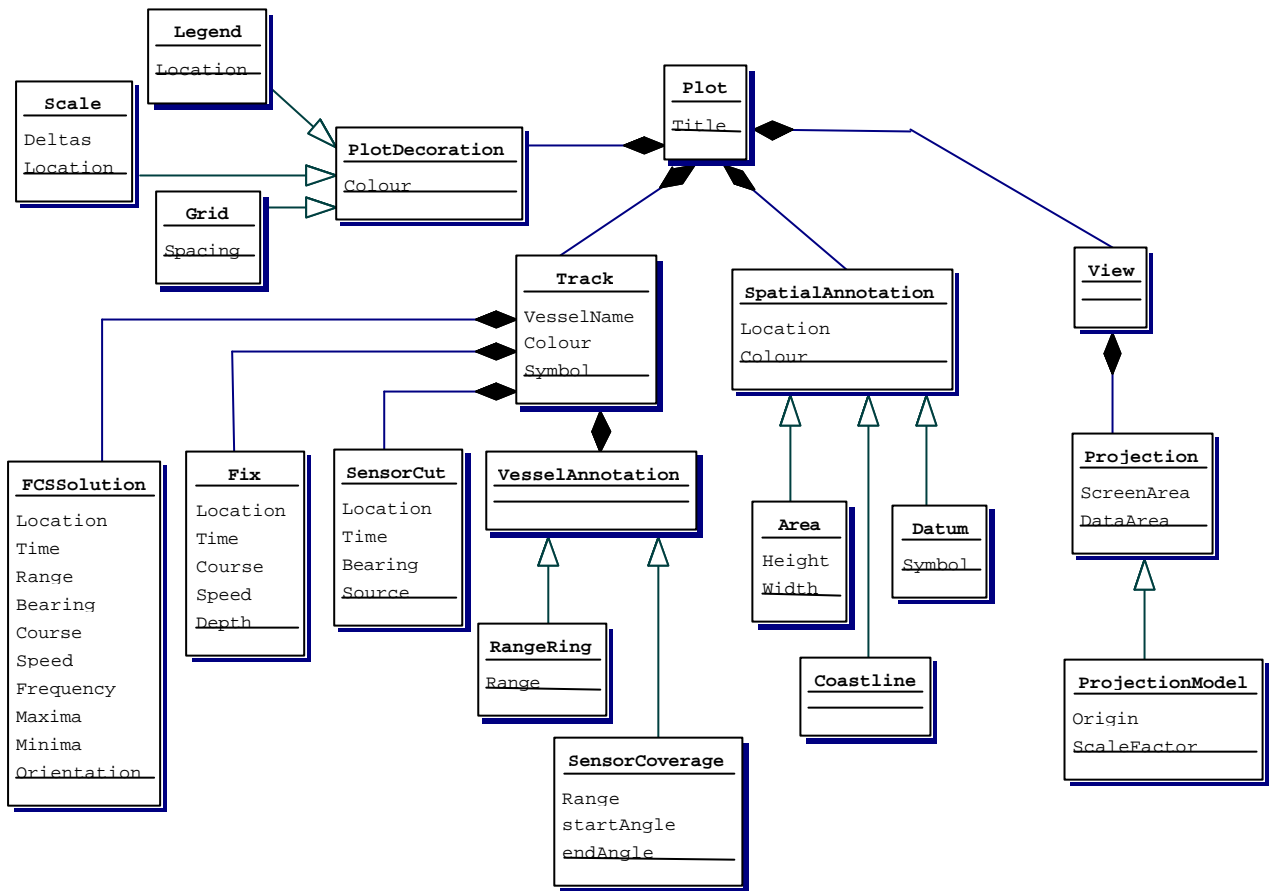
Implementation Groupings

1. The use cases described at the start of this document are to be implemented according to the following sequence/priorities:

	Application 1	Analysis 1	Formatting 1	Presentation 1	Annotations 1	Formatting 2	Analysis 2	Application 2	Annotations 2	Planning 1	Reconstruction 1	Analysis 3	Reconstruction 2
10 Collate Data											1, 11.1, 12, 14, 15		11.2, 12, 13, 14, 15
20 Format Plot		2, 22	21, 22, 25		22, 24.1, 24.2, 26	26, 27			22, 23, 24.3, 24.5	24.4		22	
30 View Plot	3, 32, 321, 33	322, 332.1, 334.1, 334.2, 334.3				311, 312	321, 322, 331.1, 331.2, 332.2					332.3, 332.4, 333	
40 Replay Tracks				4, 41, 42, 43			43						
50 Design Trial										5, 51.1, 51.2, 51.3, 51.4, 53			
6 Undo		6, 6.1	6.2		6.3	6.4, 6.5	6.2		6.3, 6.6	6.6	6.7		6.7
7 Run application	7,71,72												
8 Install application								8					

Concept Model

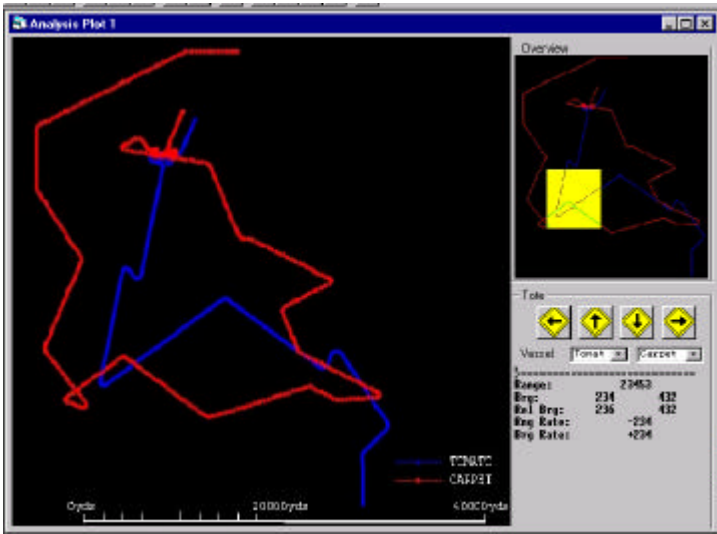
1. See the Debrief glossary document for an explanation of the terms used below.



User Interface Prototypes

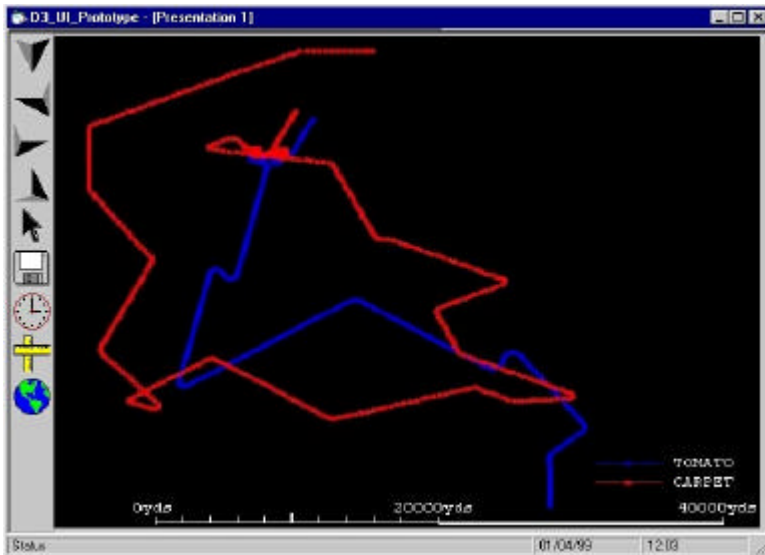
2. To provide the greatest support for separate roles in the application, 4 different child windows will be used. Debrief will run as an MDI (Multiple Document Interface) parent application, and contain a toolbar of common file activities, plus the generic controls necessary for all 'role' windows: zoom, fit-to-window, measure range/bearing, time-step, edit track/fix, control-layers, copy-to-clipboard. These generic functions will also be provided via the menu interface.
3. The role-specific windows will share the normal track-plot, but will be supported by role-specific panels as illustrated below. Note that the Presentation role window opens full screen, hiding the MDI parent – consequently the generic controls are duplicated (in a simple, stylised representation) on it's toolbar. The file-open access will open a stylised 'file-open' dialog containing a list of debrief plot-files contained in a 'Presentations' sub-folder of the installation directory. An 'others' button on this dialog will open the normal Windows file-open dialog.

Analyse Tracks



LH side contains track, which can be zoomed, double-clicked, etc. Top RH frame contains overview plot (of all data), where yellow zone can be moved around/resized to pan/zoom. Bottom RH frame contains analysis tote for two (selectable) tracks / annotations.

Present Tracks



LH size contains simplified toolbar. Note absence of menu & main toolbar, files are opened by selecting "file" icon.

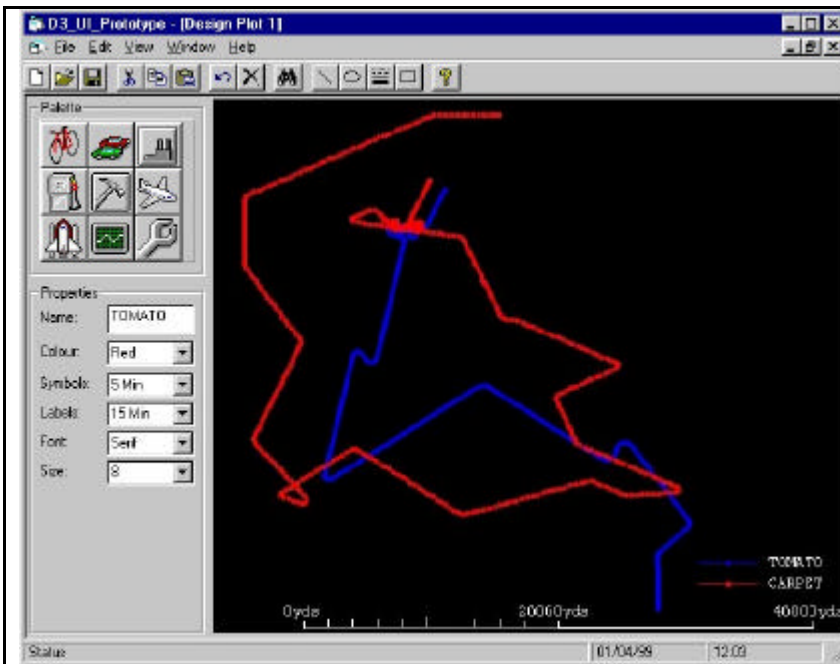
Design Plot

Top LH panel contains palette of annotations which may be added to plot.

Bottom LH panel contains (formatting & spatial) properties relating to annotation(s)/track(s) currently selected.

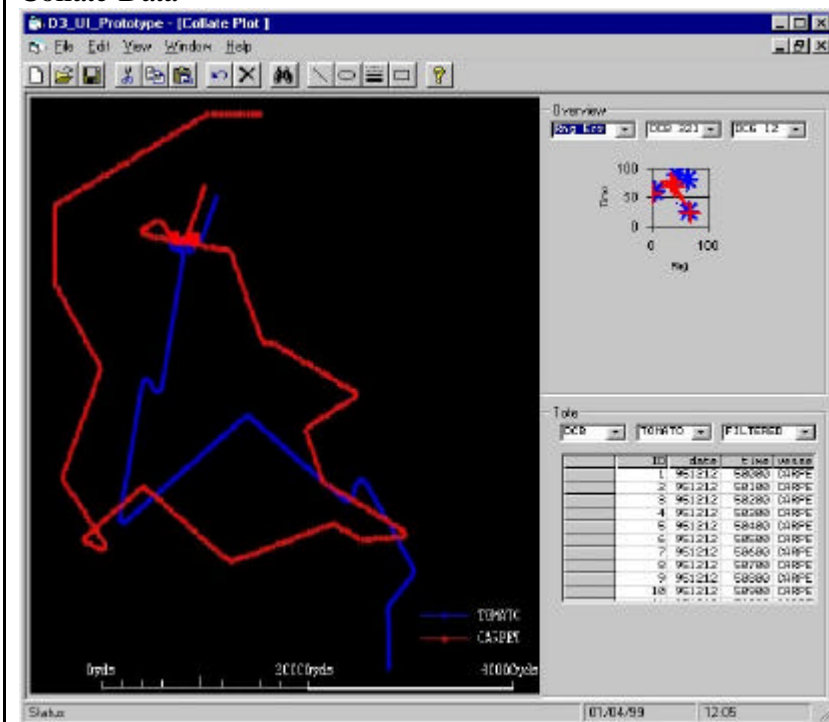
RH panel contains normal track plot.

User may double-click on legend-entry to select



particular track.

Collate Data



LH panel contains normal track plot, user able to pick up tracks.

RH top panel contains configurable graph of data, which may be opened up in separate window if necessary. Graph configured by selecting 'relationship', followed by subjects to be plotted.

RH bottom panel contains grid of data. This may be the raw data, or may be dynamically calculated data. Configured as RH top panel.

Menu Structure

4. The following structure defines the menu to be implemented by the application:

File	Edit	Window	Cursor Mode	Help
New Session	Copy to Clip	Arrange All	Select	Contents
Import Data	Cut Item		Range Bearing	
	Copy Item		Zoom	
MRU...	Paste Item			
Exit	Delete Item	List...		About
	Export Item			

5. The controls placed on the menu structure will also largely be available from the top-level toolbar of the application.

Analysis Tote

6. The analysis tote contains calculated/derived information that is of great value to the analyst. The information is updated dynamically as one or more serial participants move in time.

7. The previous incarnation of the analysis tote (in Debrief 2) allowed exactly two vessels to be selected, and showed the following data:

- a. The current time
- b. The range between the two vessels
- c. Plus an expanded section which shows the following:
 - (1) Dot-range and dot-bearing (dot representing “rate of change of”)
 - (2) Predicted CPA range and time
 - (3) Distance off track
 - (4) Bearing & Relative Bearing
 - (5) Heading/Speed/Depth

8. The new version of Debrief will present this existing information, but will also allow a reference point to be designated as one of the vessels. In this way, the dynamic range and bearing to a fixed point may be displayed by the analyst.

9. The new version of Debrief will also introduce the concept of *Primary* and *Secondary* vessel in the tote, allowing a reduced data set to be presented for the secondary track.

Contact Data

10. The new version of Debrief will allow the presentation of sensor contact data.

11. All contact data will contain an origin, a DTG, a text field, and a symbology. Acoustic data may also contain a bearing and/or a range.

12. The operator will be able to control the screen formatting of the information, the text label shown and the visibility of the information. Where a bearing is provided a range may also be edited/created.

13. Initially there are no requirements for calculations based on bearing information.

14. Sensor data may specify its source platform, together with a DTG plus the range and relative bearing of the sensor datum from the fix datum of the vessel. Such a line (represented in Debrief format) is:

```
;VLCONTACT: @B CARPET 951212 114200.000 180 1100 145 2000 some contact  
;type: symbology, source, YYMMDD, HHMMSS ,rel brg (degs), rng (yds), rel brg (degs), rng (yds),  
label
```