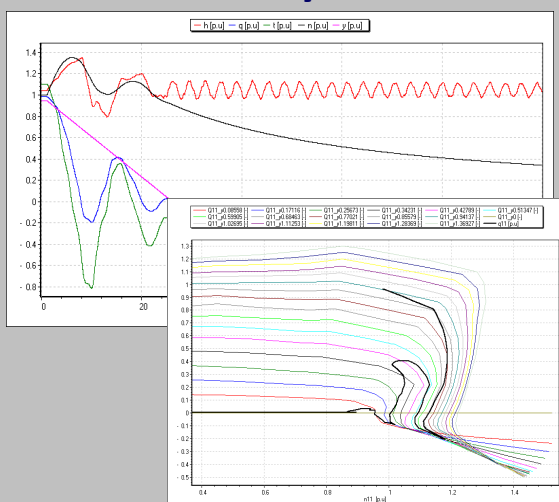




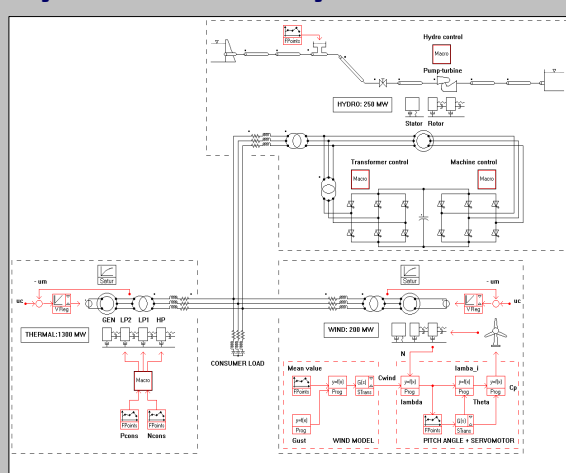
Power Vision *Engineering*

***Solutions & Expertise in Hydropower
Transients and Operation***

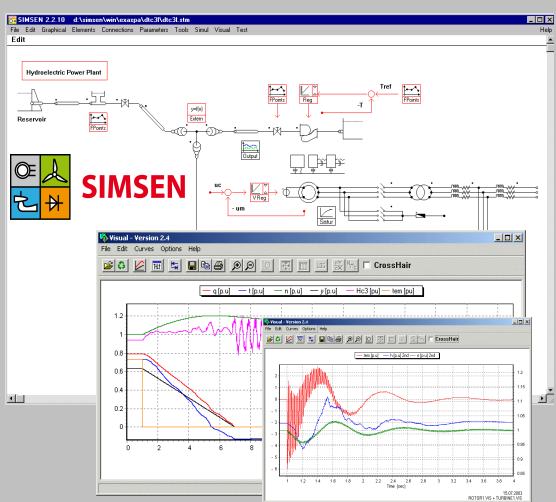
Transient Analysis



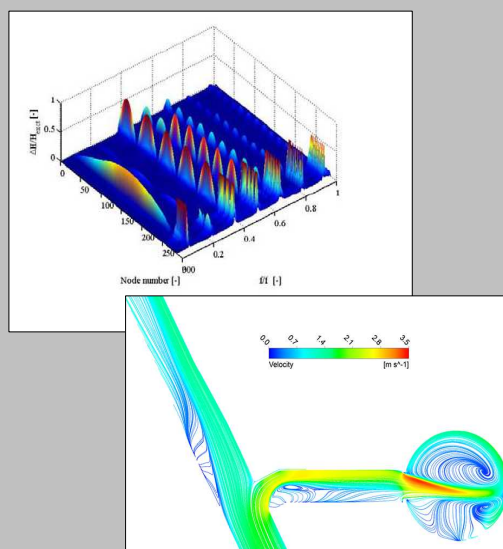
System Stability



Software Development and Distribution



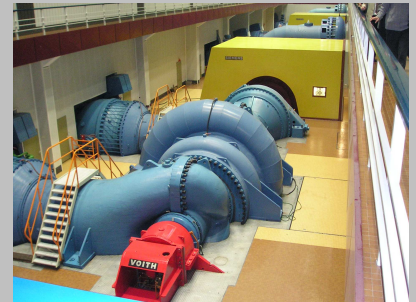
Complex Flow Simulation



Activities

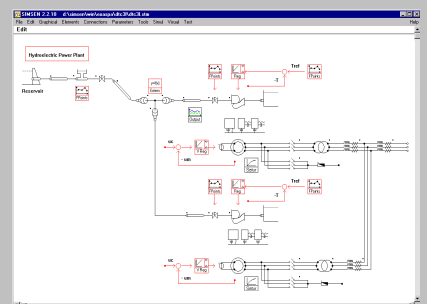
Engineering:

- **Water Hammer Calculation** (incl. Francis, Pelton, Kaplan, Bulb, Francis Pump-turbine, Pumps, Ternary Units)
- **Hydroelectric Transient Analysis** (incl. DFIM VarSpeed)
- **Energy Production Optimization** (OptiPower software)
- **Control System Optimization** (incl. Turbine Gov., AVR, PSS)



SIMSEN Software:

- **Software Distribution**
- **Development**
- **Maintenance**
- **Customer Support**
- **Training Seminars**



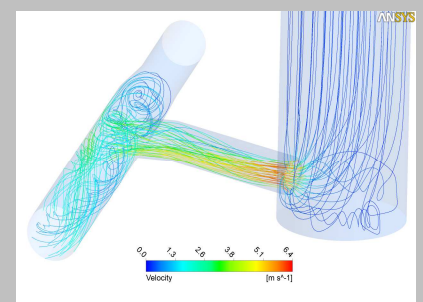
System Stability Assessment:

- **Full Load / Part Load Surge Analysis**
- **Rotor Stator Interactions**
- **Power Network Stability Analysis**
(incl. Isolated, Islanded, Interconnected Operation)
- **Grid Code Compliance / Ancillary Services**



Complex Flow Analysis:

- **CFD Computation**
- **Hydroacoustic Resonance Analysis**
- **Two Phase Flow Phenomena**
- **Model Tests Follow-up**



References

Cleuson-Dixence, Switzerland, 1200MW Hydroelectric Power Plant:

- Hydraulic Transient Analysis, 3xPelton Turbines
- Emergency Closing Law Optimization
- Energetic Coefficient Analysis
- Primary Control Services Optimization



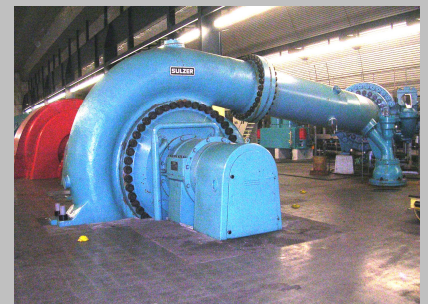
Avče, Slovenia, 185MW Pumped Storage Power Plant:

- Hydraulic Transient Analysis, 1xFrancis Pump-Turbine
- Air-Vacuum Valve Influence Analysis
- Surge Tank Optimization
- Surge Tank Scale Model Test Follow-up



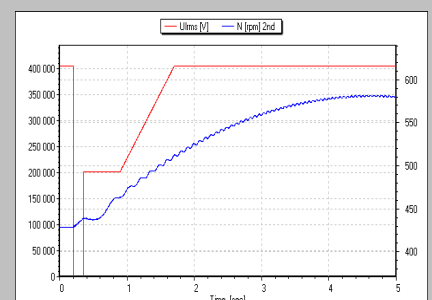
FMHL+, Switzerland, 420 MW Pumped Storage Power Plant:

- Expertise and Hydraulic Transient Analysis
- Existing 4x60MW + new 2x120MW Ternary Units
- New Surge Tank Optimization
- Transient Analysis for Existing PSPP Modifications



EDF, France, 900 MW Pumped Storage Power Plant :

- 900MW Pumped Storage, 4xFrancis Pump-turbines
- Hydroelectric Transient Analysis
- Grid Code Compliance Evaluation
- Primary and Secondary Control Capability Assessment



**Power Vision Engineering Sàrl, Expertise and Consulting
to Support you in your Hydroelectric Projects**

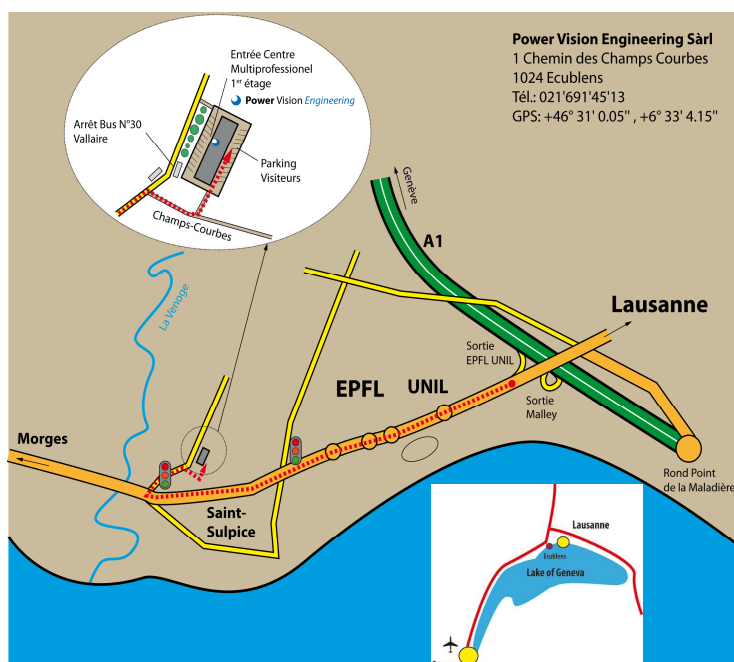
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