

SAFETY FIRST

Powering a better future



For LNG land-based storage tanks

SVANEHØJ



Accelerating the green transition

By emphasising sustainable innovation and total efficiency, Svanehøj maximises the environmental and economic performance of our customers' vessels, power plants and liquefied natural gas (LNG) infrastructure.

Svanehøj Tank Control Systems was established in Calais, France in 1961 as Whessoe plc. Whessoe equipped its first gas carriers in the 1970s and its first LNG storage tank in 1983. It was also the first to provide a level, temperature and density (LTD) gauge for floating storage. Whessoe (which was formed in Darlington in 1790) was acquired by Svanehøj in 2021.

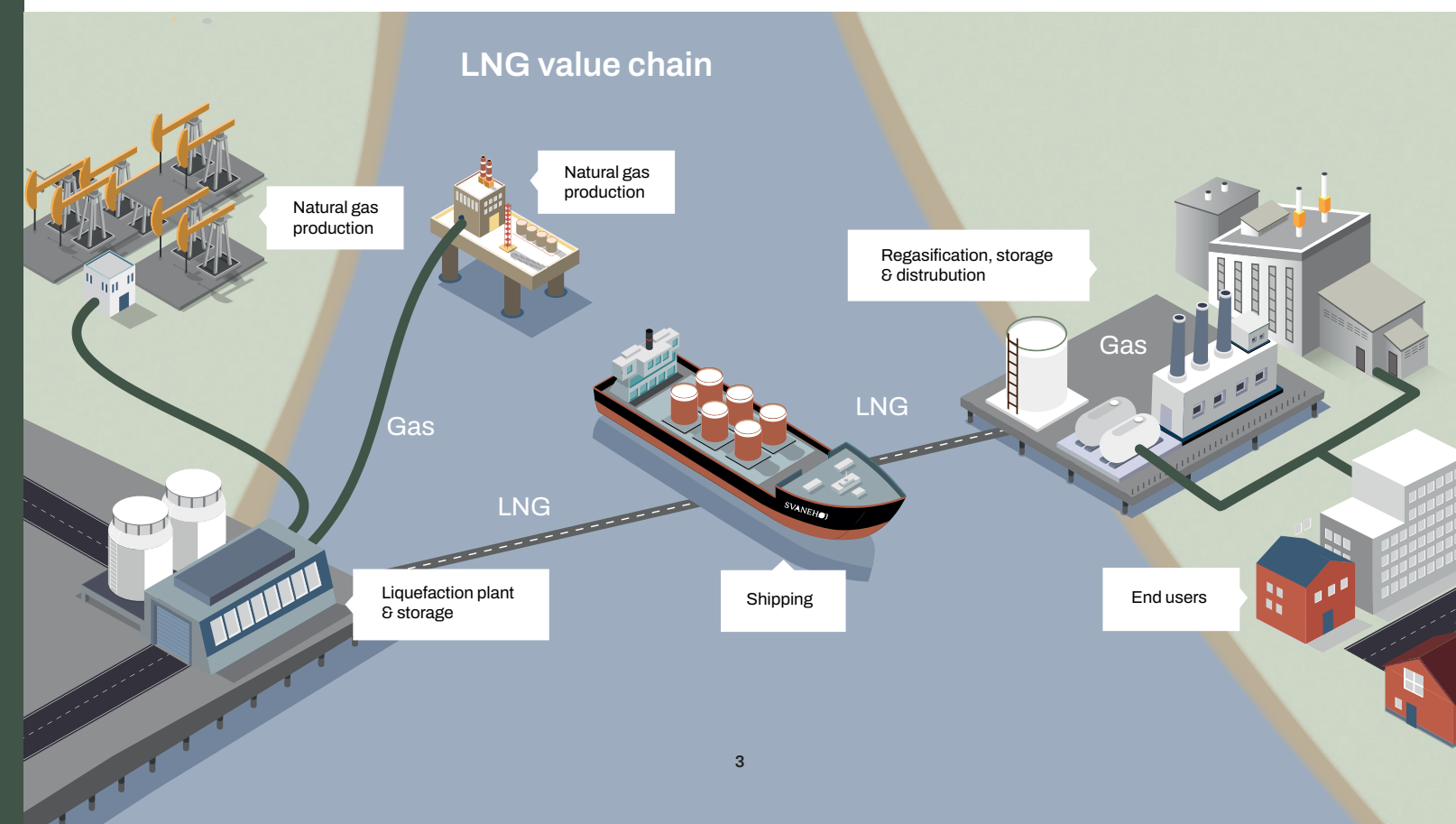
Natural gas: the natural solution

Natural gas is used widely in residential heating and cooking, energy production and transport. It's also used in the production of other gases, such as hydrogen and ammonia, as well as fertilisers, methanol and refinery products. In its purest form, natural gas is the cleanest of all fossil

fuels, producing lower emissions of CO₂, NO₂, SO_x and particulate matter than other similar fuels. In the form of liquefied natural gas, it can be shipped across the world in large quantities.

Due to lower costs, new technologies and the development of smaller LNG infra-structures, LNG is becoming available on a much wider scale than previously. Demand for the product continues to increase globally, especially with its low impact on the environment. Our land-based LNG monitoring and management systems are just one aspect of our work in providing a complete solution to your LNG needs.

At Svanehøj, we are global leading specialists in handling mission-critical liquids – both on sea and land. We design, manufacture, and supply a wide range of cargo and energy pump solutions and applications that accelerates the transition to cleaner energy types.



Reducing risks in LNG storage

Svanehøj Tank Control Systems has operation in France. We’ve been developing cutting-edge technologies that enhance the safety of LNG, cryogenic and refrigerated storage, both onshore and offshore, for many years.

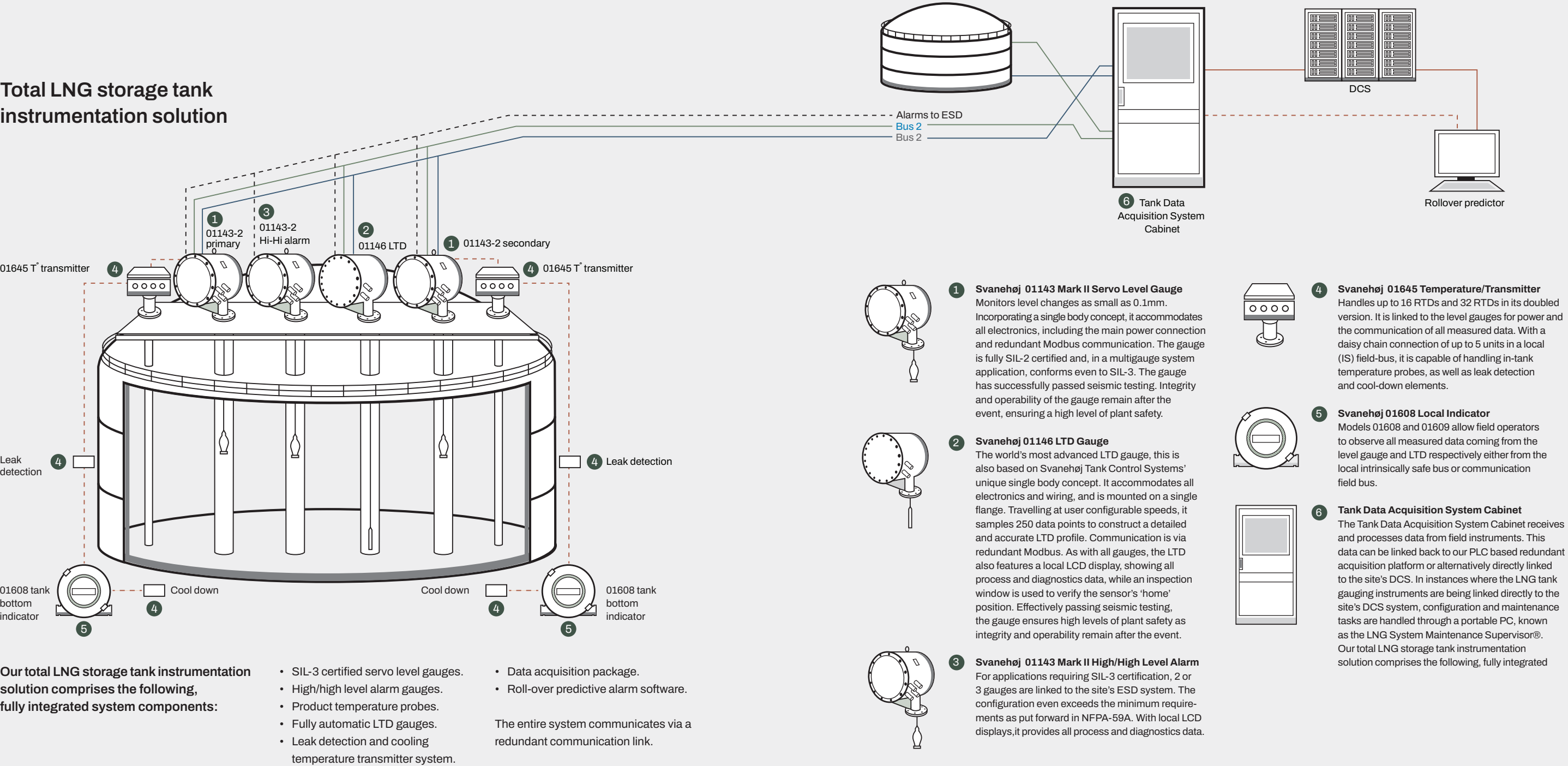
Land-based tanks that store liquefied natural gas are an expensive investment, so it’s vital that they remain fail-proof. Regassification installations must be able to handle incoming LNG that can be of a widely varying quality. One key risk is the stratification of the LNG, which could evolve into the ‘rollover’ phenomenon. This is why it’s vital that tanks have precise instruments that can measure variations in temperature, density and levels.

Tanks for storing LNG can be flat-bottom (single, double or full containment). We can provide instrumentation and safety systems for most types and sizes of tanks, customised to meet your

specific needs whilst complying with very stringent regulations. This includes instruments that operate accurately under cryogenic conditions.

Svanehøj’s range of gauges, temperature transmitters and control systems ensure that your LNG storage tanks and their contents will always stay as safe as possible. For those highly specialised applications, where safety, accuracy, reliability, and repeatability are of prime importance, look no further than our Svanehøj Tank Control Systems.

Total LNG storage tank instrumentation solution



LNG storage tank instruments and software

Svanehøj can provide stand-alone products or a completely integrated safety solution for the onshore storage of LNG. All of our products are designed to reduce risks and boost safety by providing the highest levels of accuracy, reliability and repeatability. Our comprehensive range of monitoring and control solutions for LNG onshore storage tanks includes the following products:



Level, temperature and density (LTD) gauge

The Svanehøj 01146 LTD Gauge is both compact and the lightest in its class – yet it contains a host of functions designed to provide highly accurate data relating to the measurement of level, temperature and in-tank density. The gauge is mounted on a single flange and all of its electronics and wiring are contained within a flameproof compartment.

Over 270 of our Svanehøj LTD Gauges have been installed in onshore LNG tanks across the globe. This is the world's most advanced LTD gauge currently available on the market.

Key features and benefits include:

- Accurate and repeatable temperature and density data.
- An all-in-one design, with minimal installation costs.
- Low maintenance requirements.
- A proven record for reliability.
- Optional rollover predictive software for flat-bottom tanks.



Temperature transmitters

The Svanehøj 01645 Temperature/Pressure Transmitter can handle an in-tank multi-spots temperature probe as well as leak detection and cool-down elements.

We also provide the Svanehøj 01706 Temperature Probe for the measurement of liquid and vapour phase temperatures.



Level gauges

The Svanehøj 01143 Mark II Servo Level Gauge provides continuous measurement of the LNG level, using a servo-driven sensor that is in direct contact with the liquid. The type approval of the Svanehøj 01143 Mark II Servo Level Gauge, demonstrates that the product used stand-alone is suitable for safety related functions up to SIL-2 integrity level in low demand and SIL-3 in high demand modes of operation, according to IEC 61508 parts 1 to 7, second edition, 2010.

Key features and benefits include:

- All-in one design – our 'single body' concept.
- Consistently accurate and reliable level measurements.
- Low maintenance requirements

As an alternative to servo level gauges, radar gauges can be supplied an integrated into the tank gauging package - SIL certified suitable for cryogenic applications.



Local indicators

The Svanehøj 01608 and 01609 Local Indicators are tank base indicators that are powered from the level gauge. They enable operators in the field to view all measured data from an LTD or level gauge.

Tank data acquisition system (TDAS)

The Tank Data Acquisition System is composed of:

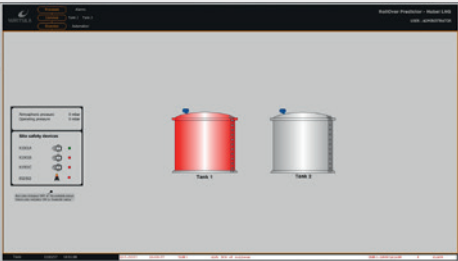
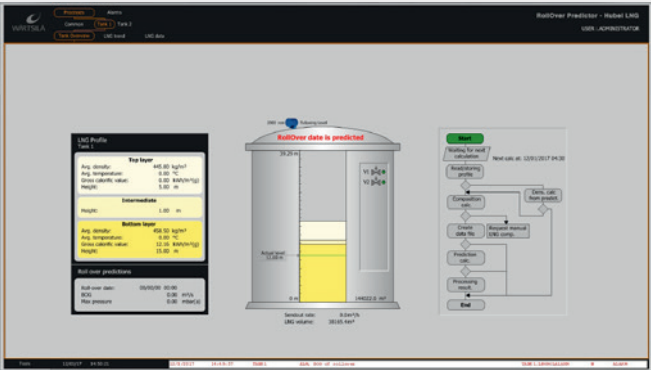
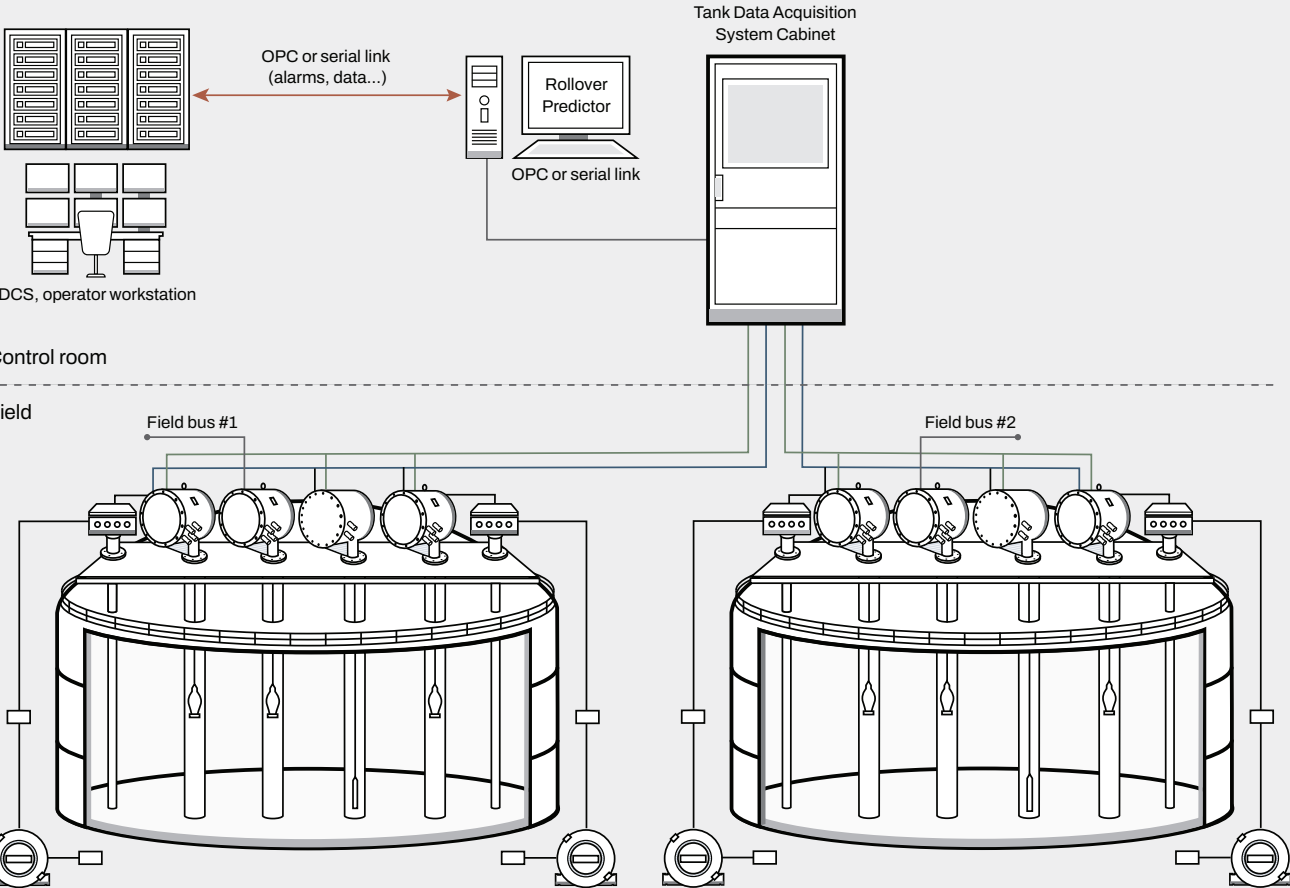
- The PLC-based acquisition system.
- The HMI in the control room.

The TDAS is linked to the field instruments and is also directly linked to your site's distributed control system (DCS). The system is PLC-based and includes all necessary I/O modules. It is fully redundant (power supply; I/O modules; CPU) and provides hot standby with Achilles Level 2 certification to ensure a high level of security against malware, spyware, and virus attacks.

Key features and benefits include:

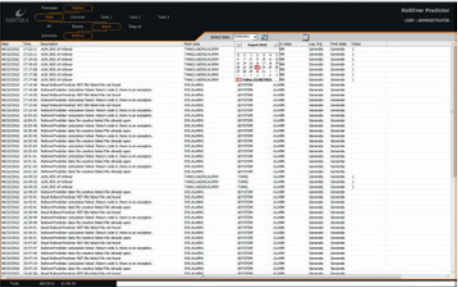
- Achilles Level 2, ISA secured certifications.
- Hot standby architecture to ensure full redundancy without loss of data.
- Built-in associated operating modules to provide a high level of security.
- Full redundancy on field buses (RS 485 Modbus).
- Redundant Ethernet-based communication between the CPU and the communication module.
- A fully modular, evolutionary and open architecture.
- Worldwide spare parts and support available for the system hardware.

LNG rollover prevention software



Plant view

- Tank overview with alarm information
- Site Safety devices status



Log file view

- Complete log file
- Archive

Liquefied natural gas terminals must be able to handle and have sufficient storage capacity for multiple grades of LNG. To control costs effectively, the storage capacity of both new and existing storage tanks needs to be optimised. Meanwhile, boil-off means that the chemical composition of the stored LNG will be in constant flux. It's therefore vital to monitor the possible development of stratification, along with warnings of any unstable stratifications that could occur.

Our flagship software offering is the Svanehøj LNG Rollover Predictor. This handles all grades of LNG and estimates the evolution of the chemical composition in real time. It can therefore calculate the development of any stratification and if necessary generate an alarm.

Fully automatic

The Svanehøj LNG Rollover Predictor needs a chemical composition in order to trigger the calculation process. The LNG composition can be either available based on the surveyor's report (LNG carrier) or collected from the DCS when a gas chromatograph is available.

Svanehøj has addressed the operational challenge of manual data entry by enabling the chemical composition calculation based on real-time process data (density, temperature and operating pressure). It makes the system very unique and fully automatic, thus removing the need for the terminal's operator to make manual data entry in the rollover prevention software.

The key features and benefits of the Svanehøj LNG Rollover Predictor include:

- Monitoring of all site components that could affect LNG stratification.
- Accurate prediction of stratification and rollover phenomena.
- Detection of a rollover for up to 30 days at a time.
- The ability to make the right decisions at the right time – so that any corrective action can be taken.
- The use of a calculation module validated through experimental campaigns provides a high level of accuracy in the prediction.

Other software we supply includes the Svanehøj LNG Master, developed by ENGIE Lab CRIGEN (formerly Gaz De France (GDF) Suez), which is designed to optimise tank-related operations and reduce costs.

A complete suite of services

Project management

Svanehøj Tank Control Systems has vast experience in serving customers around the world with expert project management.

We have an extensive background in customising projects in line with international standards, local regulations and the specifications of each individual project.

Our project team is committed to delivering on time, with full conformity to the technical specifications, and to the quality expected by our global customers.

The overall objective in everything we do is to ensure customer satisfaction.

Integrated solutions

With our extensive product and solutions portfolio, Svanehøj can provide full solutions – from design, engineering through to commissioning, support and training.

Our philosophy is to serve our customers throughout the lifecycle of their installation, with solutions including services, spare parts and upgrades.

Svanehøj's after market services offer a knowledge-based “one-stop-shop”, including:

- Spare parts handling for the entire gas installation with expert recommendations and obsolescence management.
- Remote support.
- Field service support.
- Class room training

Svanehøj's service network reaches almost all corners of the world and ensures fast response when maintenance is needed.

Other aspects of Svanehøj Tank Control Systems solutions include instrumentation and control systems for:

- Pressurized liquefied gas.
- Underground LPG cavern storage.
- Offshore LNG storage.
- Gas carriers.



No other company can match our portfolio of products, systems and solutions in these areas. Whatever your needs, please don't hesitate to contact us.



Svanehøj France A/S
109 rue de Bitche
62100 Calais, France

Tel. +33 3 21 96 49 93
Tel. +33 3 53 32 98 00
svanehoj.com

New sales: tankcontrolsystems@svanehoj.com
Aftersales: aftersalesFR@svanehoj.com

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