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¹ Document will be a draft until it was approved by the coordinator

² PU: Public, PP: Restricted to other programme participants (including the Commission Services), RE: Restricted to a group specified by the consortium (including the Commission Services), CO: Confidential, only for members of the consortium (including the Commission Services)

³ The initials of the revising individual in capital letters



Deliverable D7.3

Simulation based training tool for a DSS for EAFM

31/12/2016



Executive Summary

The MareFrame DST Training Tool is version 1.0. This means that all features are implemented and tested for bugs. Three example scenarios have been made and are available at the link provided in the user manual. New scenarios for each case-study are easily made. In addition, the software design of the training tool makes it is easy to add new features such as: more or different species and vessels, Graphical improvements and Increase the number of tracked indicators. Adding new features is beyond the scope of the project. Problem based learning is the method used in the training tool, so the training tool is used to create a concrete context, for learning about the MareFrame Decision Support Application. In problem based learning you are presented with the problem before you are introduced to theory. The theory of this method is that by trying to solve the problem multiple times with varying degrees of success, it engages and motivate the user to reflect and learn. (Walker, Leary, Hmelo-Silver, Ertmer , 2015). This deliverable is a user manual exclusive to the training tool developed within the MareFrame Project. The user manual for MareFrame Decision Support Application is due for delivery in June 2017.



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User Manual

1. Introduction

The MareFrame DST Training Tool is a browser application found at

<http://tokni.com/dev/main.html>

It is a single player fisheries management simulation. The purpose of the DST training tool is to support training sessions of the MareFrame Decision Support Application found at

<http://mareframe.mapix.com/dev/MCA/DST.html>

Both applications have been tested in Chrome, Firefox and Safari. They do not work in Internet Explorer.

During a training session you run one or more Scenarios.

Each Scenario is a simulation of a fishery. The purpose of each scenario, is to choose a successful management strategy.

Scenario success is measured by one to four different scores:

1. Economic score, is based on the strategy revenue generating capabilities
2. Environmental score, is based on biomass and recruitment levels
3. Social score, is based on job availability
4. Overall score, is a combination of Economic, Environmental and Social score

Each scenario has a goal set for one to four of the scores. All the goals in a scenario must be reached, if the scenario is to be considered a success.

2. The Four Screens

2.1 Start screen

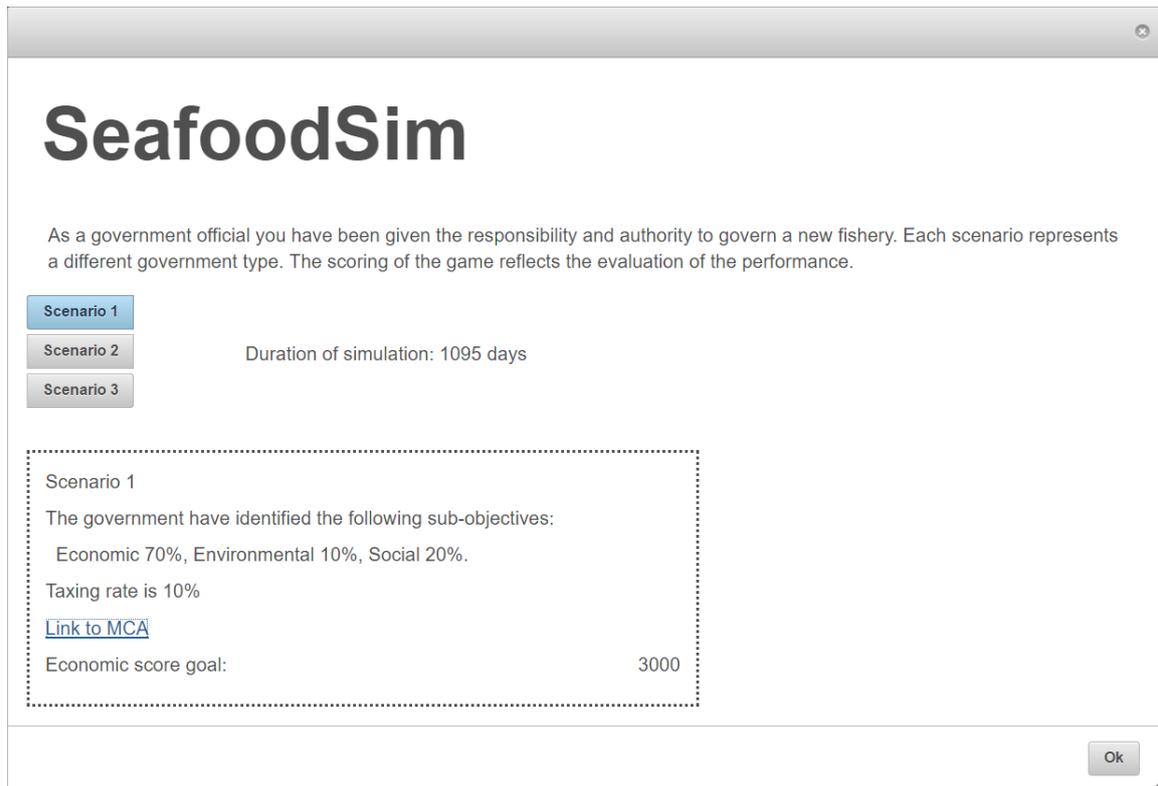


Fig 2.1.1 Start screen. Shows that Scenario 1 runs for 1095 day (3 years) and shows that only Economic score is used to measure success.

The start screen introduces the overall context for the training session.

It provides specific information about each scenario, most importantly the goal(s) of the scenario. Also there is a link to an example of MareFrame Decision Support Application tool. The example linked to has been made specifically to the scenario.

When ready the trainee chooses a scenario and presses the 'ok' button.

2.2 Simulation screen

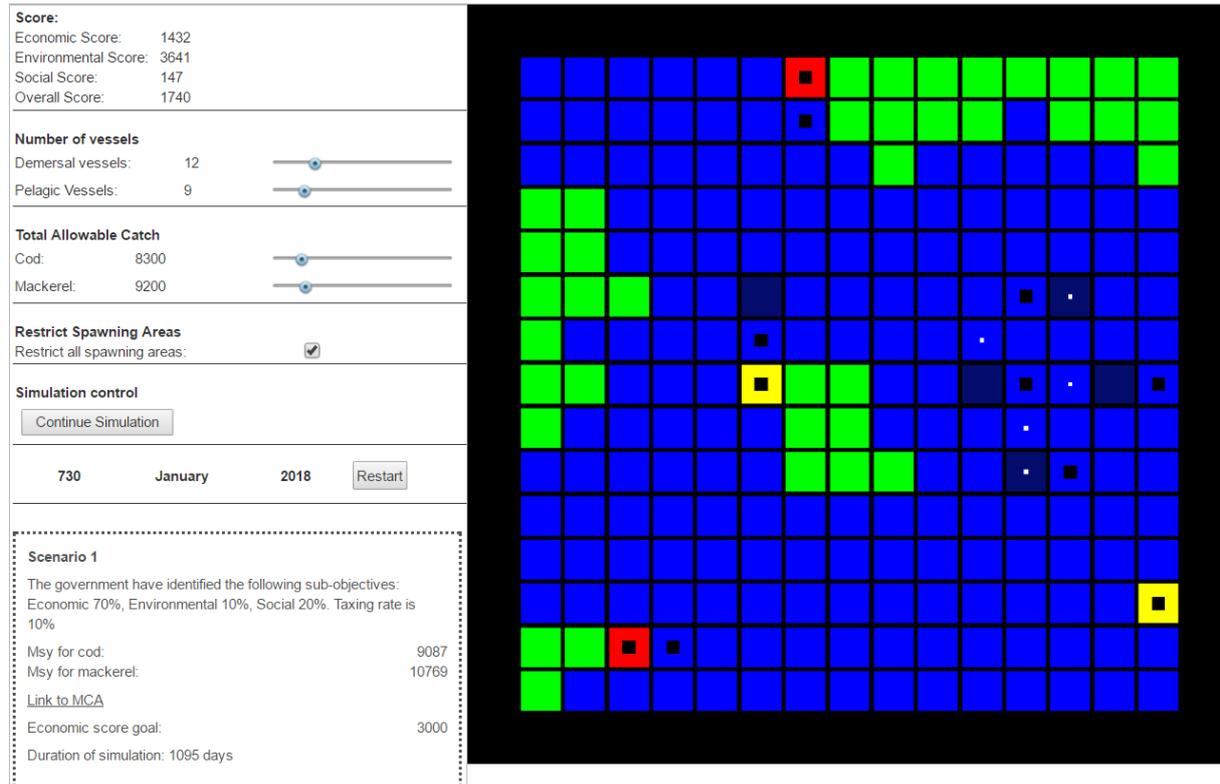


Fig 2.2.1 Simulation Screen. Shows a run of Scenario 1. 730 days(2 years) have passed. The current score is seen in the top left. The goal of the scenario in the bottom left.

The simulation screen is divided in to two parts. To the left is a menu, to the right is a map.

2.2.1 Menu

The menu is divided in 7 parts. Score, Number of Vessels, Total Allowable Catch, Restrict Spawning Area, Simulation control, Date and Information.

Score: The current score.

Number of Vessels, Total Allowable Catch and Restrict Spawning Area: Is the current chosen management strategy.

Simulation Control: Start, Stop, Continue and Speed up the simulation.

Date: The current day, month and year of the simulation. Press the restart button to abandon the current simulation and return to the Start Screen.

Information: The information from the Start Screen. And an estimation of the MSY (Maximum Sustainable Yield) of the different species on the map.



2.2.2 Map

Green tiles represent land, blue tiles ocean, red tiles landing areas, yellow tiles refuel areas. Small black tiles vessel, tiny white tiles fish. Darker blue tiles are restricted areas.

The purpose of the map is to give the trainee a sense of time progression as the simulation runs. And give a sense of what is going on in the area.

2.2.3 Choosing a management strategy

There are five decisions to be made to have a management strategy.

1. Number of Demersal vessels in the area
2. Number of Pelagic vessels in the area
3. Total allowable catch for cod
4. Total allowable catch for mackerel
5. Whether or not to restrict spawning areas

The decisions are made by manipulating the sliders and the radio button in the menu.

To help the decisions there is an estimated MSY for cod and mackerel in the information part of the menu. Furthermore, it is possible to go the MareFrame Decision Support Tool by using the link.

When the strategy has been chosen you push the start simulation button. After the simulation has started it is possible to pause or speed up the simulation.

If there is reason to abandon the current simulation, press the restart button to return to the Start Screen.

2.3 Interval screen

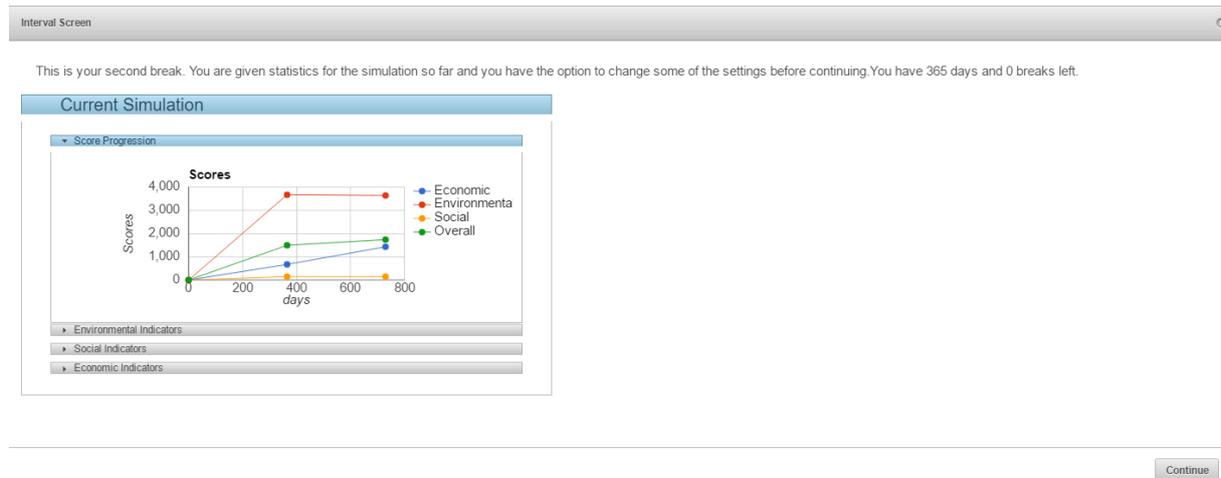


Fig 2.3.1 Interval Screen. Progression of Score of the first two years. One more year is left to reach the goal.

The Interval Screen is reached when the simulation has run for a year. There is a collection of graphs that can be studied to estimate the current success. It is also possible to compare with previously run simulations.

In each break it is possible to change the management strategy.

Four graphs are accessible in the interval screen.

- Score: is the current score
- Environmental: displays relevant environmental indicators
- Social: displays relevant social indicators
- Economic: displays relevant economic indicators

2.4 End screen

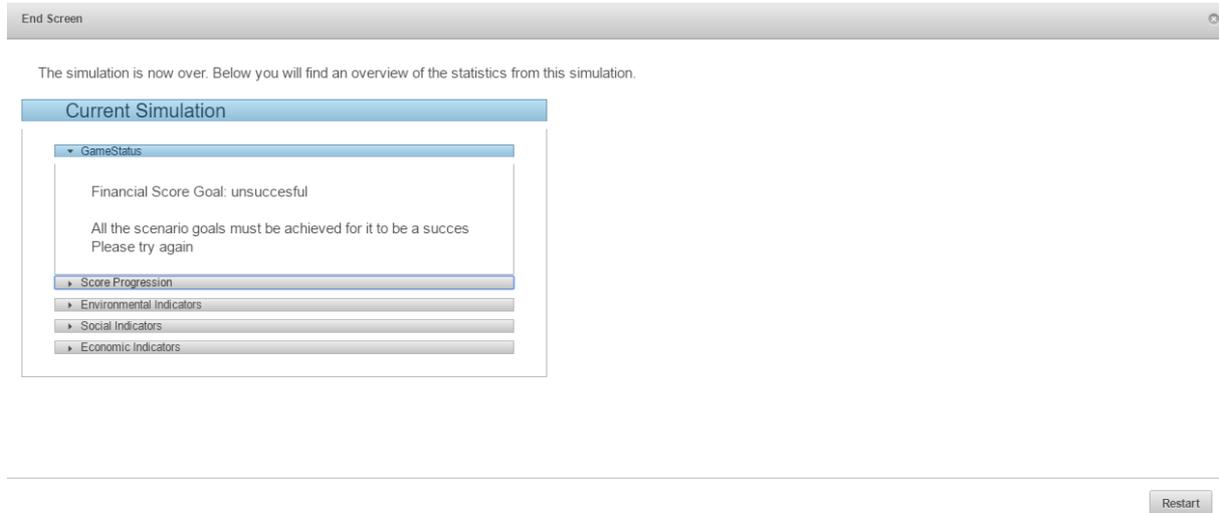


Fig 2.4.1 End Screen. Game status, the goal(s) were not reached.

The End Screen tells you whether the goal(s) for the scenario have been reached. To be successful it is required to reach all the defined goal(s) stated in Start Screen

As in the Interval Screen the same four graphs – Score, Environmental, Social and Economic – are accessible.

The end results for previous simulations is accessible from the End Screen.



3. Quick Guide

Go to

1. In the Start screen, choose a scenario.
2. In the Simulation Screen, choose a management strategy and start the simulation.

The simulation runs until the Interval Screen is available.

3. In the interval Screen, evaluate the success of the strategy, by reading the graphs
4. In the Simulation Screen, change strategy if need be.

*The simulation again runs until the Interval Screen is available.
Repeat 3 and 4 until the End Screen is available.*

5. In the End Screen observe whether the strategy was successful.
6. Reflect on Decision making and then try again from the start.



Acknowledgements

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References

Andrew Walker, Heather Leary, Cindy E. Hmelo-Silver, Peggy A. Ertmer. 2015. *Essential Readings in problem-based learning*, pp 5-13.

Appendix

The MareFrame DST Training Tool is developed using Typescript 1.8.34, which is a typed superset that compiles into JavaScript. The code is tested using unit tests.

The source and test code is available at Github: <https://github.com/Tokni/SeafoodSimDev/tree/dev>

The software documentation was done by using UML Class and sequence diagrams

Class and sequence diagram are available as a files.