



WANDA

Deltares



Wanda WEC - OpenMI

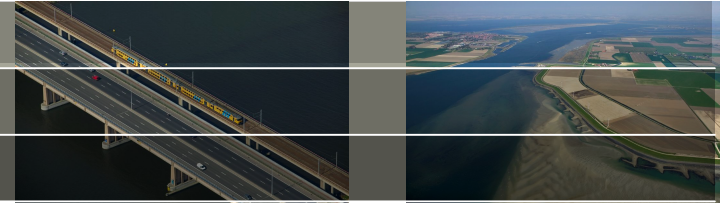
Wanda 4 coupling to external programs



Two options:

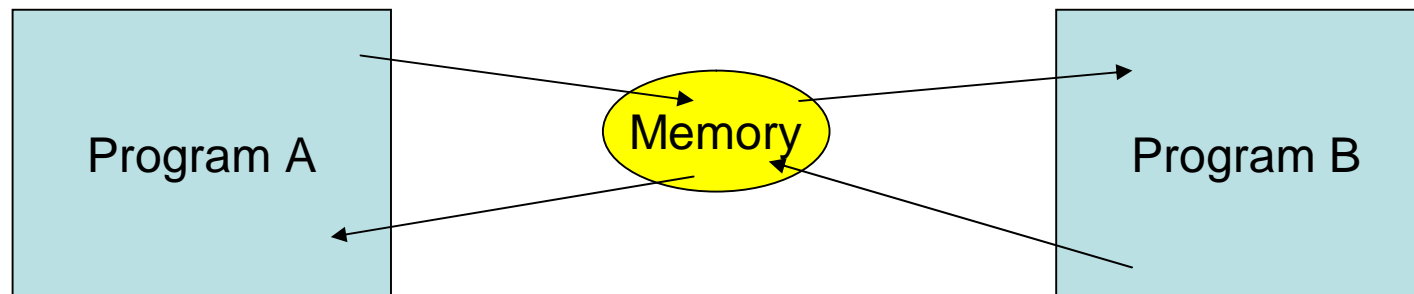
- Wanda External Communication (WEC – since 2005)
- Open Modelling Interface standaard (OpenMI – since 2009)

WEC

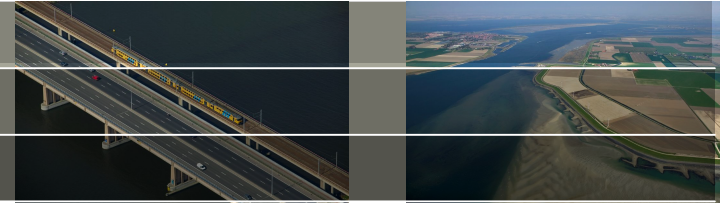


WEC = Wanda External Communication

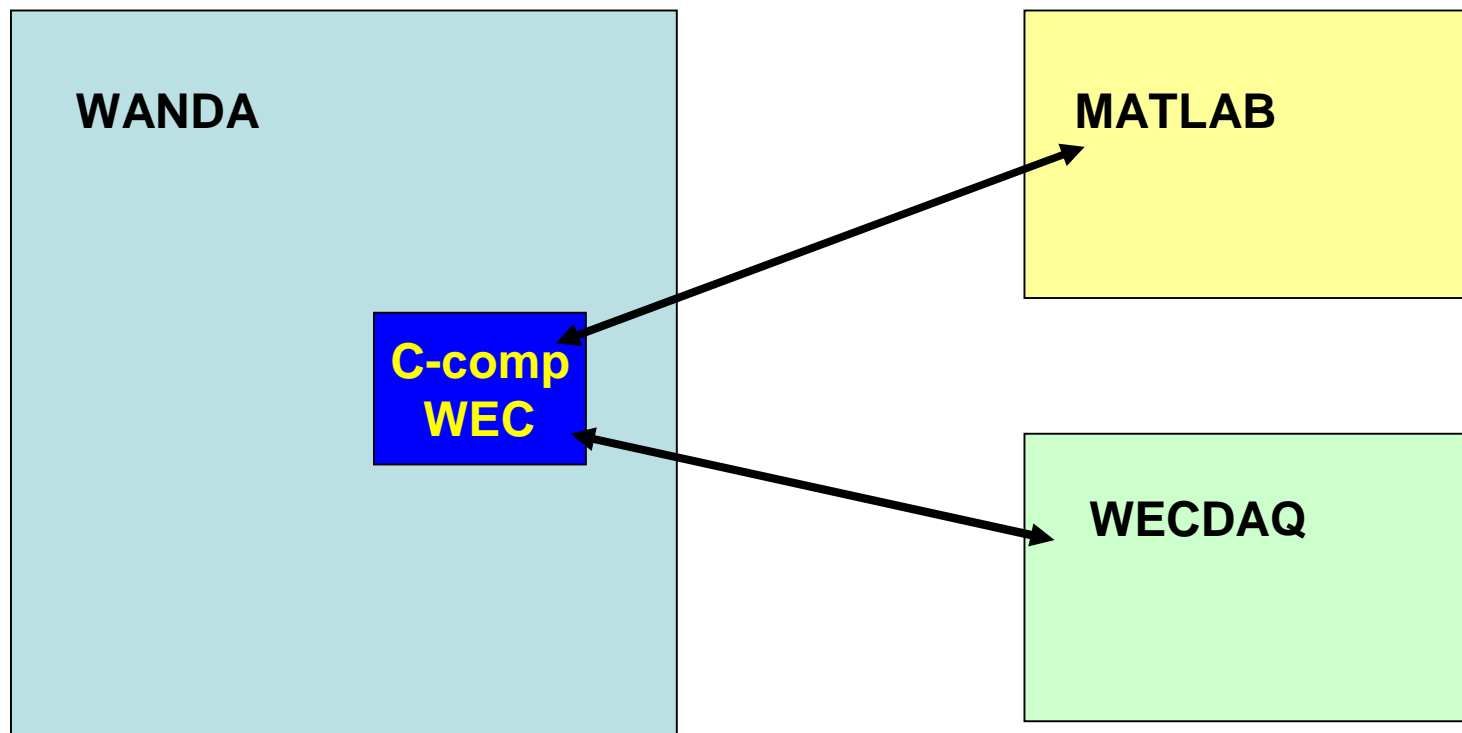
Exchange of data sets between 2 active programs using shared memory



WEC

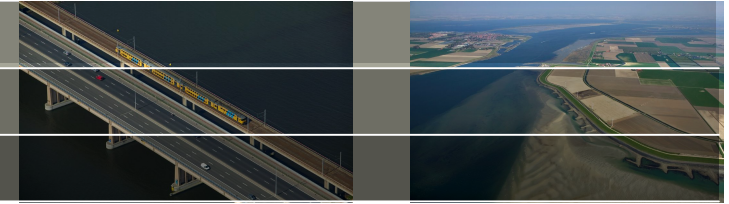


2 different applications:



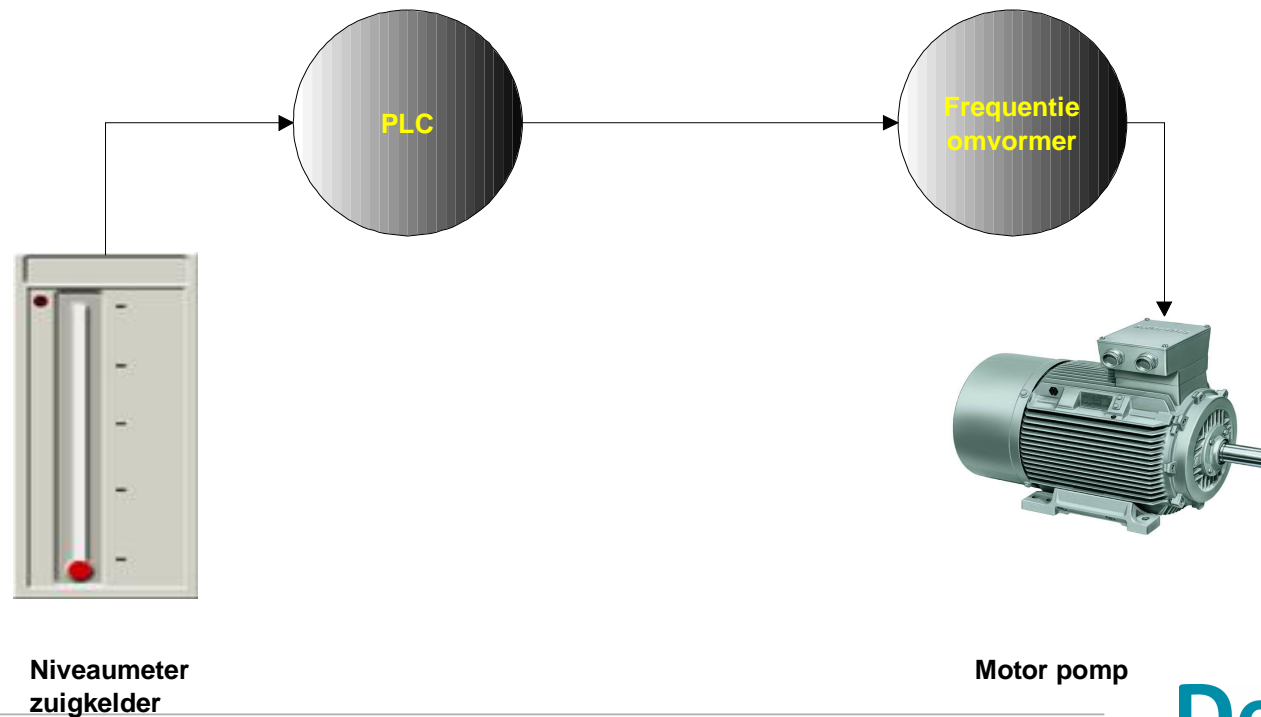
Communication by special control components WEC

Pumping station simulator

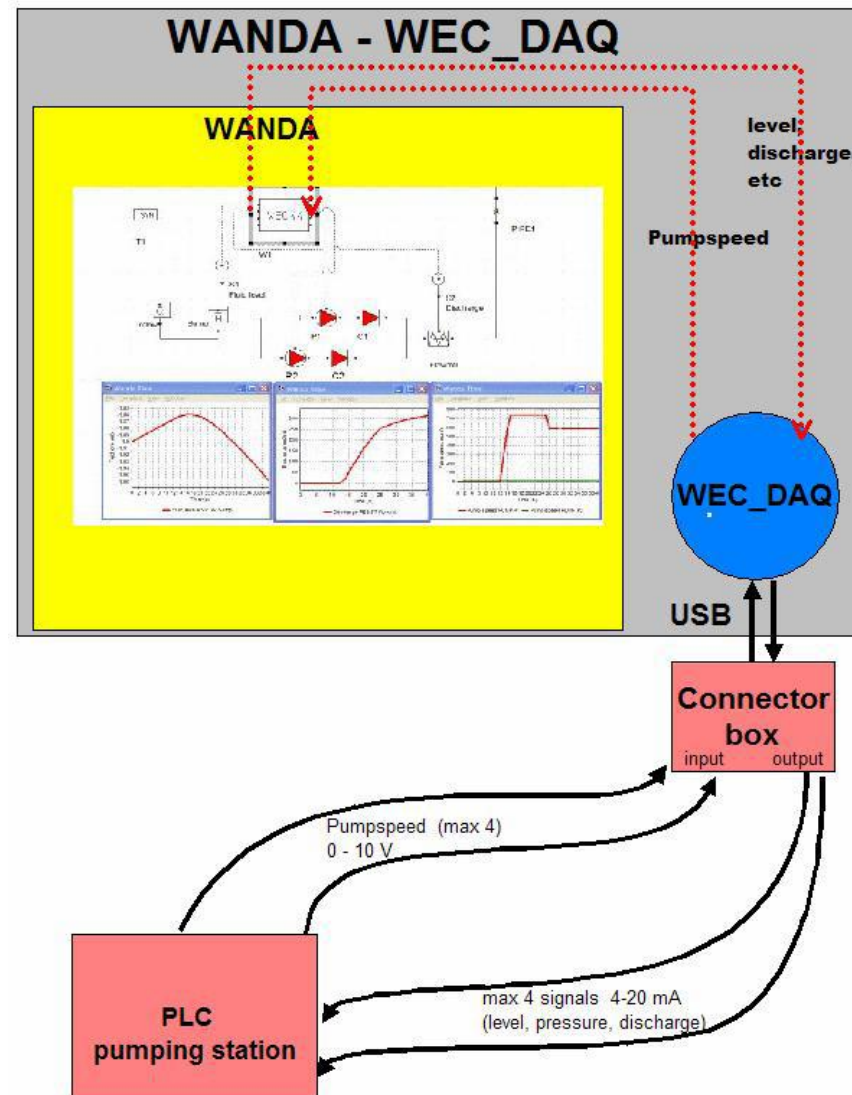
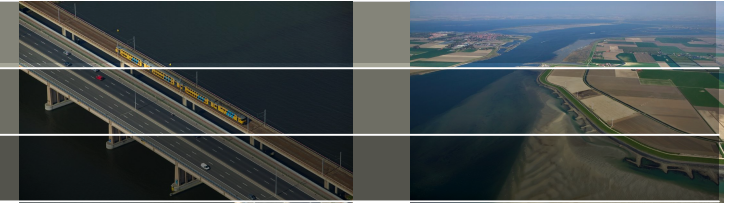


Goal of pumping station simulator:
Set PLC by means of digital water

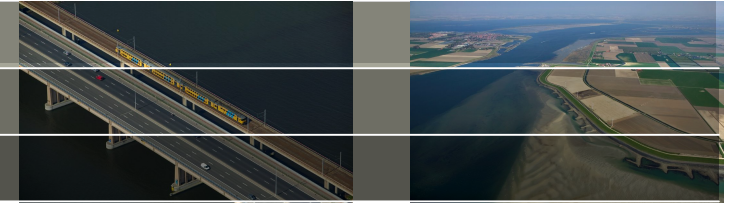
Principe gemaalbesturing



Pumping station simulator



Pumping station simulator



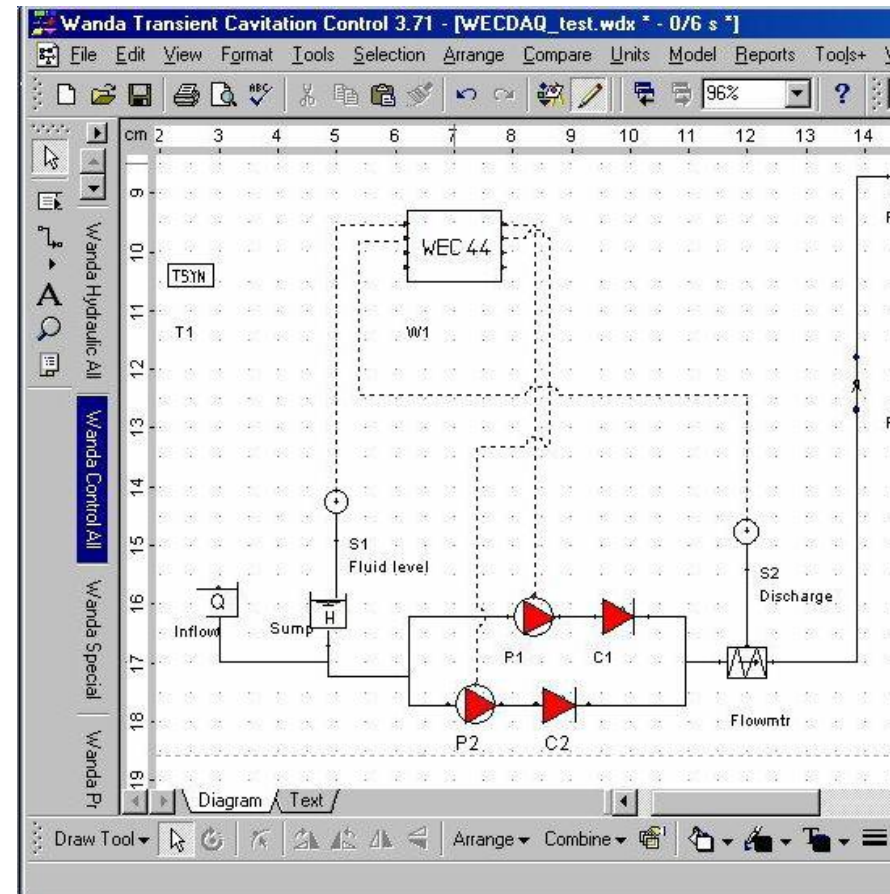
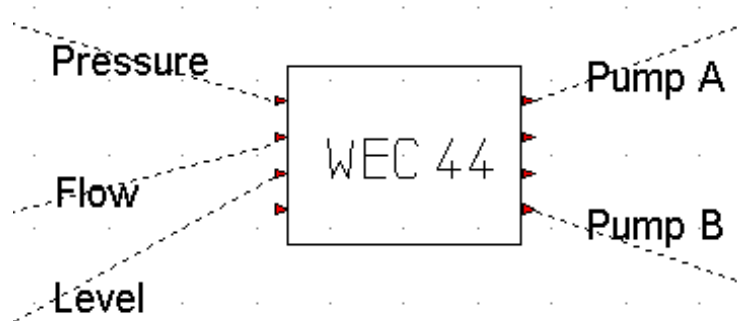
Wanda scheme:

Control component

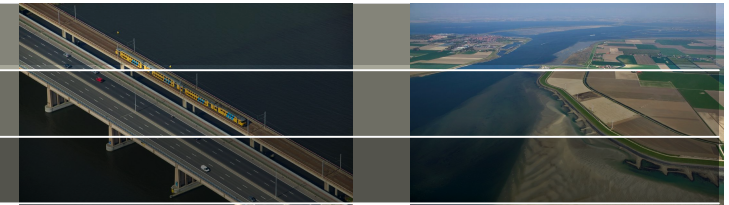
WEC

(several types

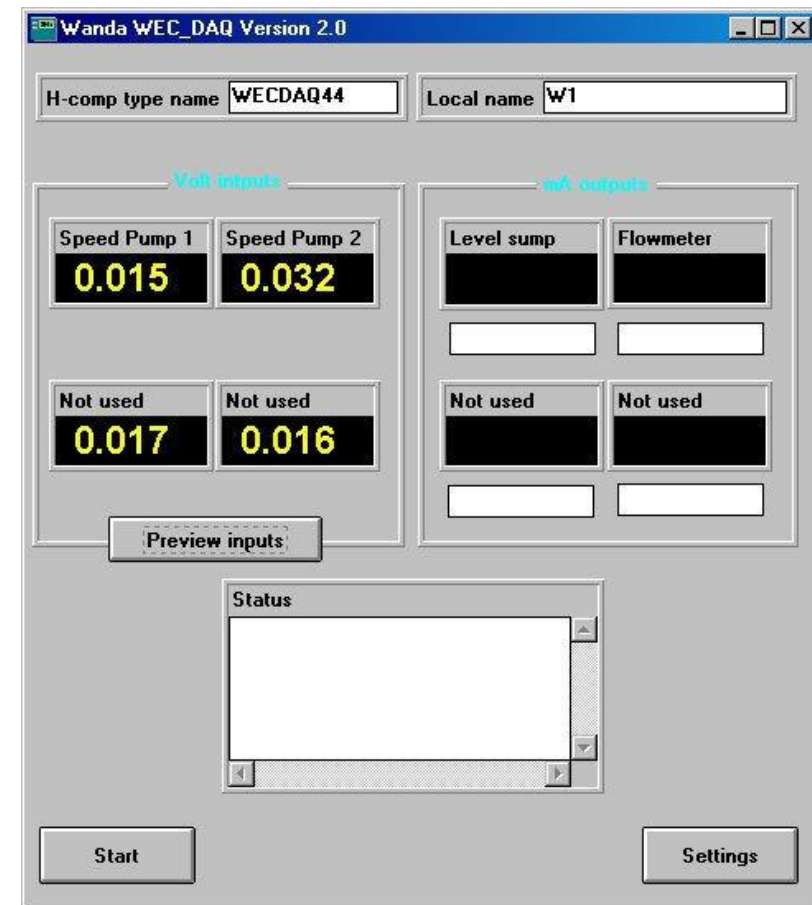
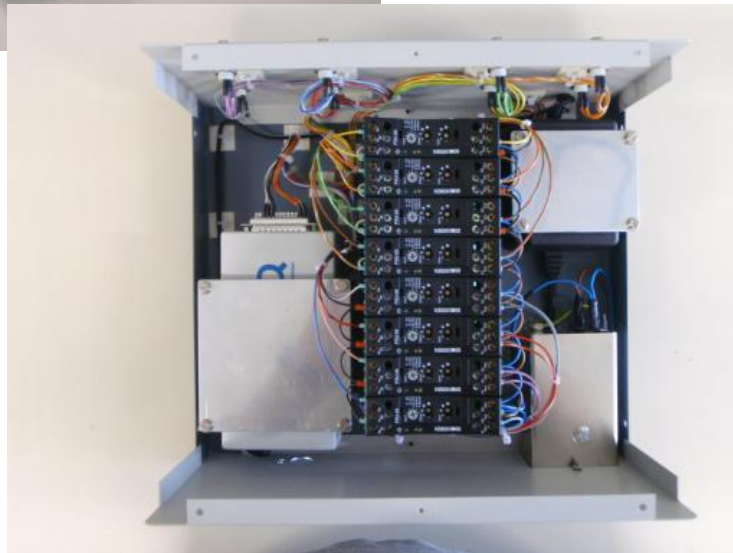
In/Out channels max 8)



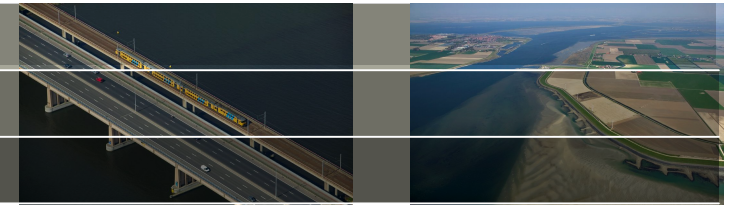
Pumping station simulator



WECDAQ hardware en software



Pumping station simulator



Demonstration

Wanda WEC_DAQ Version 2.0

H-comp type name: **WECDAQ44** Local name: **W1**

Volt inputs		mA outputs	
Speed Pump 1	Speed Pump 2	Level sump	Flowmeter
0.021	0.021	4.467	4.002
Not used	Not used	Not used	Not used
0.021	0.021	4.000	4.000

Preview inputs

Status
Initialisation OK
Start communication
DAQ running
Ready

Start Settings

Wanda Transient Cavitation Control 3.71 - [WECDAQ_test.wdx * - 0/6 s *]

cm 2 3 4 5 6 7 8 9 10 11 12 13 14

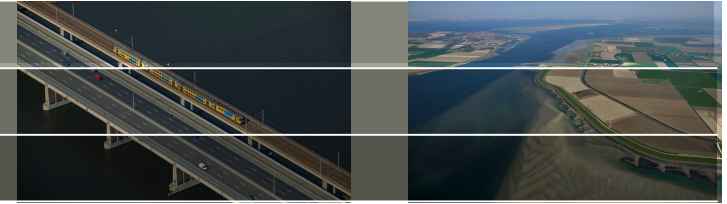
9
10
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18
19

Diagram / Text

Draw Tool Arrange Combine

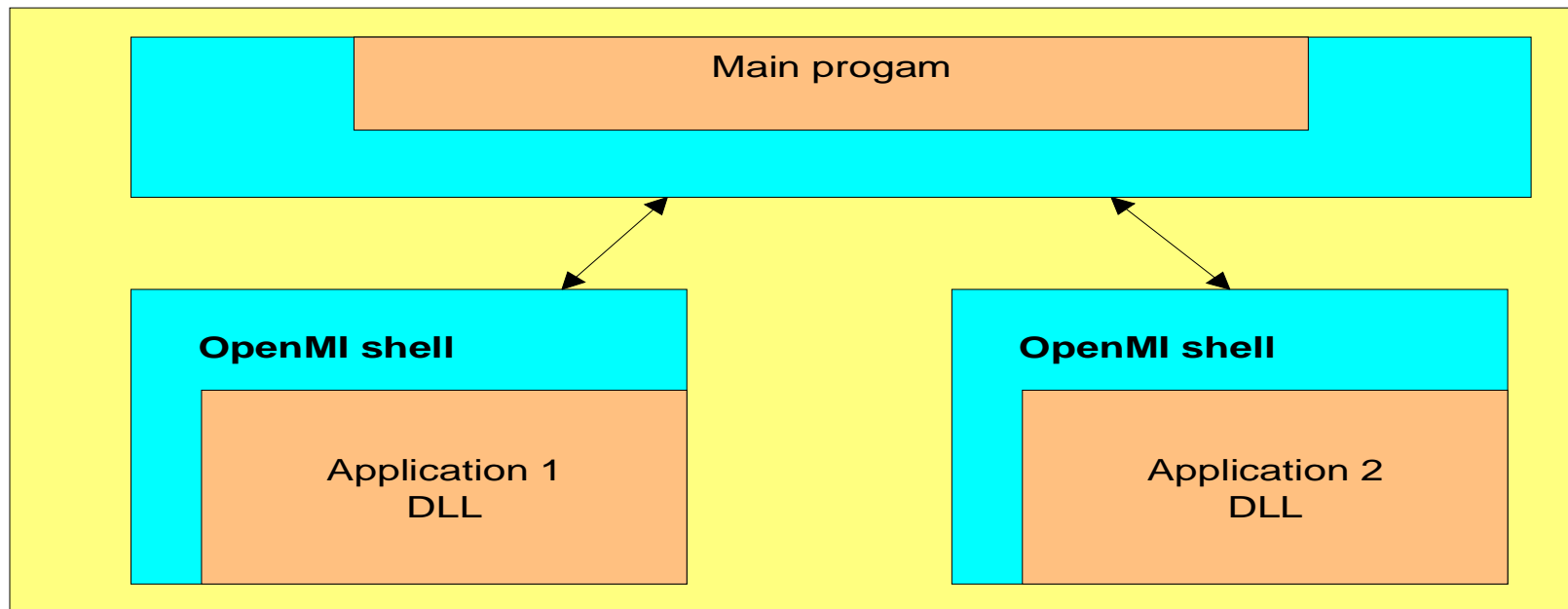
The schematic diagram shows a hydraulic system with an Inflow, Sump, and Fluid level sensor (S1). It includes two pumps (P1, P2) and two control valves (C1, C2). A WEC 44 controller is connected to the system. The diagram also shows a Discharge sensor (S2) and a Flowmeter.

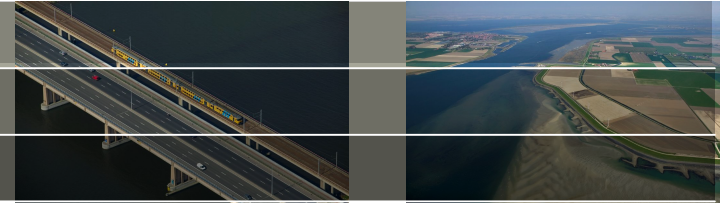
OpenMI



Open Modelling Interface:

- Standard that simplifies coupling of numerical models.
- Clear specification of which variables can be exchanged at what geometrical location (position) within which time domain.

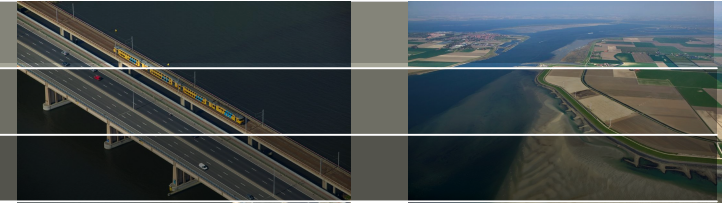




Open Modelling Interface:

- Standard that simplifies coupling of numerical models.
- Clear specification of which variables can be exchanged at what geometrical location (position) within which time domain.
 - Output of model A serves as input for model B (and vice versa).
 - The data exchange takes place at a model-time-step-basis, after which time and/or place are interpolated.
 - Two or more OpenMI-compliant models can easily be combined into a integrated model calculation.

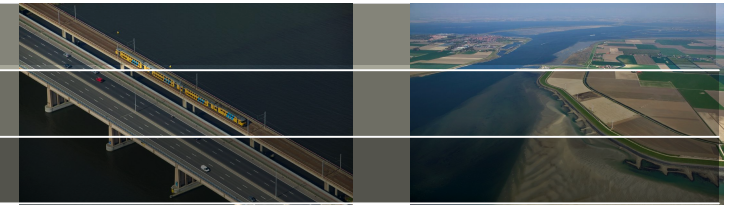
OpenMI



Example .NET code:

```
ILinkableComponent wandaModel = new WandaEngine();  
wandaModel.Initialize(initializationArguments);  
  
IInput myPumpInputItem = wandaModel.InputItems[0];  
IOutput myDischargeOutputItem = wandaModel.OutputItems[0];  
  
while ( ! (wandaModel.Status == LinkableComponentStatus.Done) )  
{  
    myPumpInputItem.Values[0] = newPumpValue;  
  
    wandaModel.Update();  
  
    updatedDischargeValue = myDischargeOutputItem[0];  
}
```

OpenMI



Open Modelling Interface: Open source code .NET

Joint development of:

OpenMI Founders

Five organizations played instrumental role in the conception and development of the OpenMI standard

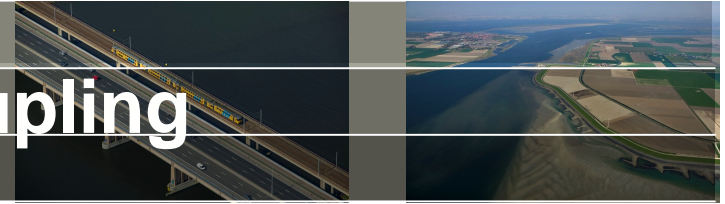


[Read more about OpenMI Association](#)

More information:

WWW.OPENMI.ORG

OpenMI - Sobek – Wanda coupling



Polder pumping station draining away to tidal water

Goal: saving energy pumping station – no pumping during HW

Question: what is the effect on the polder system?

Sobek: 1D modeling of polder system

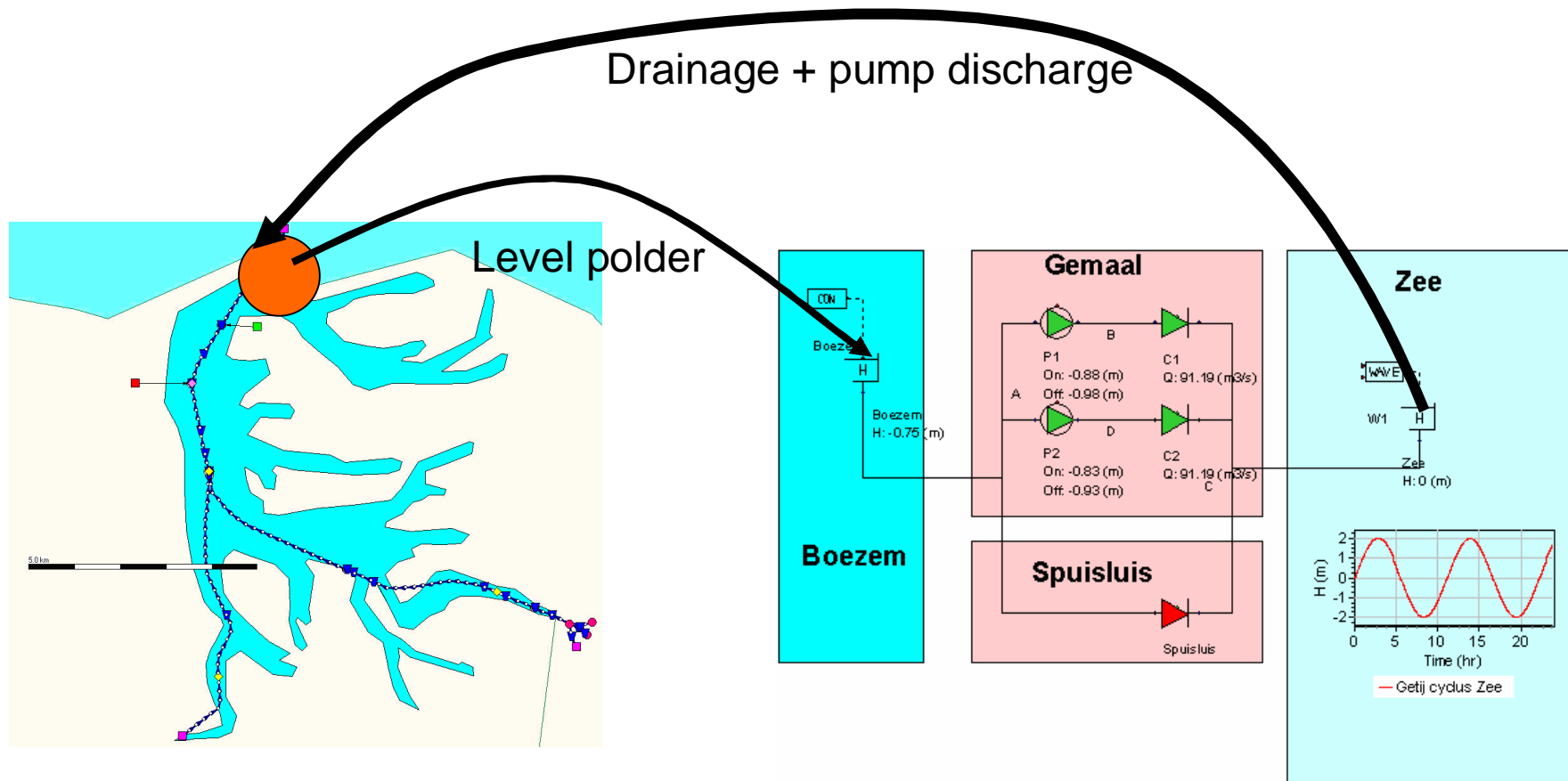
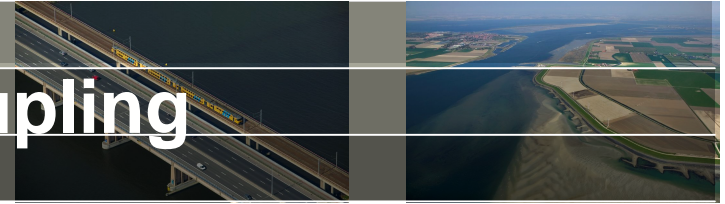
no pump model with power/efficiency

WANDA: sound pump model including energy calculation

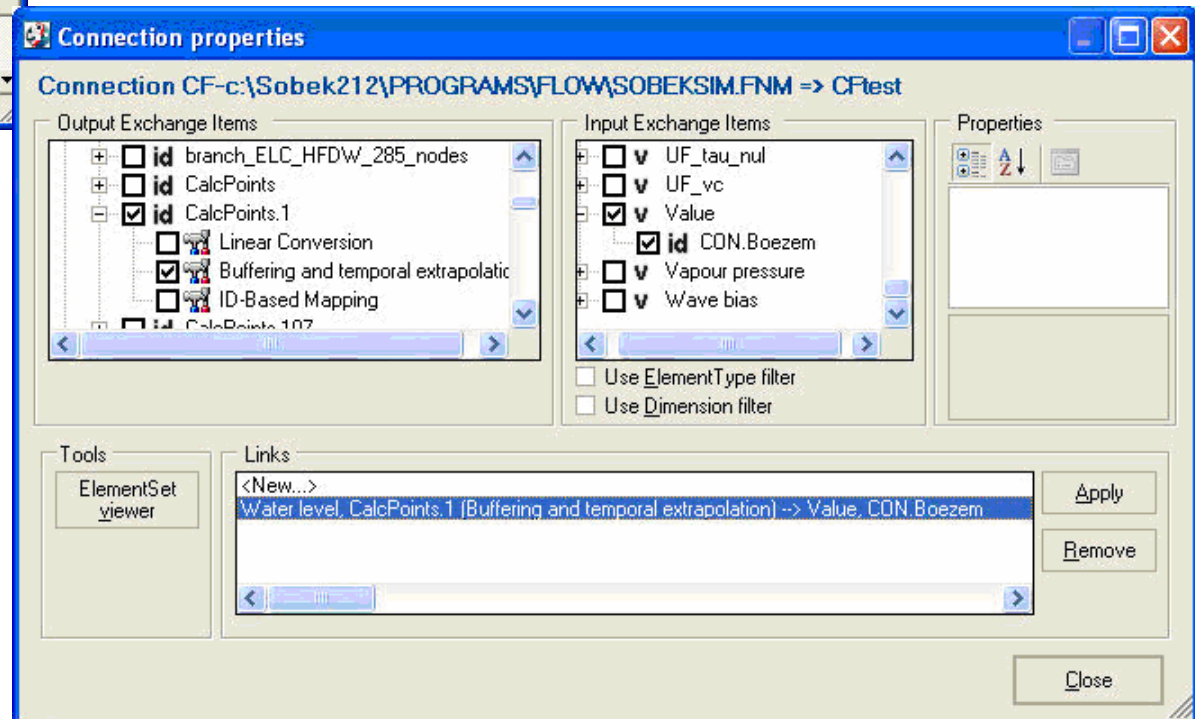
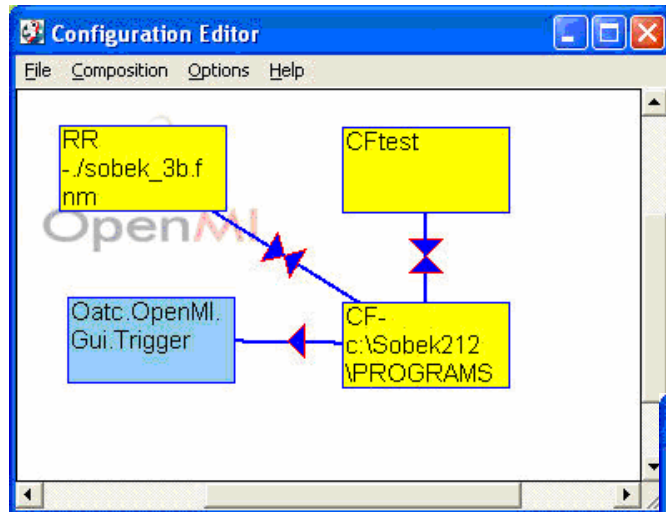
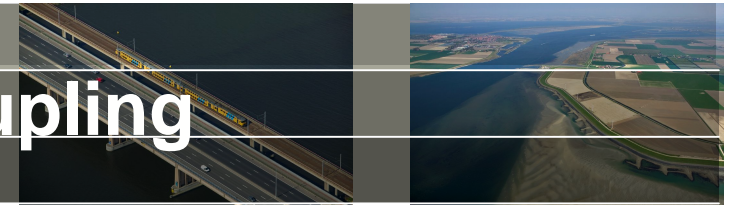
not suitable for modeling a polder system

SOLUTION: couple them

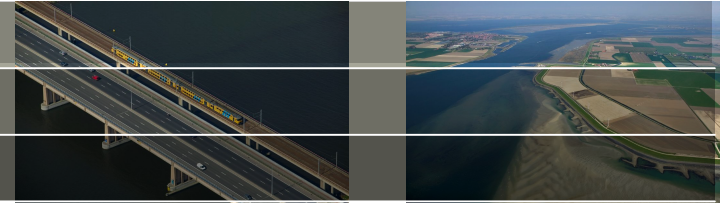
OpenMI - Sobek – Wanda coupling



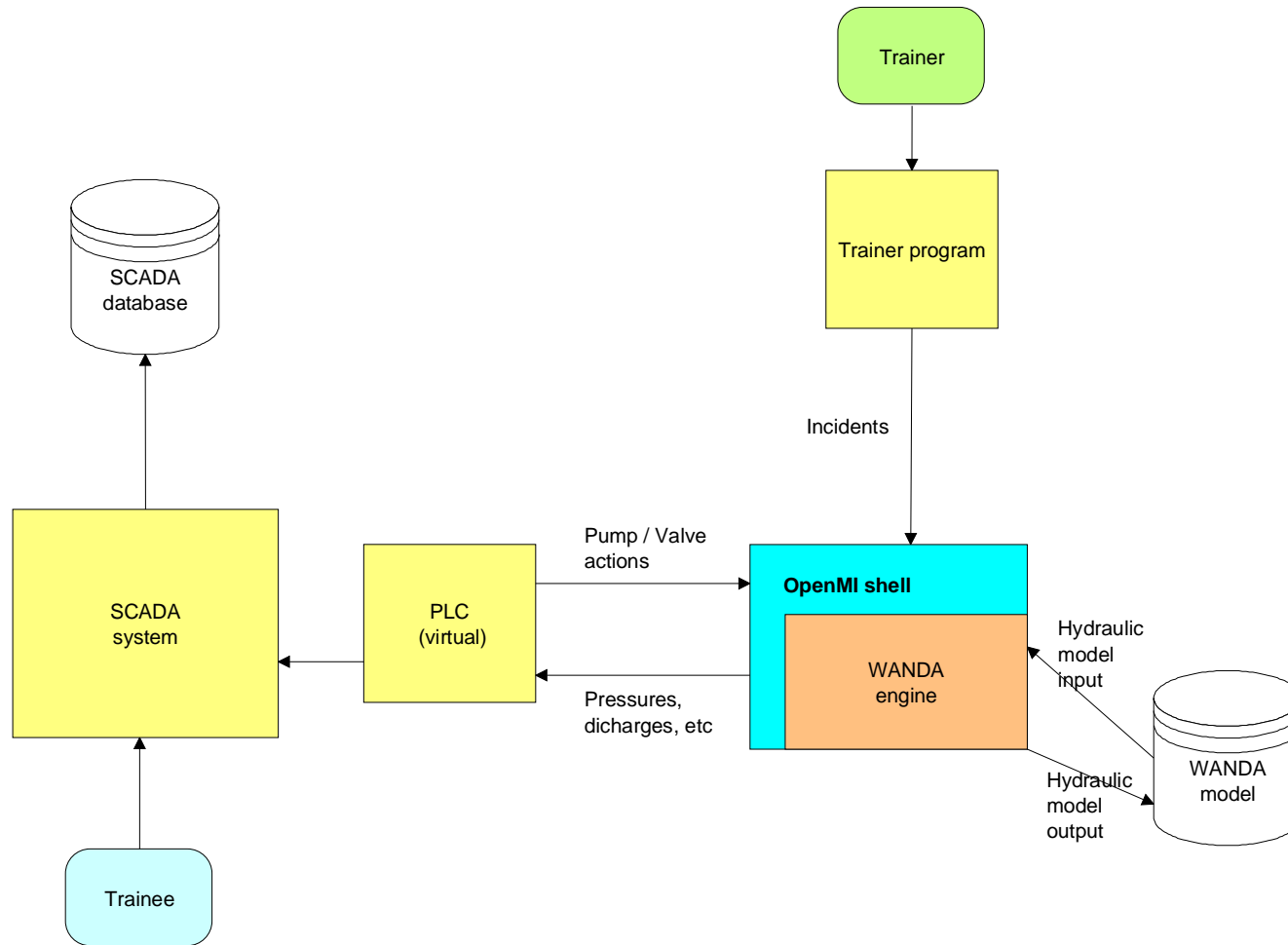
OpenMI - Sobek – Wanda coupling



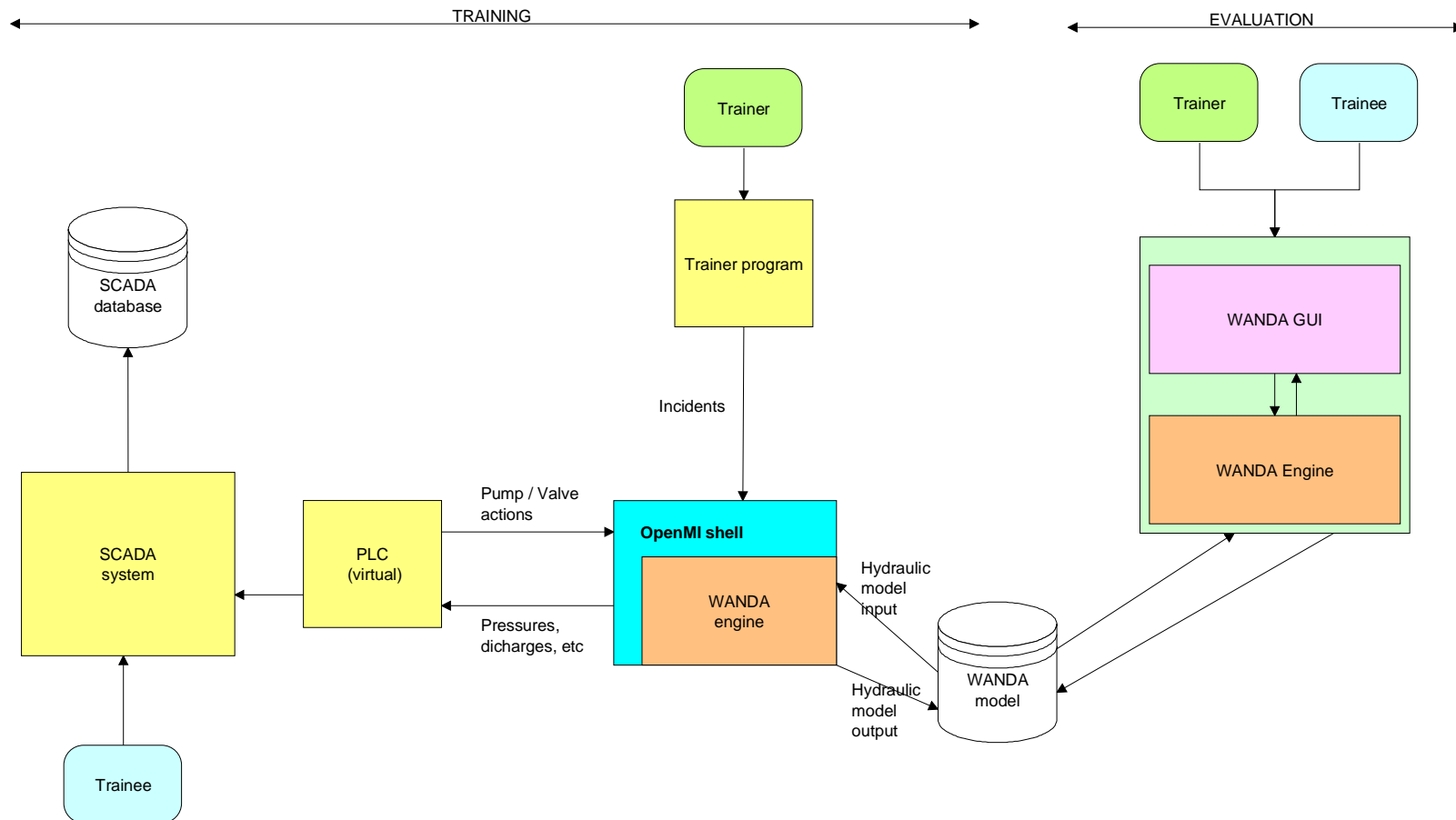
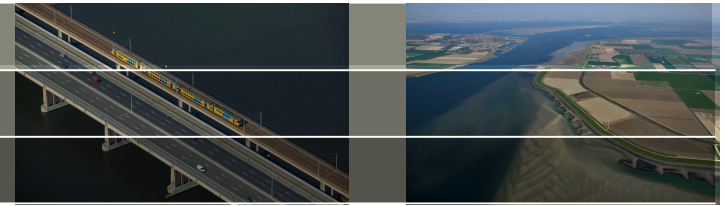
OpenMI – Trainings simulator



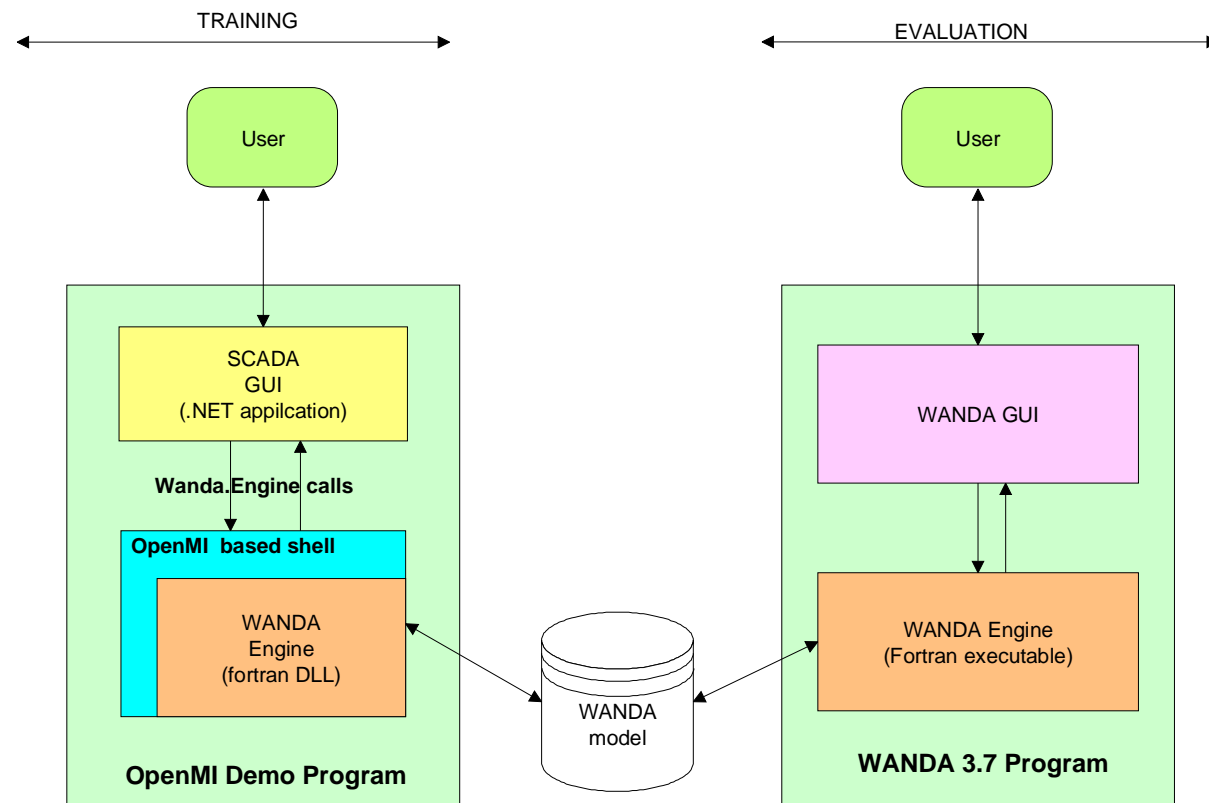
← TRAINING →



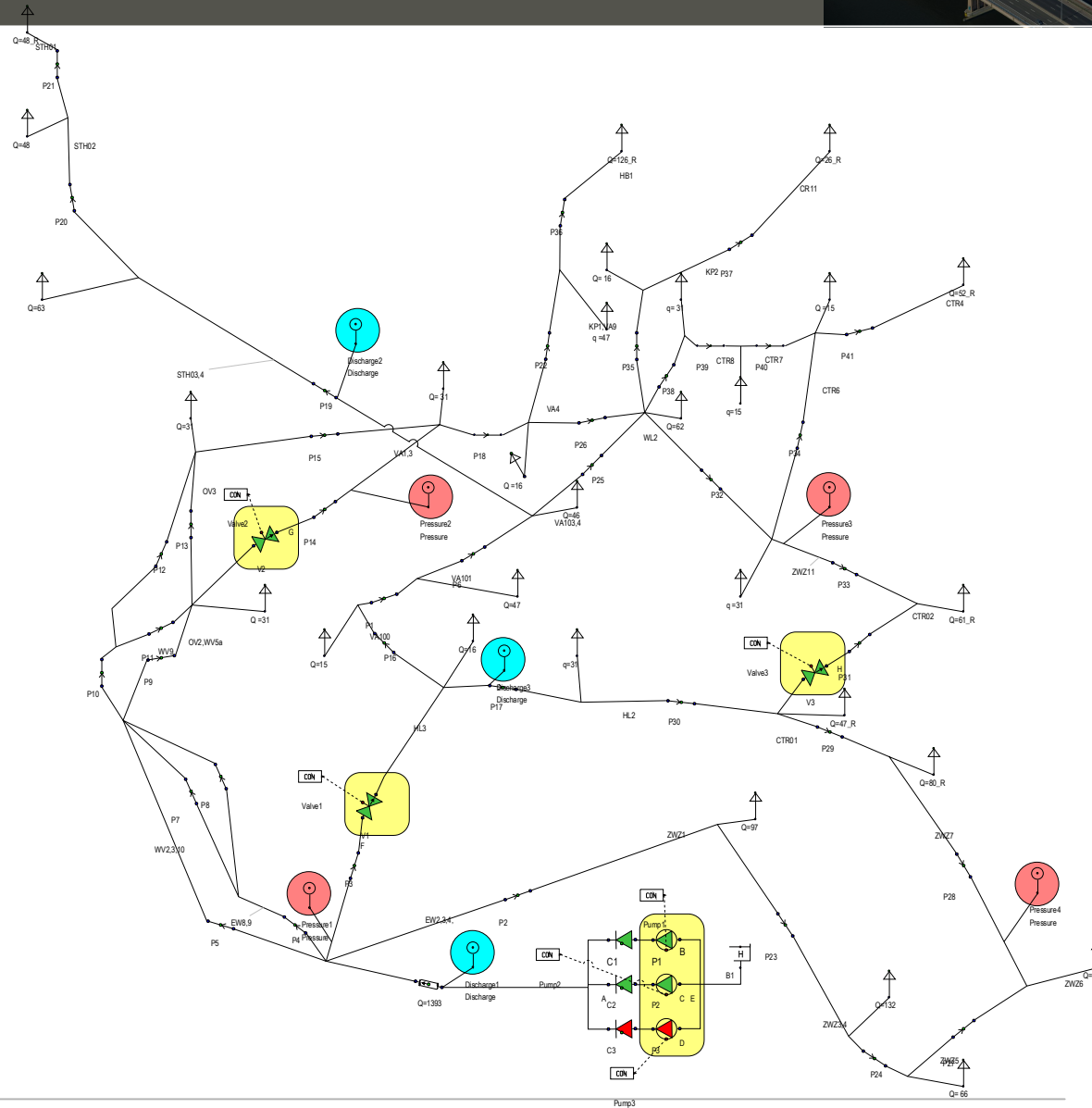
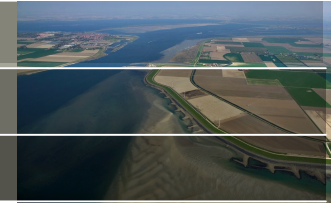
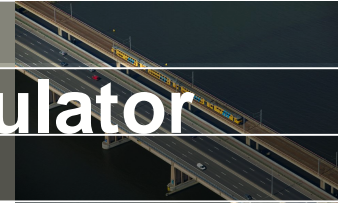
OpenMI – Trainings simulator



OpenMI – demo trainings simulator



OpenMI – demo trainings simulator



OpenMI – demo trainings simulator

