



MOHID in Action @ Bentley

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MOHID and Bentley (formerly Action Modulers)

- Bentley Systems acquired Action Modulers to:
 - First, advance Bentley's flood resilience software solutions (especially 2D runoff)
 - Second, for everything else we presented yesterday 😊
- Bentley develops software that uses MOHID numerical engines and tools (MOHID Water, MOHID Land, etc), e.g. MOHID Studio, Action Server
- MOHID Source code is released under GPL – (Bentley can redistribute MOHID)
- As with Action Modulers, Bentley will continue to actively contribute to MOHID's open source code development (4 highly experienced coders)

Bentley and IST



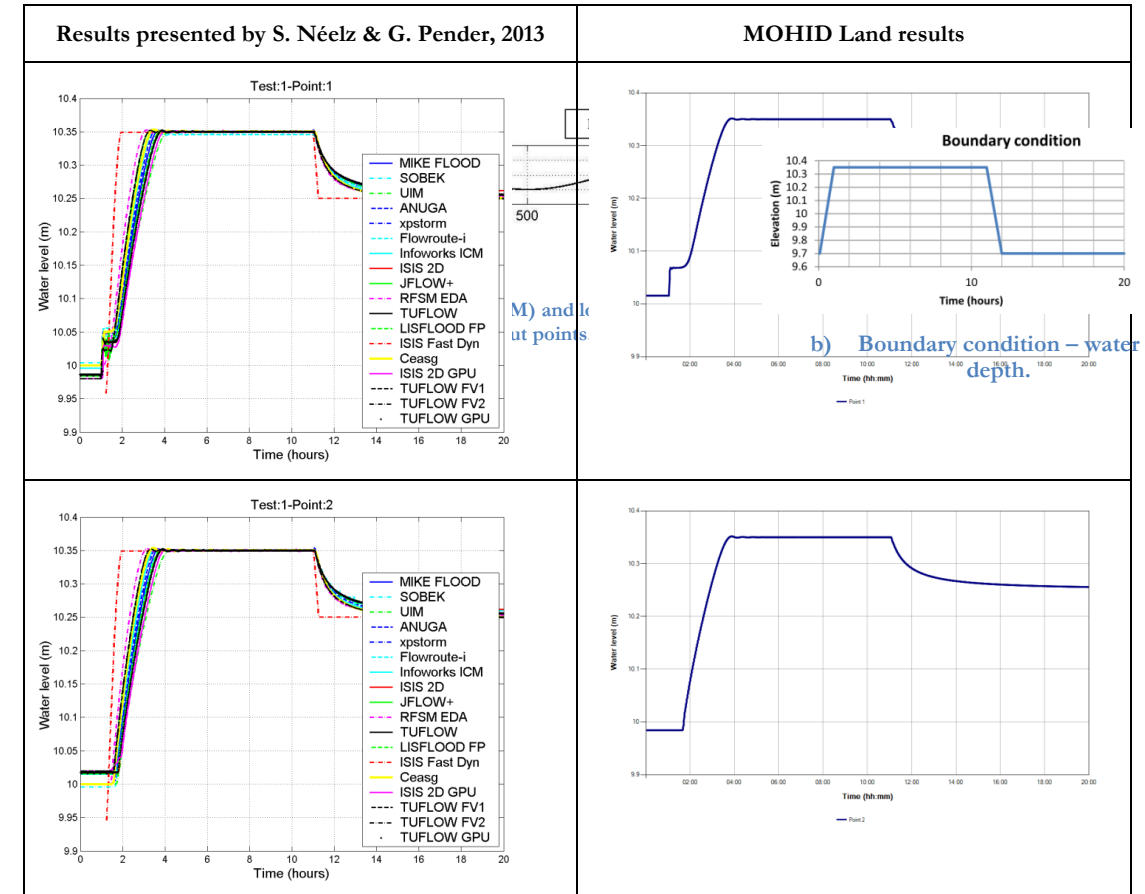
- Bentley will enter a protocol with IST
 - Provide access to MOHID Studio, Action Server and other software
 - IST to use Bentley's tools to improve model implementation/configuration tasks
 - IST research projects to serve as case studies where Bentley software is used
 - Give and receive expertise in MOHID's development
- Our new office is in Lisbon (Parque das Nações) to be closer to IST

What and how we will be working in MOHID?



MOHID Land - Benchmarking

- UK EPA has created a benchmark for 2D flood models
 - Benchmark tests flood models capabilities in solving schematic and real scenarios
 - Model inter-comparison is made in terms of ability to solve the proposed problems and computational time
 - Several modelling packages have (DHI MIKE FLOOD, Deltares SOBEK, TUFLOW, Infoworks ICM, etc)
- MOHID Land ran the benchmark in 2015 (Rui Pina et al.) for some tests
- We're doing it again, for all tests with the latest (improved) version. White paper to be published.



MOHID Land - Developments

- Drainage Network (1D)
 - Irregular cross-sections
 - Hydraulic structures
 - 1D/2D coupling
- RunOff (2D)
 - Make code faster!!
 - 1D river channels - 2D coupling
 - 1D pipe model (SWMM) – 2D coupling improvements
 - Breaklines
 - Hydraulic structures

How we code?

- **Development environment** - Visual Studio 2017
- **Fortran Compiler** - Intel 2018
- **Version management** – Tortoise GIT
- **HDF5 version** - 1.8.17 (64 bit)

Tortoise GIT – How we handle code versions

- Keep it simple
- No branching
- OK, branching allowed... to tag releases
- Commit/Push regularly (keep up the pace!)
- How we do it:



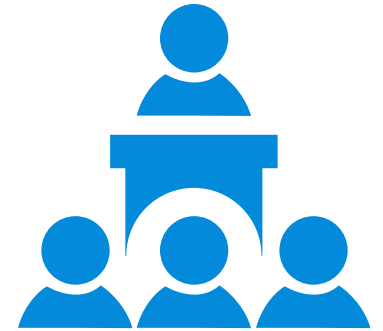
Pull → Change → Compile → Test → Pull → Compile → Commit → Push

Automatic builds and unit tests

- We are using Microsoft Visual Team Services (VSTS) for our code
 - Automatic builds
 - Automatic testing
 - Reporting issues
- We're learning a lot and will bring our experience "to the table"
- We'll most likely use VSTS for MOHID code in a near future
 - There is already a set of unit tests for MOHID Land
 - They'll be improved and will be operational this year
- We'll comply with other options too 😊! The more the merrier! We won't forget MOHID Water too!

Training & Support

- As in Action Modulers, at Bentley we will:
 - Provide training and technical support to users
 - Produce documentation (public)
 - User manuals
 - White papers
 - Forum, wiki and blog at <https://communities.bentley.com/>
 - Video tutorials



Wish list

- Improve MOHID's computational performance & benchmark assessment
 - Turn this into a research topic
- Introduce Fortran 2003 and Fortran 2008 standards
 - Object oriented features can improve code robustness
 - Requires good planning!
 - Computational performance of new features must be assessed
 - Assess new native Fortran parallel processing tools

Fortran 2018
is coming!

