

## **SIMDAT Short Description**

**(SIMDAT – Simulation Data Analysis)**

SIMDAT-Version: 5.5  
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### **General Description and Objectives**

#### ***SIMDAT main focus:***

SIMDAT is a software package for displaying and analysing data files from several sources. Originally SIMDAT [1] was designed only to display the simulation data from the Rheinmetall Advanced Nautical Simulator (ANS) series [3]. It was widely extended and now the current version of SIMDAT can be used to display, analyze and evaluate data from ANS. During a simulator exercise all data can be recorded in full detail to be available for a very extensive analysis by SIMDAT afterwards. The data which can be viewed can comprise any number of simulated manoeuvres and ships. Specifically from SHS exercises it includes own ships, traffic ships, floating object water or floating objects air. For every object the track can be viewed in a geographical or plane coordinate system alternatively. Besides the track of the ships any other simulated or measured data can be displayed and analyzed in comparison to the actual track. In the same way as for the ANS data the SIMDAT program can be used for analysing the results of the SIMOPT (Simulation and Optimization Software) [1].

Additionally SIMDAT is ready to display and evaluate the results from measurements with real ships recorded during Ship Manoeuvring Trials.

#### ***SIMDAT data Main Interface***

The SIMDAT main interface (see Fig 1.) is a combined display for track and parameter information. The upper right part consists of the track display which shows:

- Track and shapes of own ships used in the simulation
- Track and shapes of traffic ships used in the simulation
- Lines between ships if used in simulation

The tracks can be displayed either in a geographical or in a plane coordinate system. On the right side of the track display a slider allows for scrolling through the data and thus selecting relevant times for analysing the parameter.

The lower right part of the main interface displays a number of parameter to be analysed. The parameters can either be viewed as sequence over time or as actual value at a certain time. The selection of the parameters is done on the lower left side of the main interface.

The upper left side of the interface gives information on the loaded dataset with the number and names of the used ships and track display options.

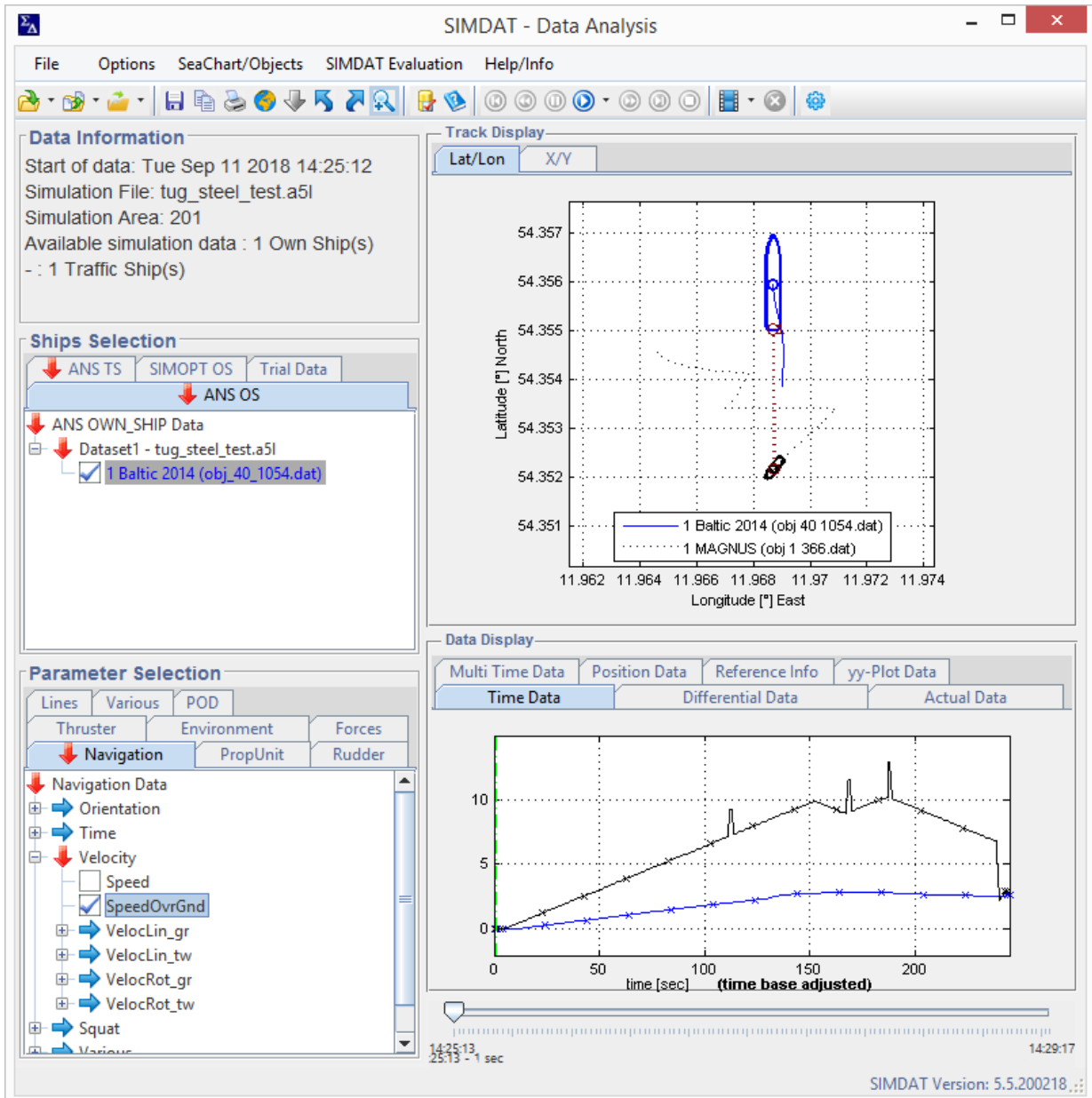
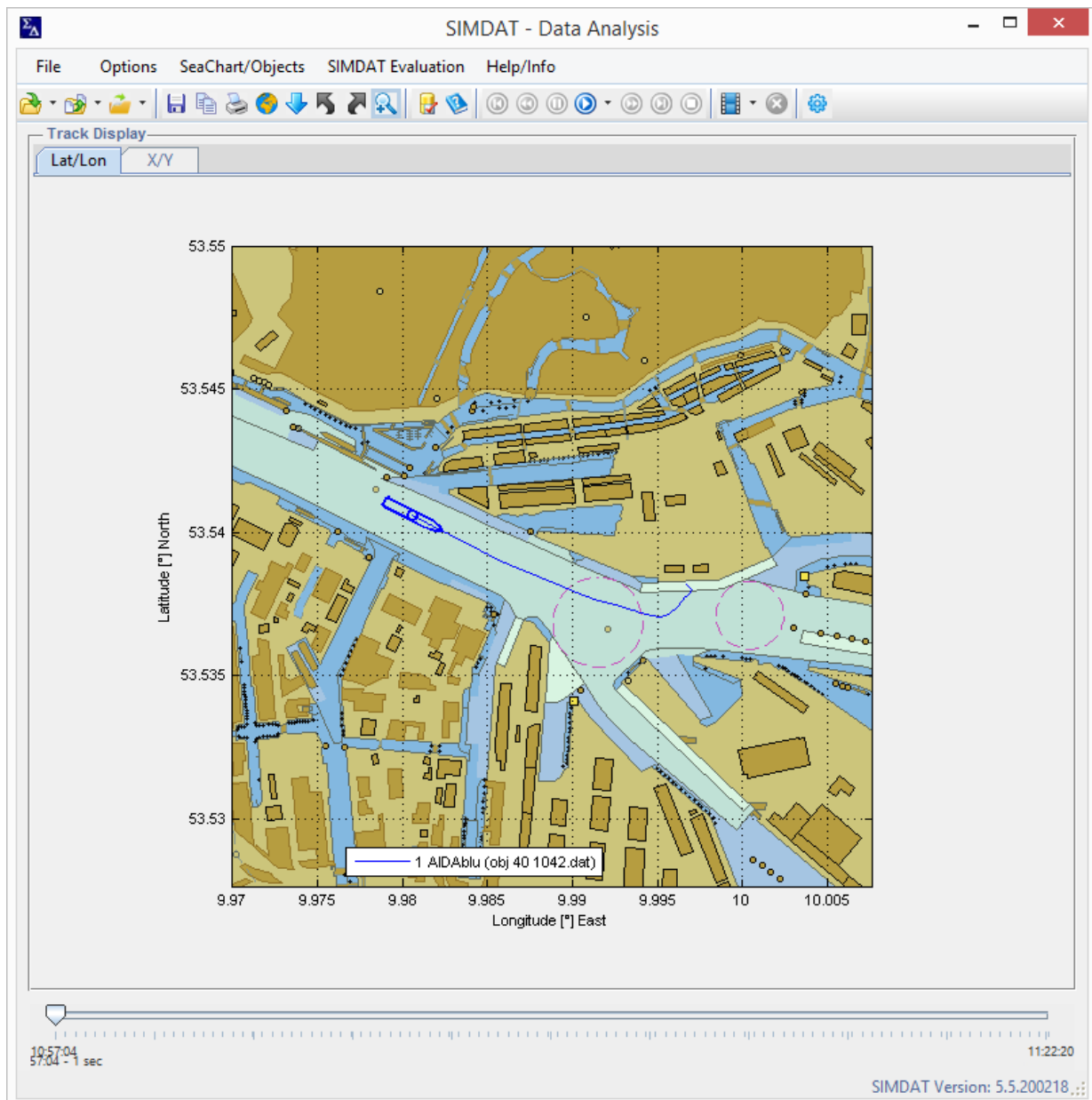


Fig. 1 - SIMDAT main interface for displaying results of an exercise with one large vessel and one tugs

The track display can be enlarged and can include extracts from an Electronic Chart (optional available upon request) to give a better visualization of the data (see Fig. 2).



**Fig. 2 - SIMDAT main window with maximized track display together with Electronic chart data**

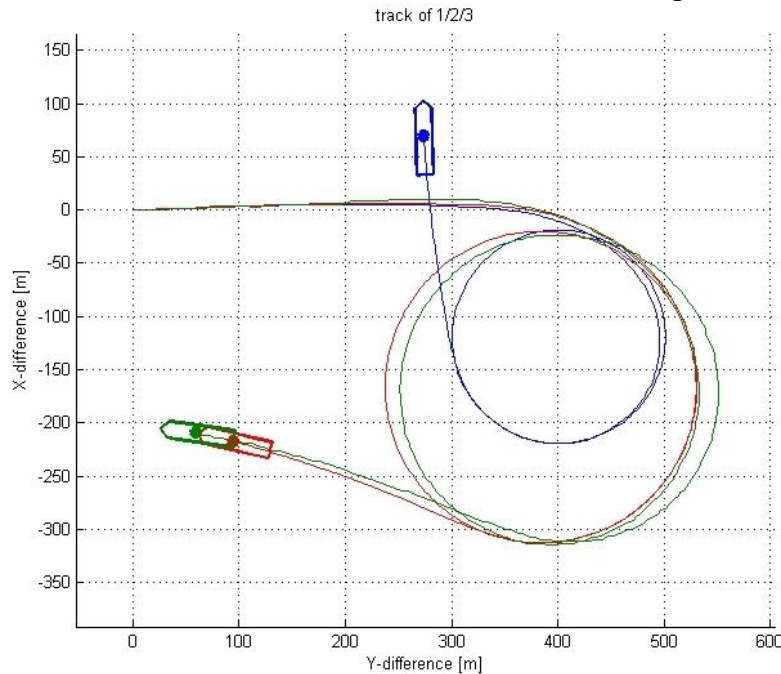
In the track display all objects are presented with the defined shapes according to the dimension of the ship.

### ***SIMDAT replay and video generation:***

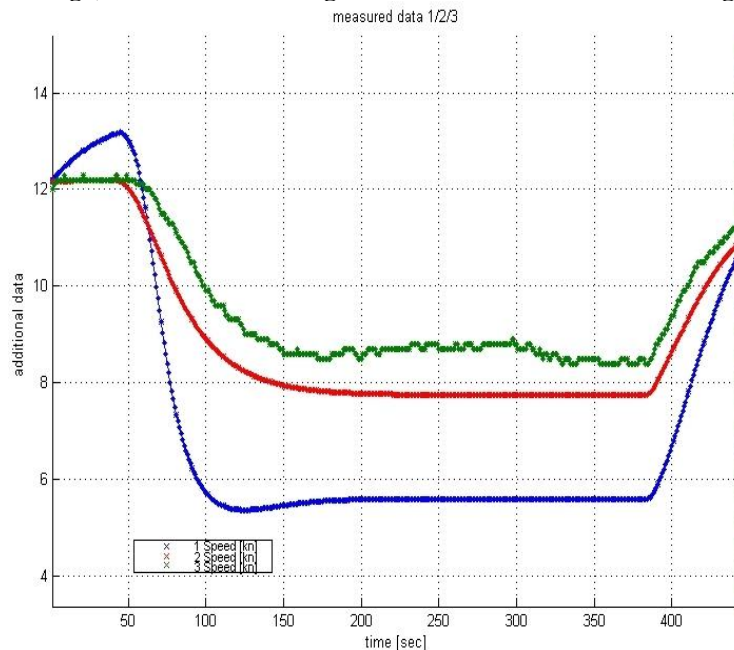
SIMDAT offers a complete replay functionality to watch the simulation or measurement trial in a complete presentation overview. For display purposes a video of the track can be generated in Audio Video Interleaved (AVI) format for a presentation outside SIMDAT.

**SIMDAT data comparison:**

SIMDAT offers a number of tools to compare data of different types. Fig. 3 and Fig. 4 display the data of a measurement (green) and of two simulations (blue & red). The displayed data include the track and the parameter speed over ground. The blue curves display the state of first tuning approximation and the red curves indicate the final tuning result.



**Fig. 3 - SIMDAT comparison of track between measurement data (green) and two stages of parameter tuning (blue – start of tuning and red – advanced level of tuning)**



**Fig. 4 - SIMDAT comparison of parameter speed over ground between measurement data (green) and two stages of parameter tuning (blue – start of tuning and red – advanced level of tuning)**

### SIMDAT data evaluation:

SIMDAT offers build-in evaluation calculations for a lot of manoeuvres, like turning circles or zig-zag tests in order to extract the characteristic manoeuvring parameters as for instance turning circle diameter, advance and transfer or over swing angles and initial turning parameters from zig-zag tests. In addition calculations to acquire distances to objects from the electronic chart or other ships can be provided to evaluate the performance achieved during the exercise.

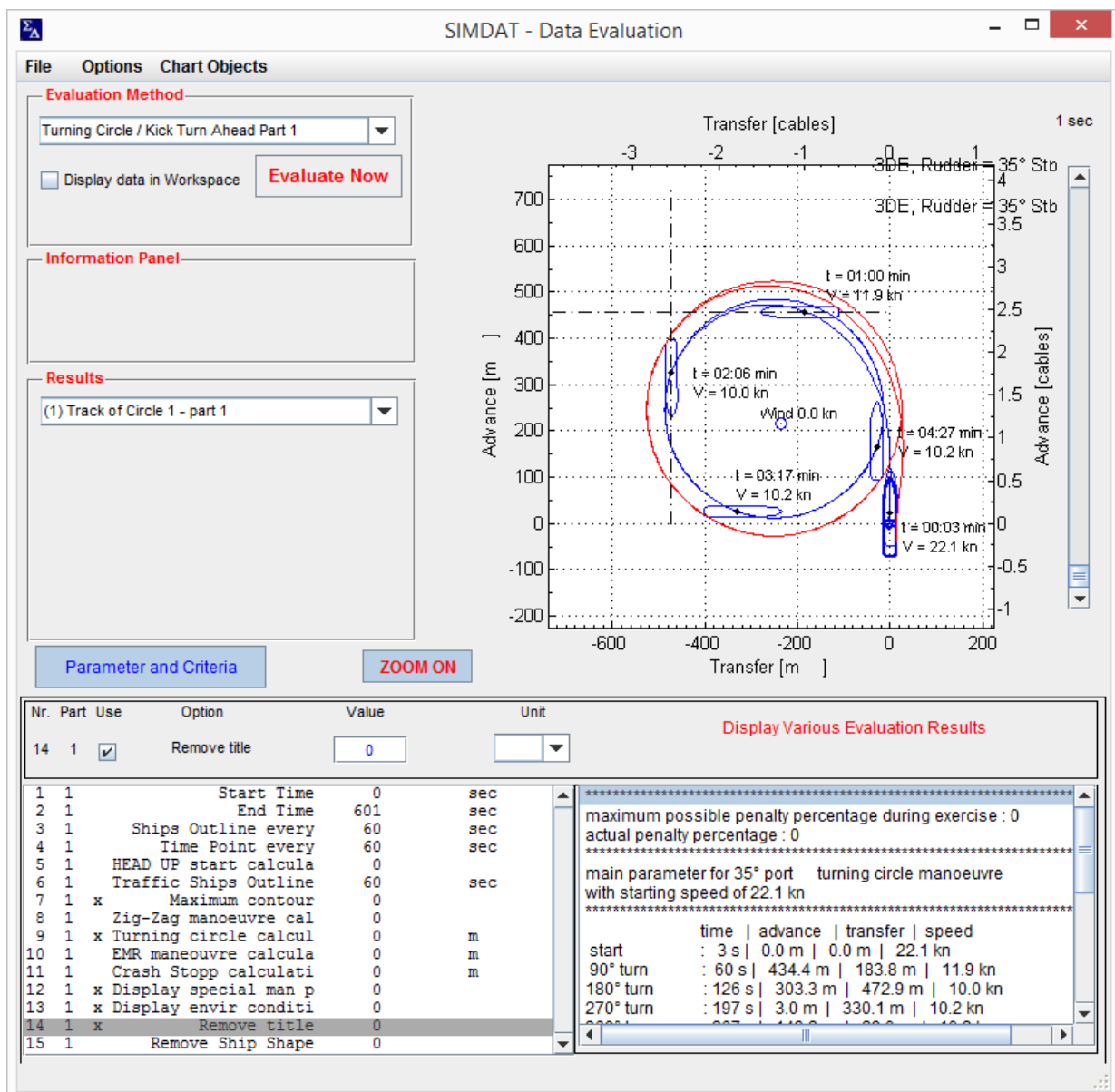


Fig. 5 - SIMDAT data evaluation of a turning circle from simulation data

### **References:**

- [1] SIMOPT - Simulation to optimize simulator ship models and manoeuvres, Manual, Version 2.2, Innovative Ship Simulation and Maritime Systems GmbH, Rostock 2020
- [2] Simulation Data Analysis (SIMDAT) Manual, Version 5.5, Innovative Ship Simulation and Maritime Systems GmbH, Rostock 2017
- [3] Advanced Nautical Simulator (ANS) , Rheinmetall Defence Electronics, Bremen 2009-2018

### **System Requirements:**

Minimum system requirements for installation and execution of the SIMDAT software

- PC with 1-GHz-Prozessor
- Operating Systems:
  - Microsoft Windows 8.1 and Windows 10
- Required disk space for complete installation 300,0 MB
- CD-ROM-Drive (for installation procedure only) or USB-Drive
- Display - Minimum resolution of Full HD 1920x1080 pixels
- Installed Web-Browser to use the SIMDAT-Help program
- Adobe Acrobat Reader to read the SIMDAT-Manual.pdf