



## CASE STUDY

# Structural Test and Monitoring Software Protected by Sentinel Integrated with NI LabVIEW

University of Hannover Institute of Concrete Construction Uses Sentinel to License and Protect its SMMEXS Structural Test and Monitoring Software

### Challenge

The Institute of Concrete Construction, a division of the University of Hannover, uses National Instruments (NI) LabVIEW development tools to create its Structural Monitoring Modular Expert System (SMMEXS) software. The institute offers engineers and research partners, the use of its SMMEXS software, on a per project basis, to monitor the structural integrity of bridges, wind turbines, and towers.

Since SMMEXS is used on a per project basis, it was important that the institute was able to license the software and its components for individual project use – and then to enforce that licensing to guard against overuse. In addition, the proprietary algorithms contained in its sophisticated software represent valuable intellectual property, which the institute needed to protect from the possibility of reverse engineering, tampering, and theft. In looking toward the future, the institute also wants the ability to license its software for embedded applications and users seeking either a limited or an expanded set of features and functions.

### Challenge

- > Guard against overuse
- > Secure proprietary algorithms contained in software code
- > Limit or expand features & functionality
- > License & protect embedded software with solution compatible with NI LabVIEW

### Solution

- > Sentinel LDK
- > Sentinel HL Pro (driverless) protection key

### Results

- > Software overuse is prevented
- > Intellectual Property is secure
- > Creative packaging of features and components
- > Future-proof protection & licensing for software and embedded applications
- > Seamless integration with NI LabVIEW for quick licensing and protection solution

## Solution

Mr. Ralf Herrmann, M.Sc., along with a colleague at the University of Hannover Institute of Concrete Construction researched and compared several commercial licensing solutions. "After careful evaluation, we chose Gemalto Sentinel for its manageability, NI LabVIEW and NI embedded support, price, technical support, reputation, and corporate longevity," said Mr. Herrmann.

The Sentinel solution includes Sentinel LDK (license development kit) and Sentinel HL Pro DL (driverless) hardware-based protection keys. Sentinel LDK provides protection for IP by encrypting the proprietary algorithms contained in the SMMEXS software code and feature-based licensing. The [Sentinel HL Pro] dongle then enforces feature-based licensing of three different parts of the SMMEXS program including the Configuration Tool for configuration of evaluation processes, the Import Demon for automatic import of measurement data as a service, and the Evaluation Demon for calculation of the evaluations, as a service.

Users download the setup from the SMMEXS software website and use the dongle to activate and use the software. "Then, upon completion of each research project, a system for the re-use of the software is then made," according to Mr. Herrmann.

## Results

Sentinel provides license enforcement to guard against overuse and strong protection against reverse engineering by securing proprietary algorithms contained in the SMMEXS software. "We really like that Sentinel LDK features plugin support for NI LabVIEW development tools, and we like the Sentinel Envelope functionality because the code is encrypted and reverse engineering is effectively prevented in this way," said Mr. Herrmann. Sentinel's feature-based licensing functionality provides the ability to enable the three different SMMEXS components.



"The implementation of Sentinel for use with NI LabVIEW was quite easy. There was no need for manual involvement. We have had our SMMEXS software with implemented protection in internal testing for only a few weeks, but it has quickly shown that the software is reliable and protected," added Mr. Herrmann.

When asked about plans for Sentinel, Mr. Herrmann replied, "We continually supplement the SMMEXS software with new algorithms and using Sentinel's feature-based licensing capability, we plan to offer a Basic and a Professional version of the software in the future."

"In another project, we have developed control concepts and operator software for testing machines. This software runs on National Instruments CompactRIO, as an embedded hardware solution. This embedded software should also be protected and Sentinel will help us do that."

## About the Institute of Concrete Construction at the University of Hannover

The Gottfried Wilhelm Leibniz University of Hannover, with 25,700 students, including 2,121 foreign students, is the second-largest university in Lower Saxony. Approximately 90 fields of study are available. The Institute of Concrete Construction deals with issues relating to the structural behavior of components and structures made of concrete, reinforced and pre-stressed concrete and masonry. In addition, the reliability of buildings and civil engineering structures (bridges, locks, wind turbines) are explored. One focus of the institute is in Structural Health Monitoring (SHM), the systematic development of planning concepts and algorithms for continuous monitoring of both new and existing buildings. For more information, visit: [www.ifma.uni-hannover.de](http://www.ifma.uni-hannover.de)

## About Gemalto Sentinel Software Monetization Solutions

Gemalto, through its acquisition of SafeNet, is the market-leading provider of software licensing and entitlement management solutions for on-premises, embedded, and cloud-based software vendors. Gemalto Sentinel is the most trusted brand in the software industry for secure, flexible, and future-proof software monetization solutions. For more information, visit: [www.SafeNet-Inc.com/software-monetization-solutions](http://www.SafeNet-Inc.com/software-monetization-solutions)

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