

# Issues for a future of a SAF community

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# Once upon a time in the west



In West of France, the SSA10 asks for an ESE model able to take into account:

- Hydrology
- Agricultural Crops
- Irrigation processes
- Primary production
- Shellfish farming uses
- Governance
- Scenarios
- etc...

All parts of the model were written in the ExtendSim platform for almost 6000 lines of ModL

According to our local managers, the result is very promising and encourages new developments of our model

# New developments ?

## Today's Manager tools

*Operational use of the  
EAUCéa model  
CYCLEauPE for weekly  
management of  
irrigation:*

- ✓ Flow data assimilation
- ✓ weather forecast
- ✓ Negotiations

avoid restrictions or  
bans in freshwater  
shortage periods

## Charente river manager



## SPICOSA Alternatives

- ✓ Study of different management scenarios for irrigation
- ✓ Long time process
- ✓ Integrated view of other ecosystems (coastal zone impacts)

### Short Term :

- ✓ Operational
- ✓ Communicative

### Long term :

- ✓ Communication
- ✓ Exploratory

*"Validation ? with short terms aspects"  
... operational stage*

# New development : Integration of a new hydrology

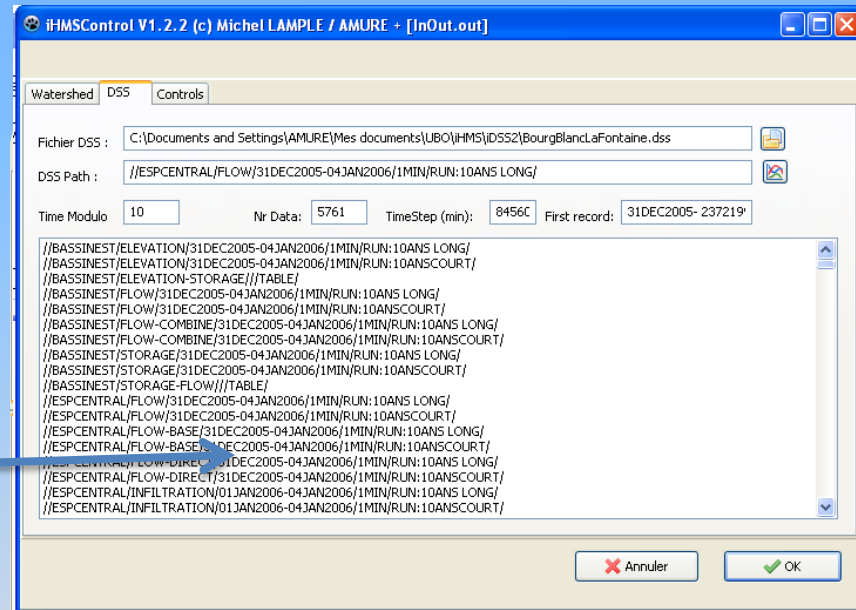
We developed a new interface between ExtendSim and the HEC-HMS hydrological model. [www.hec.usace.army.mil](http://www.hec.usace.army.mil)

- ✓ Specialized hydrological model
- ✓ More complex hydraulics structures
- ✓ Hydrological Assimilation
- ✓ Forecasting
- ✓ Sources transport

**ExtendSim SSA10**

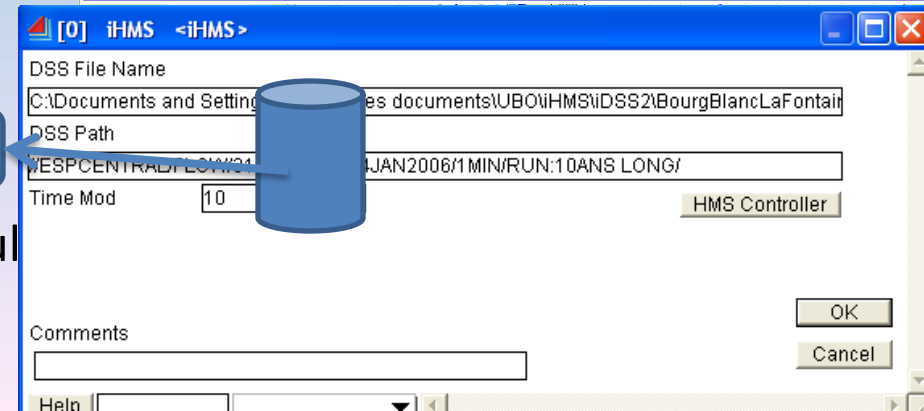


**HMSControl.exe**



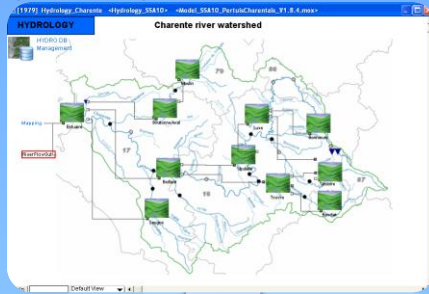
**HMS.dll**

onInit, onSimul

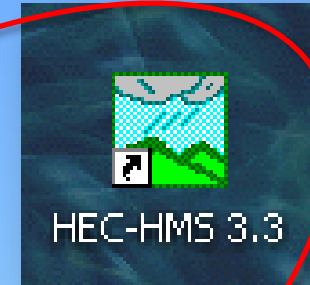


# Stop ! What are we doing?

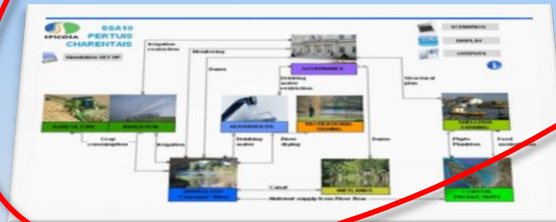
Before :  
Completely rewritten code



After :  
HEC-HMS



**ExtendSim SSA10**



- Integrating model
- no more need for expert
- In-line scientific libraries

- Science-Integration
- Off-line scientist work
- Integrated-set of models

Other successful experiences : PCRaster / hydrodynamics models...

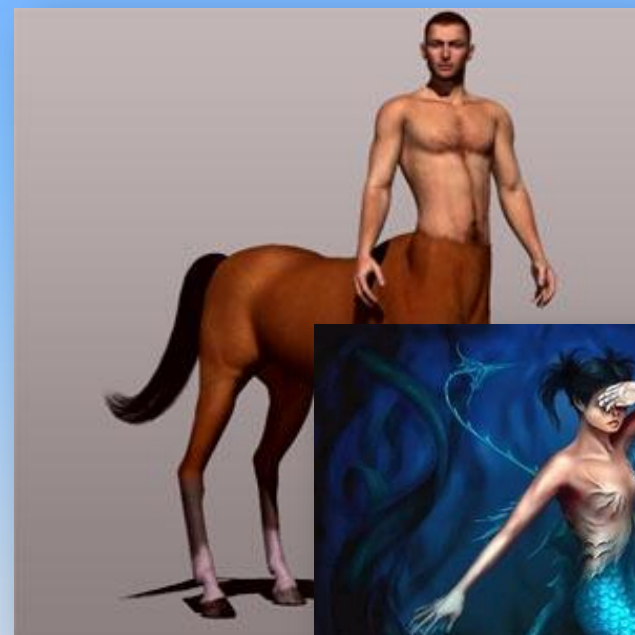
IEMSS conference Ottawa 2010 : *Integrating vs. integrated models ?*

# The IEMSS dream

(Ottawa july 2010)

- agricultural sustainability and food safety
- adapting to a shifting climate
- water resources management
- ecosystem service issues
- sensor networks
- integrated modelling approaches
- modelling & software frameworks
- decision support systems issues
- capacity-building in less-developed countries and regions

*International Environmental Modelling  
& Software Society*



The power of  
models integration...  
How to obtain this ?  
(Alexey A. Voinov)

# IEMSS: Voinov's integronsters



Wich “SAF” process could ensure to avoid such “integronster” ?

Are they only a drawback of "integrating models" ?



# You said "integronster" ?



OR

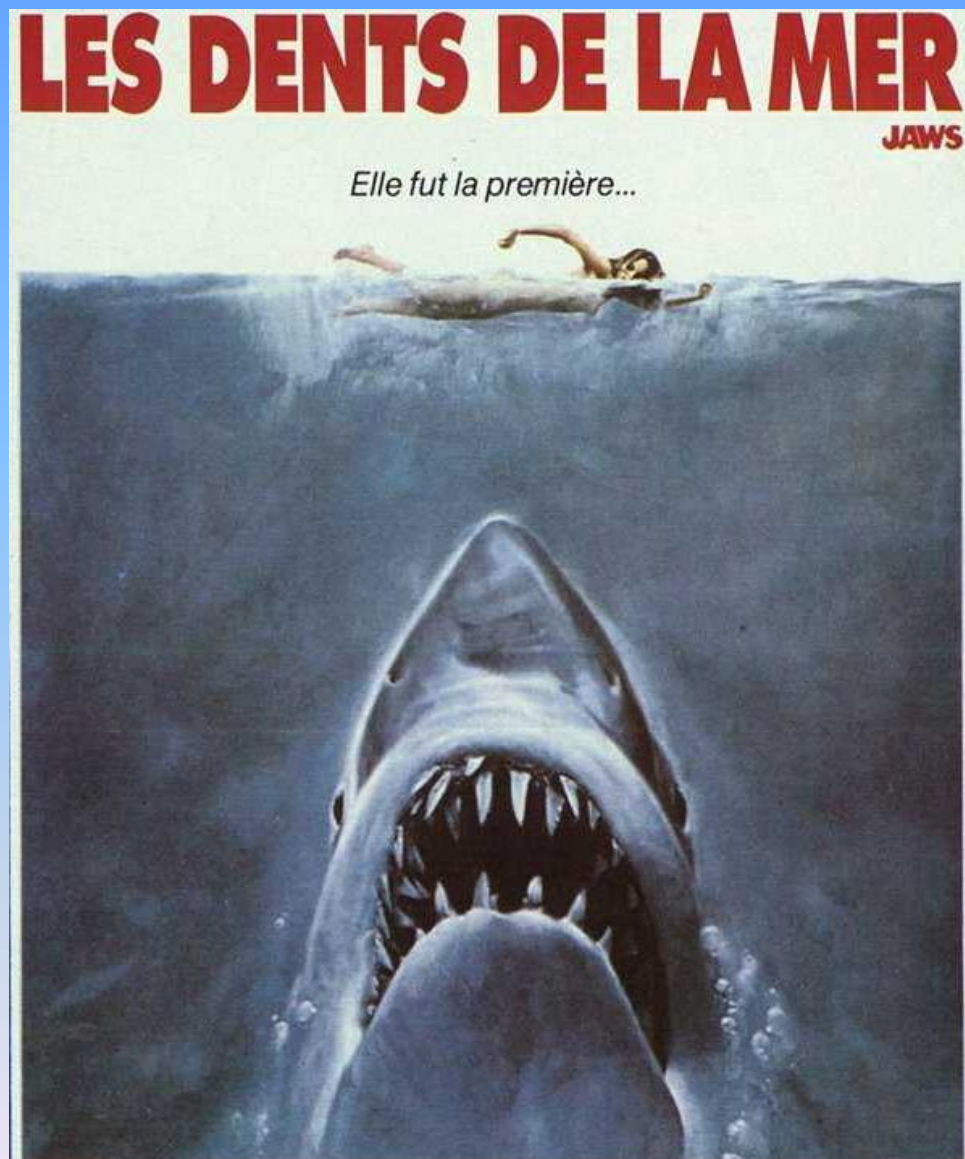


This is an ill-posed problem

The way of integration lies elsewhere :

Science integration does  
not mean integration of  
scientific models





Top model  
integration

# Back at the SAF

Integrating scientific models in an ESE platform :

- ✓ only a little part of scientific knowledge can be imported in the platform
- ✓ leads to a necessary reduction of the model's capabilities
- ✓ scientists give their models, but not their knowledge

I'm interested in your knowledge

I'm interested in your model

Can ESE models be more than object  
of science curiosity ?

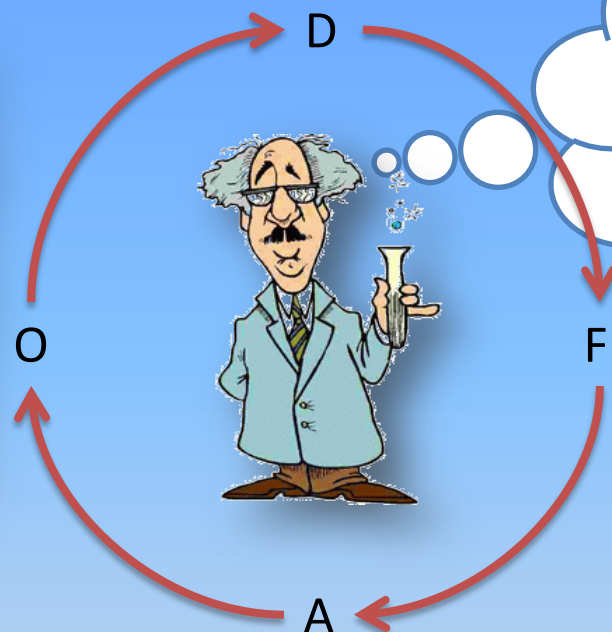
Other than a teaching tool ?

A game or experience for scientists ?



Mobilizing science needs state of  
the art scientific tools

# SAF & Science ?



SAF process

At the beginning, researchers were at the center of the SAF process

Questions of responsibility, competency, interest ...

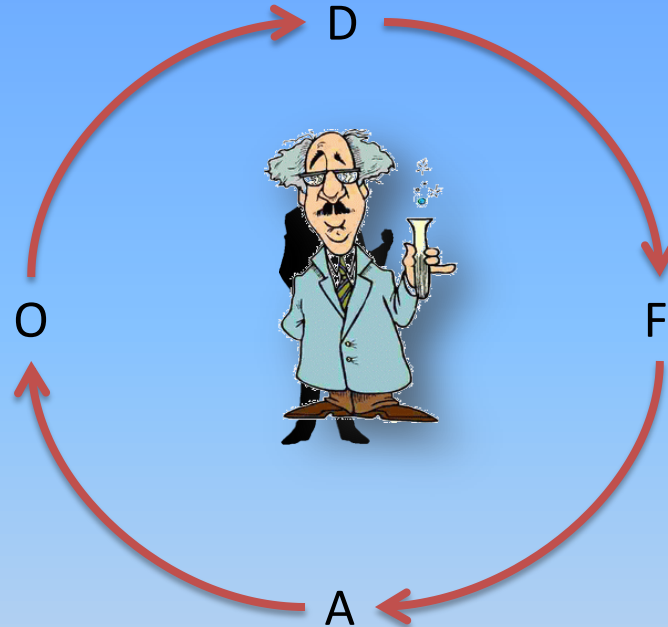
*Should the SAF be science driven or policy driven ?*

# Imagine : SAF-Project, SAF-Team



*I have a dream :*

- *pay my Taxes*
- *take a vacation*
- *meet a (true) mermaid*
- *...*

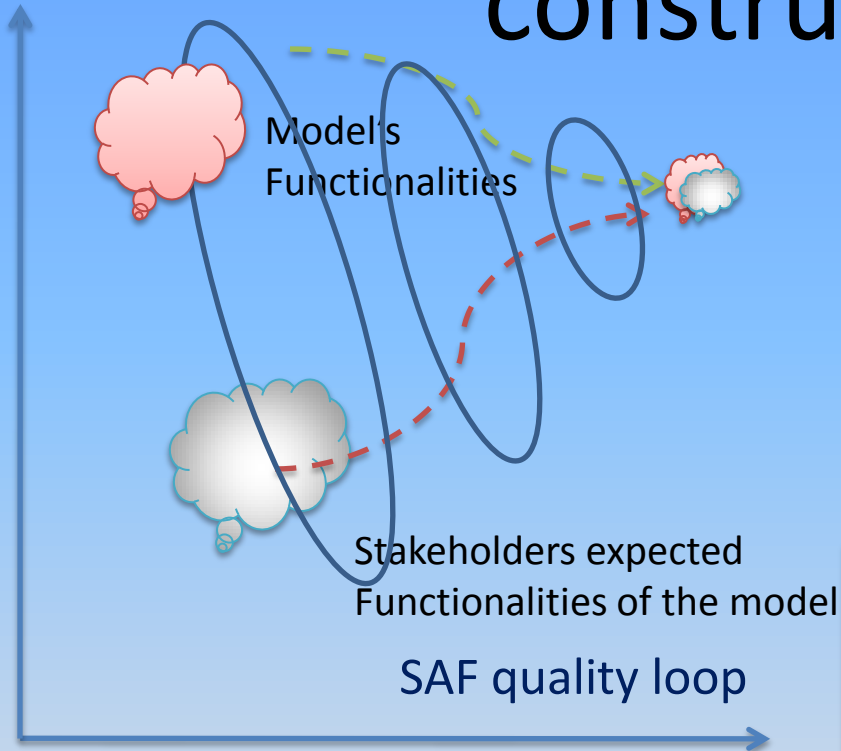


Scientists as experts in a SAF Team

Who must take the leadership of a SAF project ?

SAF-Architect : managing a SAF-Project and a SAF-Team (researchers, experts, modelers...)

# Science of managing co-constructed models



Model's functionalities expect to meet the stakeholder expectations.

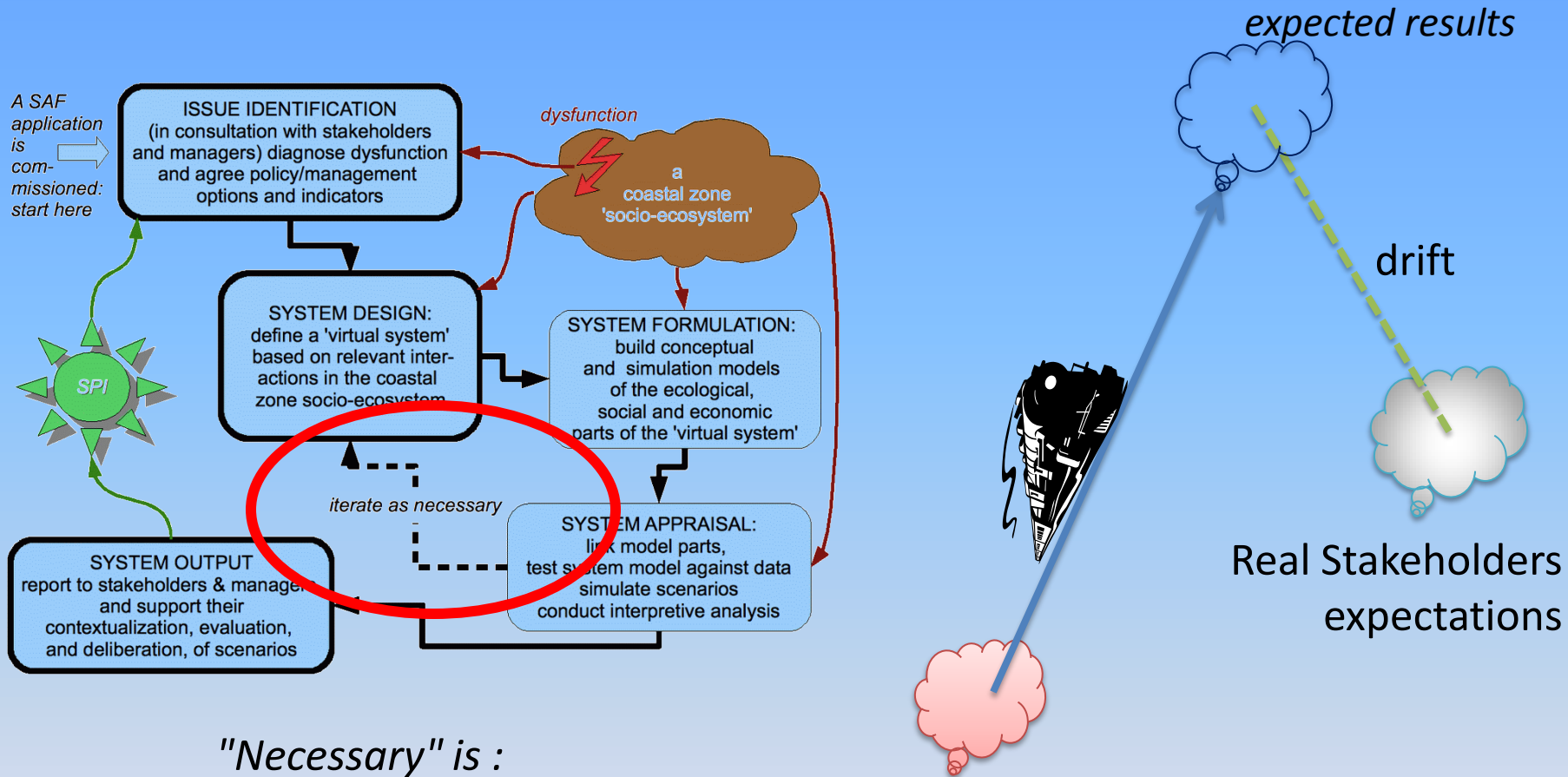
At the same time, the perception of the model by stakeholders changes..

Ideally, the two trajectories must join

SAF needs quality-loop to ensure finite-time convergence of operational SAF-Process

Measuring distance, forecasting...  
pursuit, tracking missile, weather forecast... “Mathematical assimilation”  
(Kalman filter, nudging, IAU (Bloom & al))

# SAF and model drift ?



"Necessary" is :

- no result ?
- bad results ?
- no expected results ?

# Future of the SAF

A platform for models integration ? → A platform for science integration

Reduced integrated models based on scientific libraries ? → State of the art models allowing a efficient collaboration of scientists

Science driven SAF ? → Policy driven SAF

Uncontrolled model drift ? → Quality protocol for convergence

New job ? SAF-Architect

- manager of a SAF-Project
- with SAF-Team
- and a A SAF renewed methodology

Thank you for your attention