



# Generic Reconstruction and Analysis for Simulations or Live Exercises

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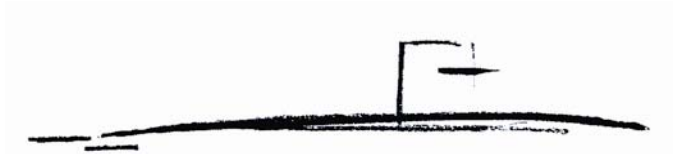
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## Introduction

- › GIDS: Logging & Analysis on Walrus class Submarines



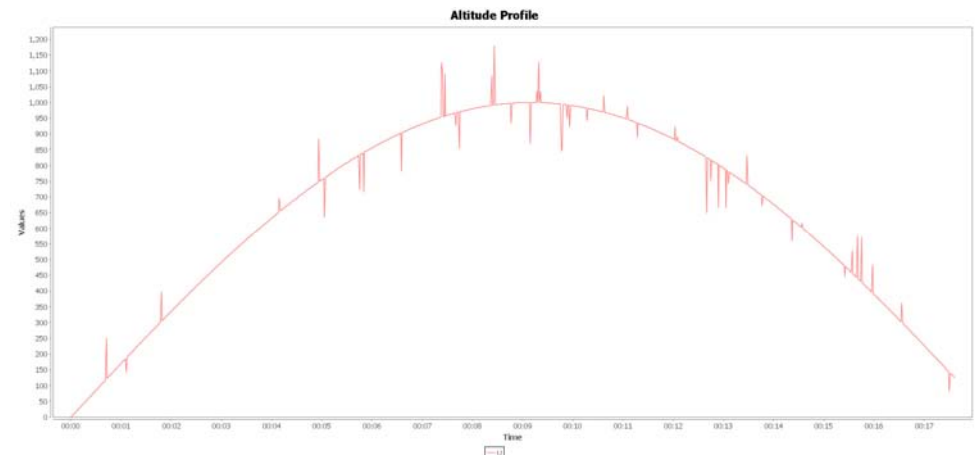
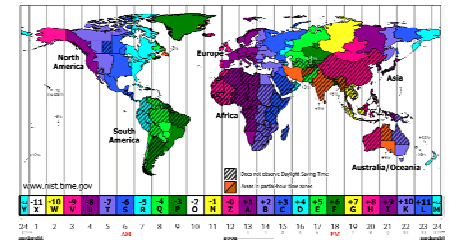
- › New Air Defence & Command Frigates
- › Live Firings





## Analysis issues

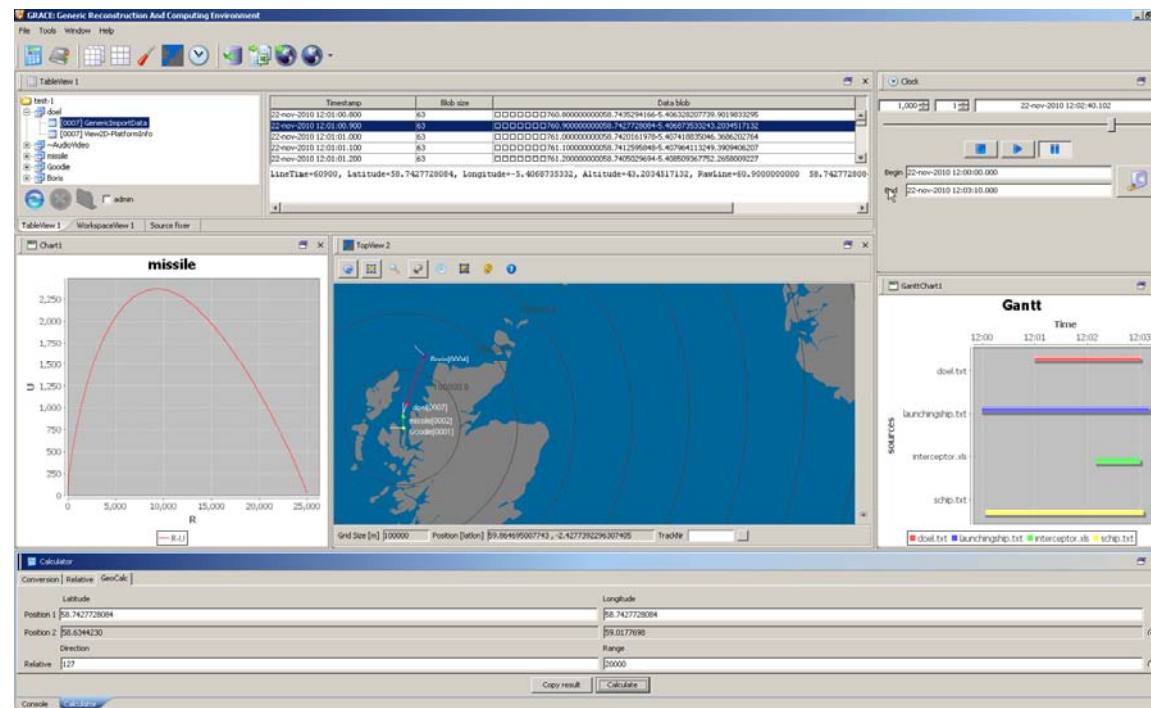
- ▶ Large amounts of data
- ▶ Many different data formats, partly unknown
- ▶ Time Synchronization
- ▶ Time Zones
- ▶ Many different coordinate systems
- ▶ Gaps and errors in data
- ▶ Data processing is very time consuming





# Analysis Solution

One tool for logging, reconstruction & analysis for simulations & live exercises



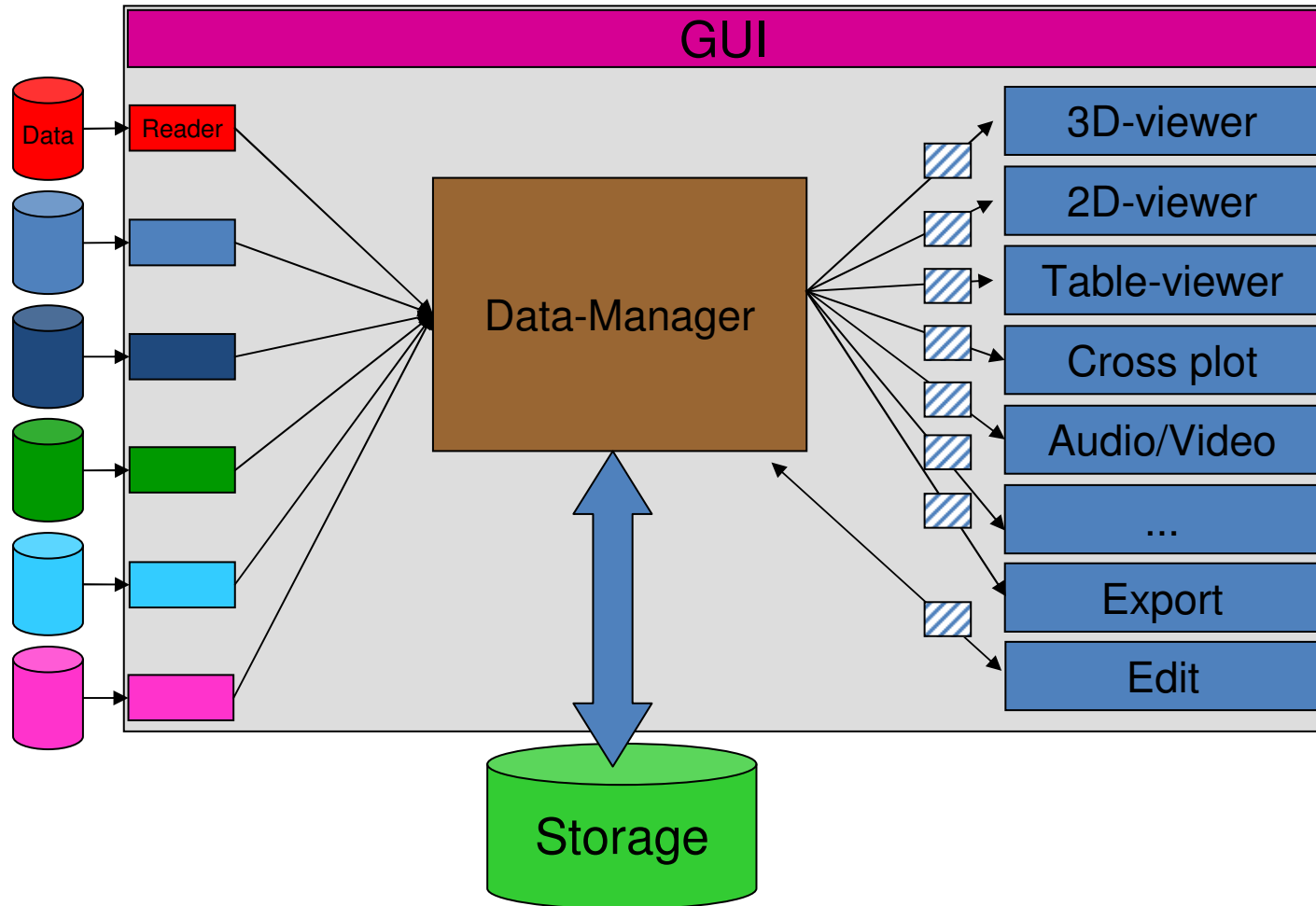


## Requirements

- › Generic Data Storage
- › Storage of raw data
- › Data is time-related
- › No full knowledge of data contents required
- › Integration of different data sources
- › Modular software setup
- › Not depending on commercial licenses
- › No special hardware required



# Tool Architecture





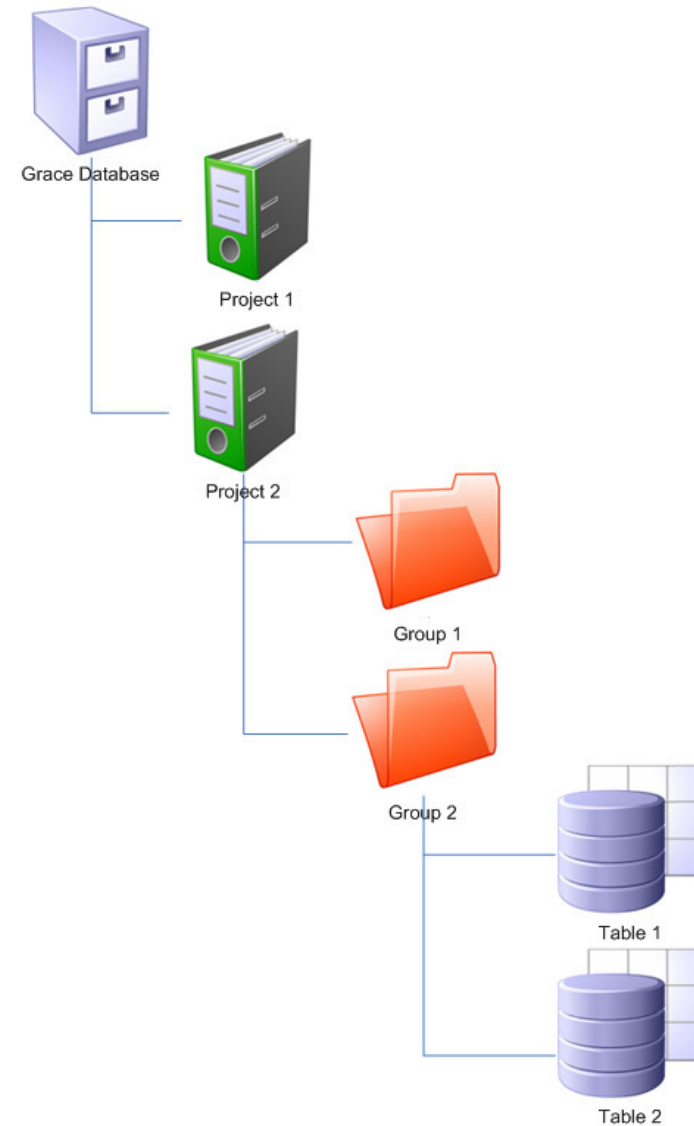
# Tool Architecture

## Data Organisation

- › Workspace
- › Project
  - › Group
    - › Table
    - › Record

## Data Storage

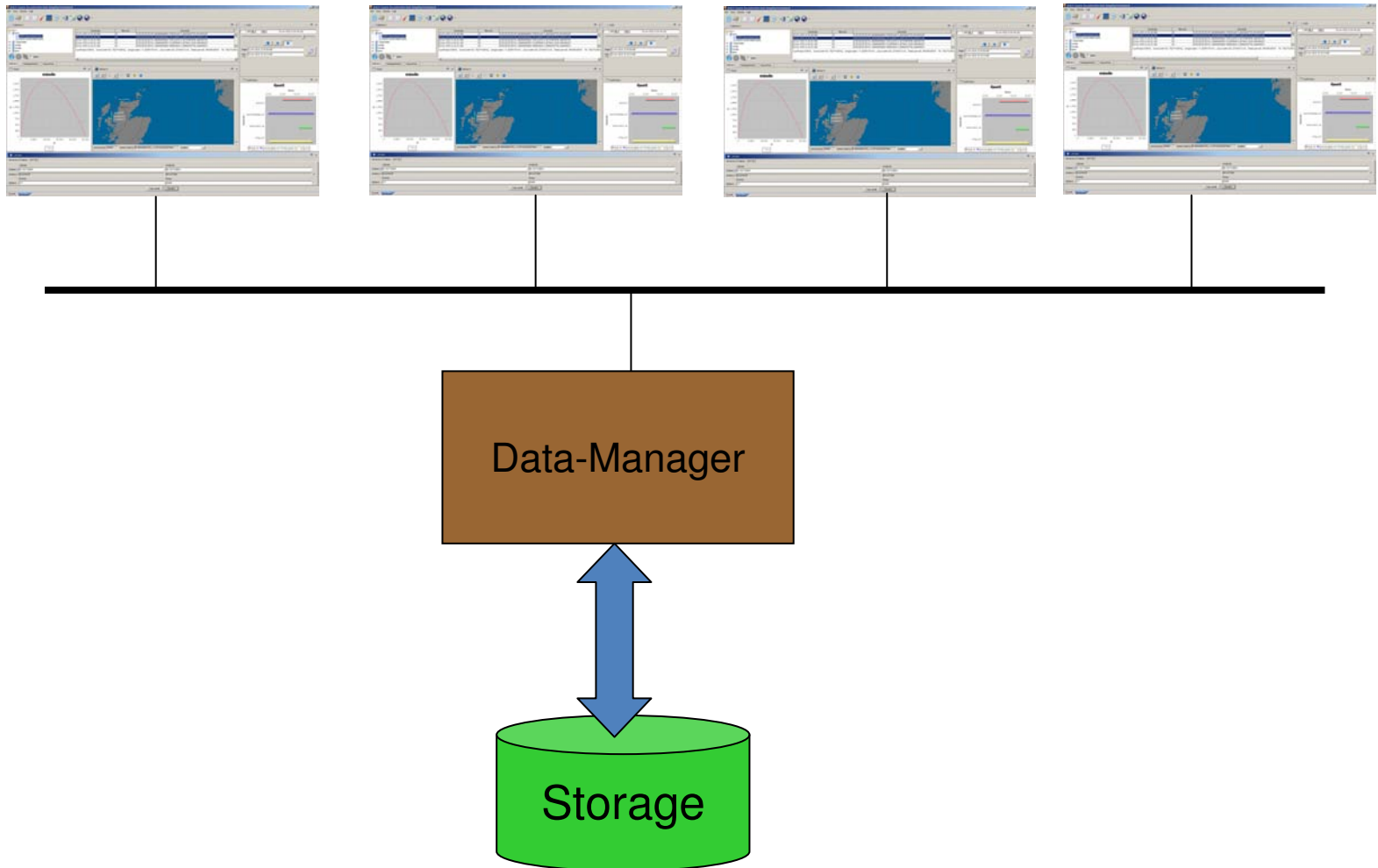
- › File
- › SQL





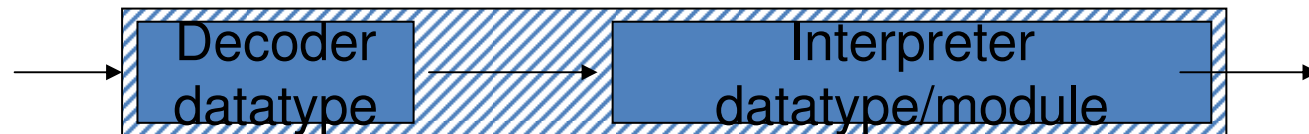
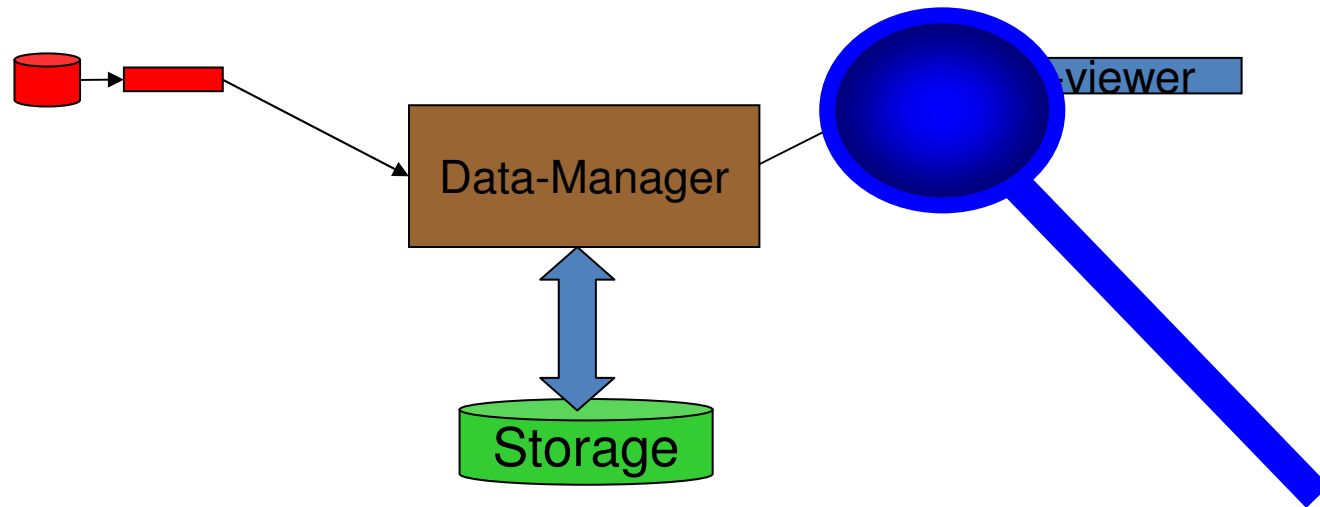


# Tool Architecture





## Tool Architecture





## Functionality

- › Data formats
  - domain specific
  - NMEA GPS
  - audio / video
  - generic
  
- › Topview / side-view
- › Timed / XY charts
- › Timing charts
- › Export to SIMDIS
- › Export to MS Excel
- › Geo Calculator
- › DIS / Link 16 logging & replay



## Analysis

Still requires a human touch...

... but it can be supported with

- › visualisation
  - › topview
  - › 3D-view
  - › data table viewers
  - › charts (XY, timelines, ...)
- › Data conversion
- › Comparison with simulation results
- › Specific data processing



## Applications

- › Live Firings
  - › Reconstruction of Firings (missile, torpedo) in SIMDIS
  - › Both Technical and Tactical
  - › Integration / comparison with simulation results





# SIMDIS (NRL)

The screenshot displays the SIMDIS software interface. The title bar reads "SIMDIS [a.fct]\* c:\temp". The menu bar includes "File", "Time", "View", "Eye", "Data Manager", "Media", "Overlays", "Tools", "Display", "Map", "Plug-in Tools", and "Help". The toolbar contains various icons for navigation and analysis, including a "SUPER RANGE" indicator with values 17 and 32, a "TRACKS" icon, and buttons for "DC", "TS", and "TC".

The main display area shows a 3D reconstruction of a ship's path over a terrain map. The ship is depicted as a grey vessel with a white superstructure. The path is shown as a series of orange lines forming a curved shape. The terrain is rendered in shades of brown and green. The word "unclassified" is displayed in large black text across the top and bottom of the main view.

In the bottom left corner, the following data is displayed:

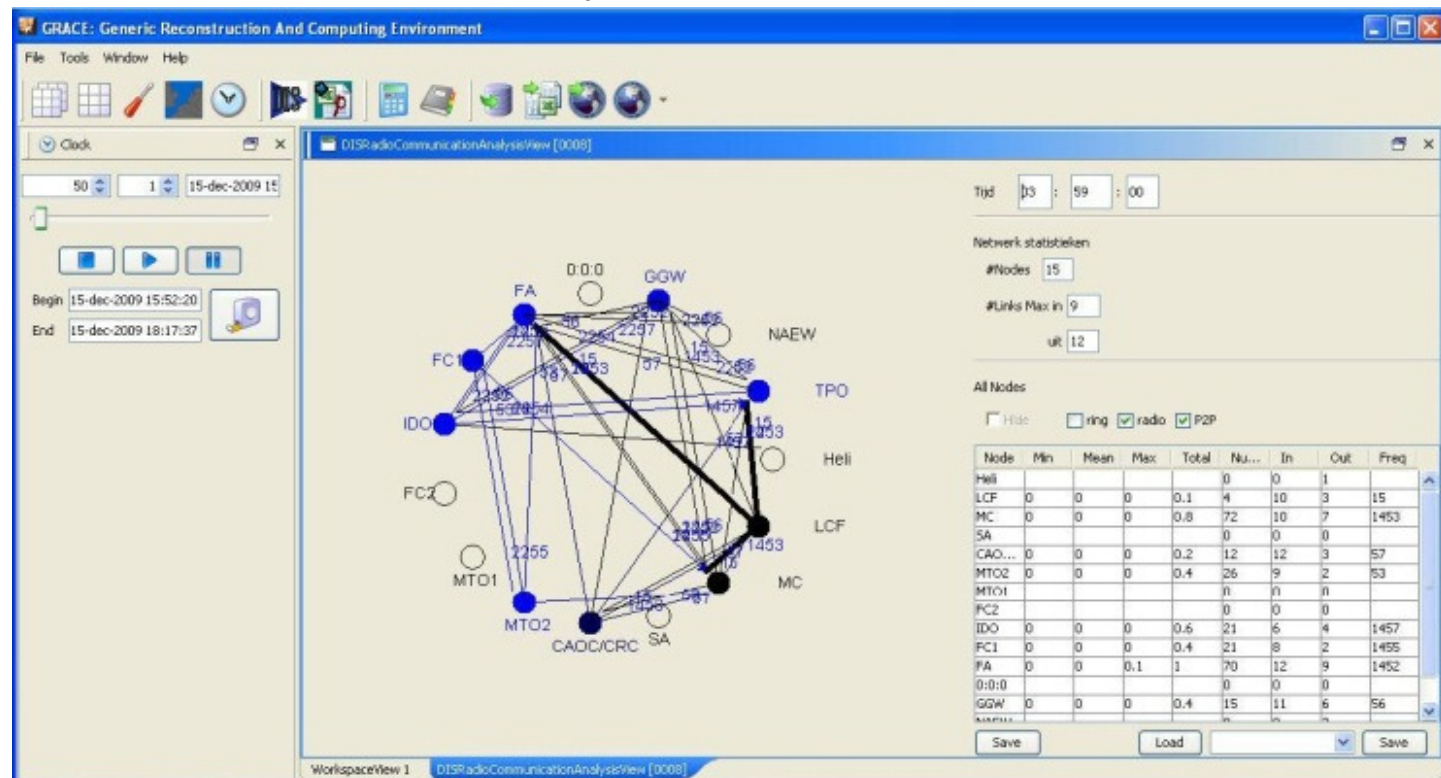
- Time: 326 12:02:47.200
- Time Step: 0.100 Secs
- Distance: 16372.741 m
- Azim: 331.238°
- Elev: 25.657°
- Centered: None

In the bottom right corner, there is an inset window showing a 3D view of the ship from a different perspective, highlighting its superstructure and radar mast.



# Applications

- › Simulation Analysis
- › Radio Communication Analysis





# Applications

➤ Exercise Logging & Replay → JoiNT



Joda 0.1.0.1

Start range: 12:11:08 | Current time: 12:12:56 | End range: 17:13:03

Process status

Table | DIS and TDL Data | Map | Report | Raw Analysis Data | Event Annotation | Operation

### Link 16

AL	Update	Track	#STN	STN:DIS Entities
1	12:11:19	4131	1	134:?
	12:12:43	30027	1	134:(12:60:406)[1101]
1	12:11:21	30634	1	16:?
1	12:02:26	30330	1	16:?
1	12:11:24	30124	1	16:?
1	12:11:32	30125	1	16:?
	12:11:58	30123	2	134:(12:60:406)[202], 16:(12:60:406)[290]

### Track Messages

Time	Label	SubLabel	STN	Additional
12:11:36	3	2	16	TQ=12
12:11:38	7	0	16	DROP TRACK REPORT
12:11:38	3	2	134	TQ=10
12:11:44	7	0	134	DROP TRACK REPORT

### DIS

AL	Update	Entity ID	Marking
	12:12:51	12:60:508	ABT_AGBADS_
	12:12:51	12:60:501	ABT_AGBADS_
	12:12:51	12:60:410	ABT_AGBADS_
	12:12:55	12:60:335	ABT_ADCPI_F
	12:12:51	12:60:306	ABT_AGBADS_
	12:12:51	12:60:720	T3000-60-St
	12:12:51	12:60:726	T4000-60-St
	12:12:51	12:60:221	ABT_AGBADS_
	12:12:51	12:60:193	ABT_ADCPI_F
	12:12:51	12:60:196	ABT_AGBADS_
	12:12:55	12:60:739	T4000-63
	12:12:51	12:60:666	T4000-59-St
	12:12:51	12:60:699	T3000-57-St
	12:12:51	12:60:696	ABT_AGBADS_

### Entity Messages

Time	Type	Platform	Force / area
12:11:08	Entity State	12:60:596	Opposing
12:11:15	Entity State	12:60:596	Opposing
12:11:21	Entity State	12:60:596	Opposing
12:11:28	Entity State	12:60:596	Opposing
12:11:35	Entity State	12:60:596	Opposing
12:11:41	Entity State	12:60:596	Opposing
12:11:48	Entity State	12:60:596	Opposing
12:11:54	Entity State	12:60:596	Opposing
12:12:01	Entity State	12:60:596	Opposing
12:12:07	Entity State	12:60:596	Opposing
12:12:14	Entity State	12:60:596	Opposing
12:12:51	Entity State	12:60:683	T4000-57-St

Domain: BasicEntityProperties  
ABT\_AGBADS\_







## Thank you

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