

## Virtual lubrication system provides an environment for learning, experimenting and innovating *Oil lubrication system simulator has been published online*

The eScop project has created a web application which allows the user to create and monitor a simulated lubrication system for heavy machines. The simulator, which is freely available at the project website, gives anyone the opportunity to build and test their own lubrication systems.

**Oil Lubrication System Simulator** is a simulator for a Circulating Oil Lubrication System. The system is used to lubricate machines available in the process industries like, but not limited to the pulp and paper industry. With the simulator the user will be able to develop an understanding about the maintenance and monitoring features for a lubrication system. The Oil Lubrication System Simulator was developed as part of the eScop project by researchers in FAST-Laboratory at Tampere University of Technology with contributions from Fluidhouse Oy.

- *The Oil Lubrication Simulator is a great tool for visualizing the type of data generated by circulating oil lubrication systems. This in turn allows us to create performance indicators that provide more meaningful information for management decision making. Additionally, the technologies behind the simulator allow us to build more user-friendly interfaces,* states project engineer **Roberto Camp** from Fluidhouse.

The simulator can be used by partners in the eScop project to test their tools and use it as a virtual industrial environment for the development process. This is achieved by treating the simulator as a factory-floor which can be controlled and monitored through RESTful web services. The simulator can be used by students and engineers doing research related to lubrication systems, enabling them to create a system according to their own requirements, and to study the behavior of the system over time. It also allows development of other control and monitoring systems for the lubrication system. The flexibility and scalability of a virtual simulator provides a simple, but realistic testing environment. As result the simulator allows us to learn, to experiment and to innovate faster, cheaper and from anywhere.



### Mirroring a real life lubrication system

The simulator was built to resemble the features of the FluidCirc Oil Circulation Lubrication system from Fluidhouse Oy, one of the partners in the eScop project. Fluidhouse Oy, which offers advanced hydraulic and oil lubrication solutions and services, develops the FluidCirc systems for lubrication purposes in manufacturing and processing industries. The FluidCirc Lubrication system consists of components including lubrication units, measuring stations and flow meters. The lubrication unit is the main component of the FluidCirc, consisting of filters, pumps and tanks. The

### eScop Details

Duration: March 2013 –  
February 2016

Total costs: 5,82 M€

Participating Countries:  
Czech Republic,  
Finland, Italy, Poland

Participating  
organisations: 10

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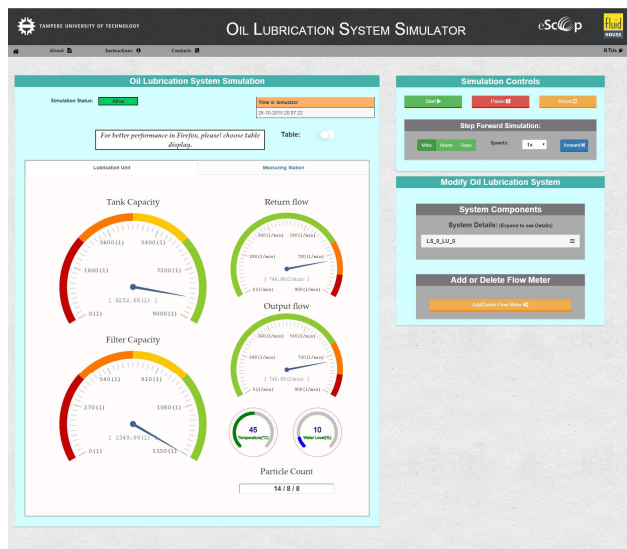
Published November 4th, 2015

PUBLISHER: Tampere University of Technology, FAST-Lab.

flow meters regulate the flow of lubrication oil to the required lubrication points in the machine. Finally, the measuring station is the intermediate component between lubrication unit and flow meter, grouping the flow meters and providing the interface that allows the monitoring of oil properties and flow rates.

### *Editing the simulations through a web interface*

The simulator is divided into two parts. The first one allows the user to select the capabilities of the lubrication unit, the number of measuring stations and the amount of flow meters (with their corresponding flow rates), thus generating the specification for the whole system. The second part allows the user to monitor the created system and add or remove flow meters as required, even during the simulation. The simulator can be accessed through any web browser. To make it possible to build new supervisory monitoring and control tools, the simulator also provides a simulated RTU (Remote Terminal Unit) with each system for subscribing to sensor events and performing services in the system. The tools can communicate with the RTU of the simulator by using JSON Messages and simple RESTful Communication protocols.



eScop is a three-year software development project, including 10 European partners and coordinated by FAST Laboratory at Tampere University of Technology. The aim of the project is to create service oriented framework that allows building and simulating factory and process control systems. This approach is called open, knowledge driven manufacturing executing system.

[www.escop-project.eu/tools](http://www.escop-project.eu/tools)



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eScop is made possible by funding from the ARTEMIS Joint Undertaking