A COMPUTER TOOL FOR OPTIMISATION OF MARINE OPERATIONS FOR OFFSHORE WIND FARM INSTALLATION

EERA DEEPWIND'2021, 13-15 JANUARY 2021

Elin Espeland Halvorsen-Weare[1], Eivind Fonn[2], Kjetil Johannesen[2], Yauheni Kisialiou[1], Lars Magne Nonås[1], Agathe Rialland[1], Kristian Thun[1]

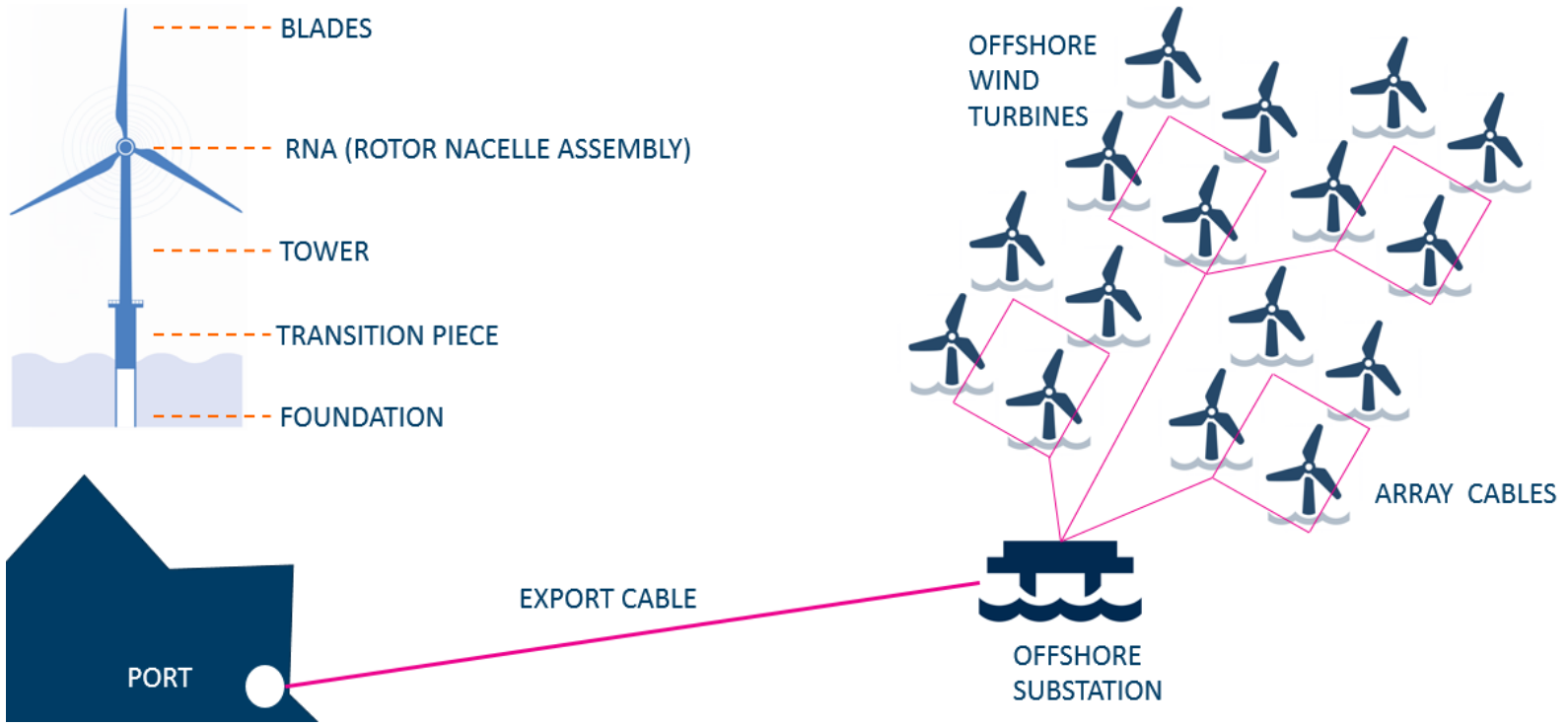
[1] Energy and Transport, SINTEF Ocean [2] Mathematics and Cybernetics, SINTEF Digital

Application: early phase planning of wind farm installation

Objective: decision support with regards to installation/development strategy and planning for early phase offshore wind farm development

Input: number of wind farm components and number and type of resources (vessel/port) available

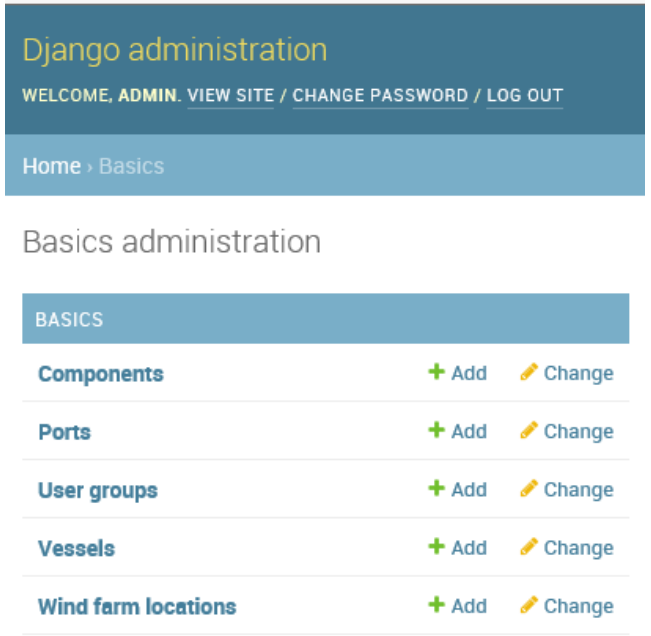
Output: schedule of marine operations (transport and installations of offshore wind farm components) associated with lowest cost and time, given potential weather conditions

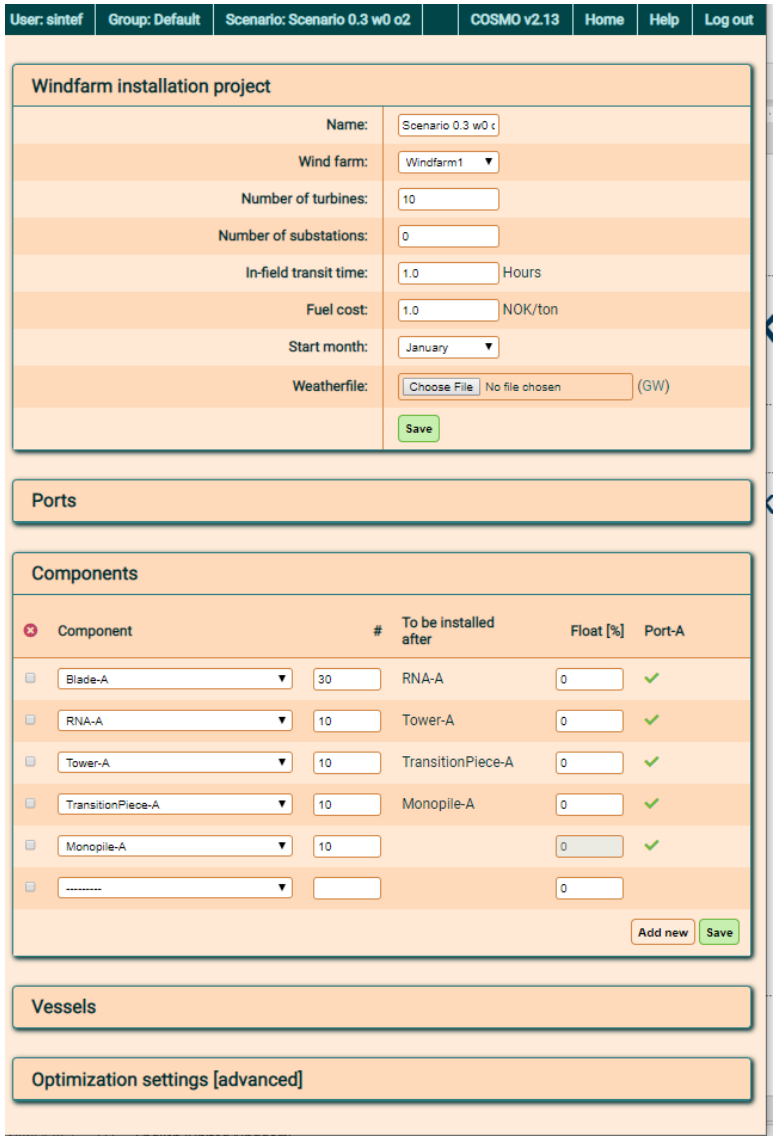


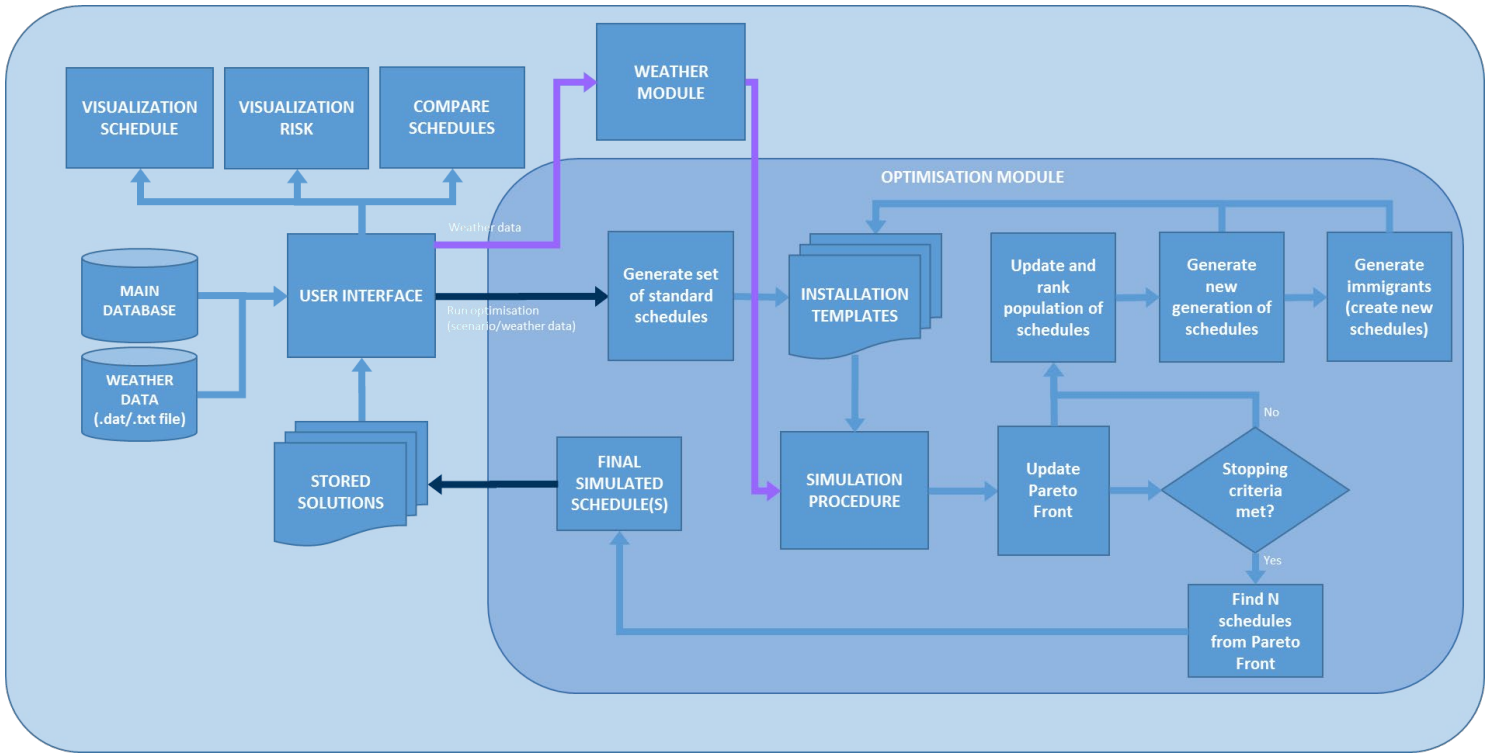
SINTEF

INPUT

- Database
- Interface: Scenario set-up





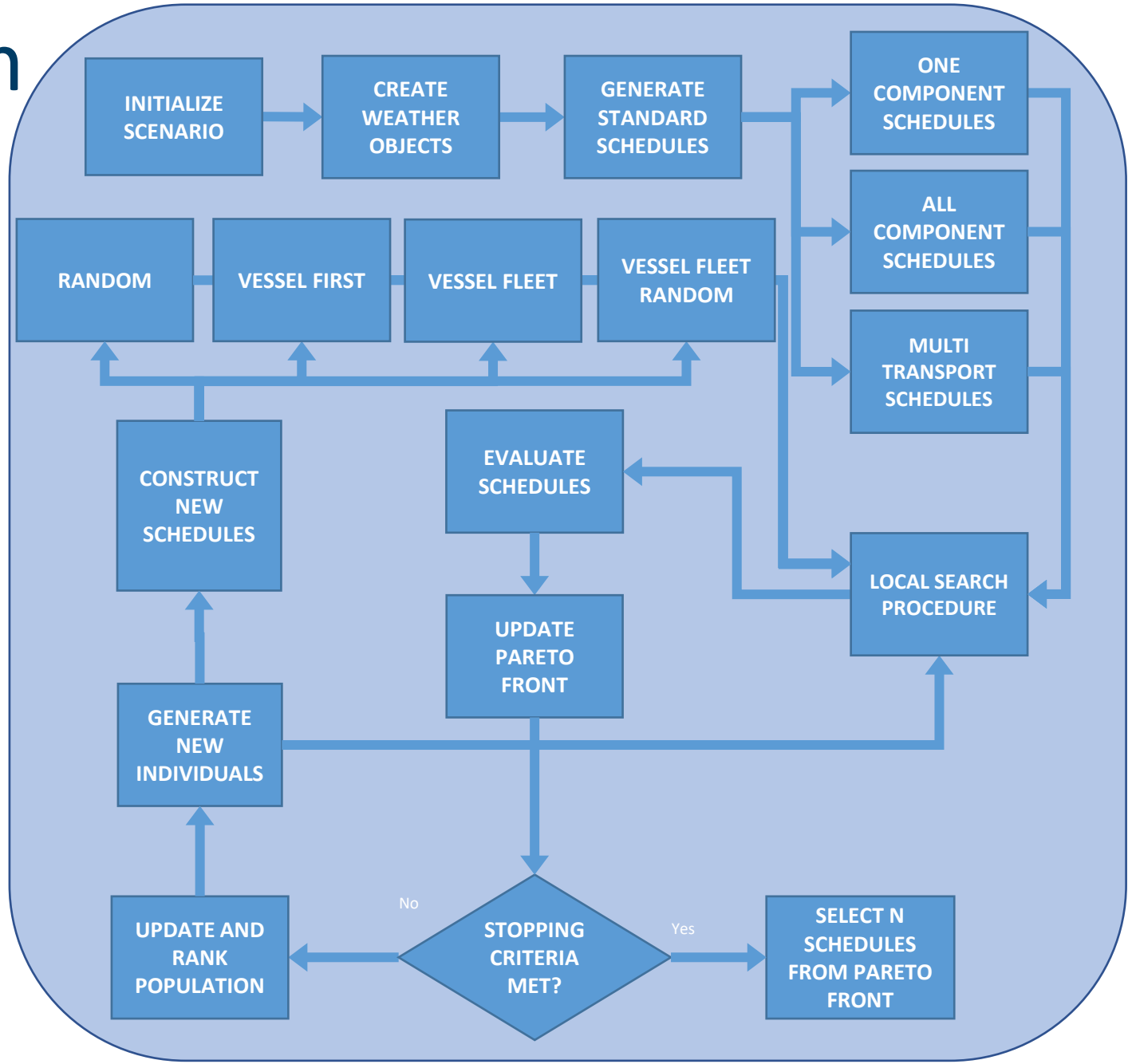


SINTEF

Optimisation algorithm

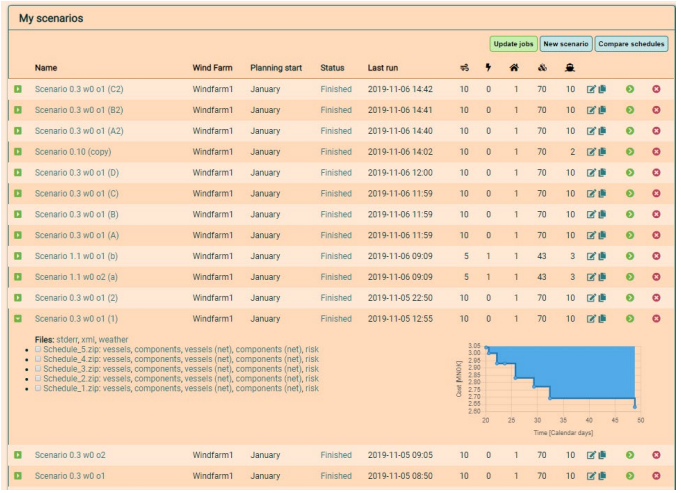
Version of a Genetic Algorithm:

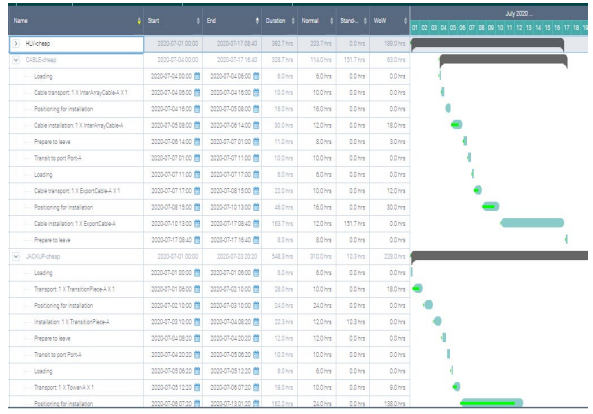
1. Start by generating *standard schedules*
2. *Evaluate* each schedule by a simulation procedure
3. *Education* – local search procedure
4. Generate *new generation* based on schedules in the current *population*
5. *Evaluate* by simulation procedure and *educate*
6. Add *immigrants* to population generated by *construction heuristics*
7. *Evaluate* by simulation procedure and *educate*
8. *Continue* from 4. until stopping criterium is met

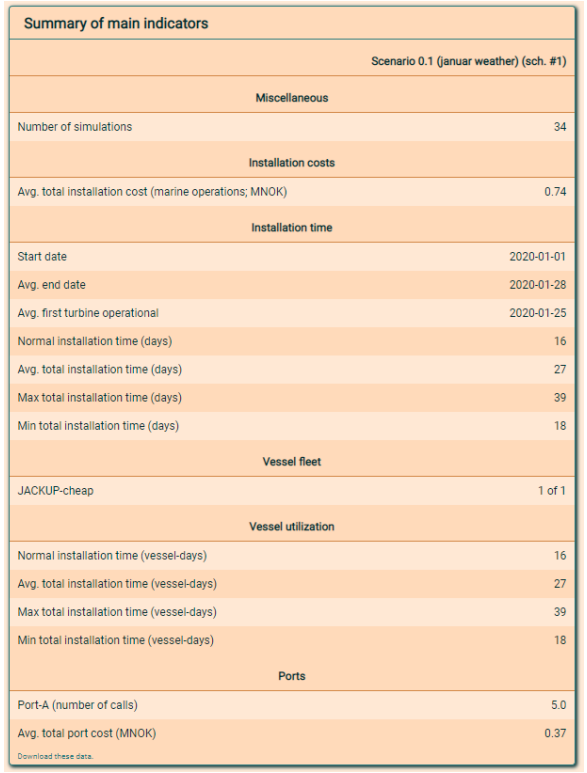


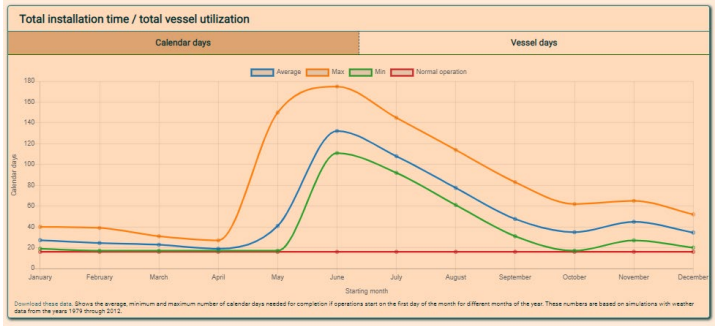
OUTPUT

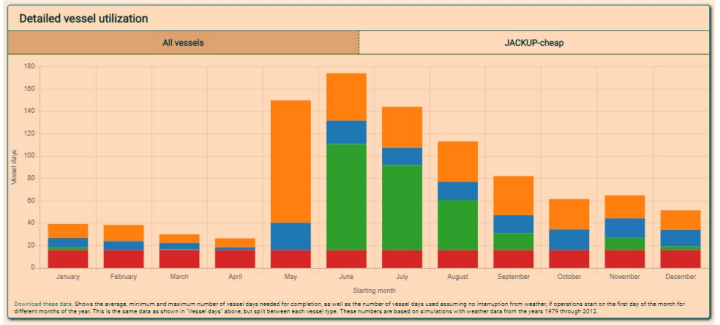
1. Schedule solutions (time/cost Pareto front)
2. Schedule Gantt-diagrams
3. Main performance indicators
4. Weather simulation

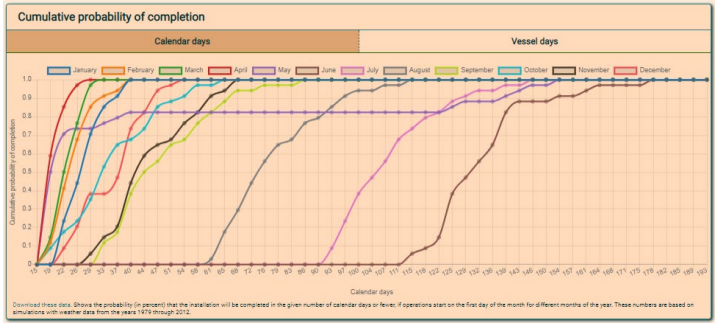












Contact:
Elin Espeland Halvorsen-Weare
Elin.Halvorsen-Weare@sintef.no
Phone: +47 975 32 092