

Curriculum Vitae

Personal details

Name: Sander Kaart
 Titles: dr. ir.
 Date of birth: 17th of January 1972 in Haarlem
 Marital Status: Married, 1 child
 Nationality: Dutch

Summary

Process Expert driven by optimization of production assets with a pragmatic, systematic and fundamental approach to problem solving and with a proven track record in design, start-up and stabilization of mega LNG projects.

Likes open communication and professional challenge, thrives in an environment of knowledge & expertise sharing and mutual learning.

Work Experience

JSC NOVATEK

March 2022 – Present

Head of LNG Operations Department (Technical Manager LNG Operations)

Leading a team of experts in Operations and Maintenance of LNG with the objective to harmonize best practices between operating assets in which Novatek is a major shareholder (Yamal LNG, Kryogas Vysotsk, Magnitorsk LNG), and development projects (ALNG2, ObLNG, ALNG1)

The following team leads report to the Head of LNG Operations

- Operations & Commissioning,
- Process Technology,
- Maintenance & Inspection,
- Rotating Equipment, and Small Scale LNG

August 2020 – March 2022

LNG Expert in LNG Project and Operations Department

Process expert responsible for capacity optimization of operating NOVATEK LNG plants and defining solutions to reduce the greenhouse gas emissions from operating LNG production facilities, including blue hydrogen manufacturing, gas-turbine conversion and application of waste-heat driven organic rankine cycles.

Definition and expert review of design solutions for prospective NOVATEK projects, including Obshiy Gas Chemical Complex and ALNG1.

Yamal LNG

In addition to LNG project development, also deeply involved in NOVATEKs Alternative Energy projects that have as objective to produce from Natural Gas, Energy Carriers with low-carbon emissions, like Hydrogen and Blue Ammonia and be ready for the next wave of international competition constrained by climate change.

July 2013 – August 2020

Chief Technologist Yamal LNG

Manager of Technical Services Department (TSD) of the LNG production complex. Definition of roles, responsibilities and structure of the permanent organization's TSD. Developed an initial team of 4 technologists to 36 people in two shifts and 5 teams each with their own specialization that support the various plant operation areas: Process Safety, Utilities & Storage and Loading, Inlet-Facilities and Gas treatment, Liquefaction and Fractionation, and Process Control. The TSD looks after process technical safety, process troubleshooting and optimization, process control and debottlenecking of an integrated production and liquefaction facility of 3 trains with an average annualized 5.5 MTPA capacity each.

Developed Start-up Logic and actively supported the start-up execution. Responsible for adjustment of process operations, control logic and trip response logic with the aim to achieve and exceed the basis of design reliability of 334 stream days (94,4%). Definition of and implementation of Advanced Process Control and legalization effort for the 120% peak capacity with the aim to further stabilize and improve daily production and reliability.

In 2021, the 3 trains produced over 19 MTPA with an availability > 98% and peak throughput of more than 120% of the initial design. This top-quartile performance is achieved thanks to the first in the world application of 2x50% C3MR and sophisticated trip-response control & automation.

January 2012 – July 2013

Process Technology Lead Yamal LNG Plant

Resident Engineer representing CLIENT in CONTRACTOR offices. Technical and operational assurance of FEED design via continuous design review process and application of lessons learnt. Identifying Specific CAPEX and availability improvements. Contributing to EPC contract definition regarding statement of requirements, definition of technical deliverable scope and future performance guarantees.

Development of economical model input and gas production profiles. General knowledge sharing of international LNG industry practices within organization new to the LNG business.

Shell UK	October 2011 – December 2011 Lead Process Engineer CNNS Maturation
	<p>Definition of the roles and responsibilities of a new team focusing on identification and initial scoping of debottlenecking ideas for the surface facilities of the Central Northern North Sea platforms and FPSO's</p>
Sakhalin Energy - Shell seconded	October 2008 – September 2011 Lead Technologist LNG Team Lead of 3 process technologists Technical Authority Process Engineering
	Start-up Development of initial start-up logic & cool down procedures. Panel-operator coaching during first start-up(s). General trouble shooting, revision operational philosophy & control schemes.
	Business Integration Technical input Business plan development & integrated production chain modeling. Input & Review in various compliance documents regarding production & flaring targets. Gas pipe-line hydrate and pressure management philosophy. Input to Shareholder Technical Committee
	Operational Support & Trouble Shooting Definition of Process Optimization Targets and daily support to the Operations Assistant & Panel Operators Review of procedures & operations manuals Incident investigation & RCA.
	Technology development Development & Implementation of process monitoring tools (e.g. refrigerant compressors and frame-7 gas turbine drivers) based on plant historian and interface with Unisim Design. MCHE performance analysis & debottlenecking. General process debottlenecking. Support to Advanced Process control implementation & model review and definition. Focal point for technical services provided by Shell Global Solutions. Development of plant changes to improve reliability and system integrity.

Shell Global Solutions **March 2004 to September 2008**
(Senior) Technologist LNG and Gas Processing

LNG Processing team

Rubix Scouting study,

G&P sponsored based on “Green and Large LNG train” designs in a Middle East context.

Process Integrator for Utilities (power generation), Gas treating and LNG process design.

NLNG7+ project:

Development release split-C3MR; Competition Linde & APCI as MCHE (Main Cryogenic Heat Exchanger) supplier

Support to dynamic model evaluation

Split propane compressor line-up development release, dynamic modelling of the SplitPropane-compressor controls and coordination of follow up study with process control group.

R&D team

Large LNG train development study (LNG15 paper)

Development of dynamical modeling skills within the LNG design department – case study for MCHE cool-down modeling for Sakhalin LNG

Development of structured approach to C3/MR process design optimization.

Witness MCHE (APCI replaced by Linde) test-run in BLNG to identify effect of pro-active plugging

Building in-house expertise of coil-wound heat exchanger modelling & design

**Shell Global
Solutions****September 2002 to February 2004
Reactor Technologist/CPO developer (Catalytic Partial Oxidation)**

Worked on various Shell Hydrogen sponsored projects in cooperation with a US based joint-venture between Shell and UTC called HydrogenSource

Automotive Program (50 kWe CPO based, gasoline fueled fuel processor)
Responsible for the design and prototype development and testing of an integrated fuel/air mixer, CPO reactor syntheses-gas water quench and WGS reactor.

Coordinated the selection and optimization of the syngas cooler in a trans-Atlantic team.

Model development of the start-up dynamics of the integrated fuel processor.

Stationary Program (150 kWe CPO based, natural gas based fuel processor)

Responsible for redesign, and experimental validation of the fuel/air mixer and syntheses gas quench cooler.

Guided day-to-day pilot plant tests of the CPO reactor.

Led root-cause analysis of the failure of the first reactor prototype and mechanical redesign to improve mechanical integrity of the reactor prototype.

Technology Program

Kinetic rate and catalyst-deactivation modeling based on bench scale experimental data.

Energy research Centre of the Netherlands (ECN)	April 2000 to August 2002 Reactor Technologist – Department of applied Catalysis and Hydrogen Technology Worked on various Shell Hydrogen sponsored projects to develop and test fuel-processing equipment at pilot plant scale. Seconded to Shell Global Solutions from December 2001- August 2002
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Courses

May 2007	Interpersonal Skills (Shell Learning – Lensbury Country Club)
April 2007	Safety in Process Design
April 2004	Campbell Gas Course
April 2003	Performance Through People (Shell Learning – Noordwijkerhout)
November 2001	VCA – Basic Safety certificate (Koninklijke PBNA)
March 2001	Project Management (Leeuwendaal Advies b.v)
November 2000	NIOK course “Advanced catalysis Engineering
1996/97	Systems, Signals and Stochastics; Control theory; Control theory – special topics (Delft University of Technology)
3-7 June 1996	OSPT-Course Process Dynamics and Control

Education
PhD Study**August 1995 – April 2000**Thesis defense date 17th of December 2002

Promoter Prof. ir. Van den Bleek and Prof. dr. ir. J.C. Schouten from the department of Chemical Reactor Engineering of the Delft University of Technology.

Research focused both on the theoretical development and practical application of control methods of the non-linear, chaotic dynamics of bubbling Gas/Solid fluidized beds

Applied techniques from linear control theory, such as model predictive control (MPC) and Kalman filtering, to non-linear, chaotic systems like a mechanical chaotic pendulum, and small-scale single orifice bubble column.

ICI Holland b.v.**September 1994 – December 1994**

Internship at ICI.

Identified sources and measured flows and composition of industrial household waste from the various process units at the Rozenburg site. To quantify potential ways of reducing the costs of waste disposal

Master of Science (ir) in Chemical Engineering**September 1990 – June 1995**

Delft University of Technology. Graduated Cum Laude and received “Best Student of the year” award from the University Specialization in Chemical Reactor Engineering

Languages
Dutch

Native Speaker

English

Fluent

Computer Skills
Process Simulation Tools

Hysys; Unisim; Pro/II; Mathcad; Jupiter/Python

Office Software

Microsoft Office, including Visio, VBA and basic knowledge of Access

Published Patent Applications

Kodde A J., Kaart S., Demmers A M., “Process for removing mercaptans from liquefied natural gas” US2010115993

Kaart S. “Method and Apparatus for liquefying a hydrocarbon stream” US2010071409

Kaart S., Kevenaar M A., “Method and Apparatus for cooling a hydrocarbon stream” US2010024474

Kaart S., Klein Nagelvoort R., Jager M.D., Chantant F., Van der Graaf J.M., “Method and Apparatus for producing a cooled hydrocarbon stream” US20090282862

Kaart S., “Methods and apparatuses for cooling and/or liquefying a hydrocarbon stream; method for accommodating a reduction of available driver power; and method of reducing a decrease in the production range of a cooled hydrocarbon stream” WO2009/050178

Kaart S., Jager M.D., “Method and apparatus for cooling a hydrocarbon stream” US20090241593

Kaart S., Chantant F., “Method and apparatus for controlling a refrigerant compressor and method for cooling a hydrocarbon stream” US20090188277

Kaart S., Klein Nagelvoort Robert, “Refrigerant Circuit – in particular for use in a liquefaction plant” US20080289360

Kaart S., Kodde A. J., “Refrigerant Circuit”, US20070204649

Kaart S., Klein Nagelvoort R., “Refrigerant Circuit”, WO2007068730

Kaart S., “Method for the Liquefaction of a hydrocarbon rich stream”, WO2006094969

Bracht M., Caanen M., Hendrie K. J, Kaart S., Van der Meer J., Ten Bosch B. I. M, “Compact Mixing Device for homogenisation of fluid flow”, EP1626804B1

Kaart S., “Quench for cooling syngas and apparatus containing a catalytic partial oxidation reactor and such quench”, WO2004103897

Papers

Christopher Ott, Igor Chasnyk, Sander Kaart, Christian Bladanet, Benoit Laflotte, Guillaume Le-Ridant, Benoit Delva, and Oriano Zucchi: “Yamal LNG: Meeting the Challenges of Natural Gas Liquefaction in the Arctic”, LNG Conference 2019, Shanghai China

René Verburg, Sander Kaart, Bert Benckhuijsen, Padraig Collins, Rob Klein Nagelvoort “Sakhalin Energy’s Initial Operating Experience From Simulation to Reality: Making the DMR Process work”, LNG 16 conference, Oran Algeria 2010

S. Kaart, P. Bosma, M. van Loon, R. Klein Nagelvoort, “Green, Novel and Large LNG Trains”, 6th Doha Conference on Natural gas, Qatar, October 2007.

S. Kaart, W.E. Elion, B. Pek, R Klein Nagelvoort, “A novel design for 10-12 mtpa LNG trains”, LNG 15 conference, Barcelona 2007.

S. Kaart, B. Pek, A. Omarali, P. Groeneweg, “MCHE Replacement ant Brunei LNG”, IPTC Conference, Doha November 2005.

S.Kaart, J.C. Schouten, C.M. van den Bleek, ‘Chaos control applied to the hydrodynamics of gas-solid fluidized bed reactors to improve chemical performance’, Fluidization IX, edited by L.S. Fan and T.M. Knowlton, Engineering Foundation, p621-628 (1998).

S.Kaart, J.C. Schouten, C.M. van den Bleek, ‘Improving conversion and selectivity of catalytic reactions in bubbling gas-solid fluidized bed reactors by control of the nonlinear bubble dynamics’, Proceedings of the Second International Symposium on Catalysis in Multiphase Reactors (Preprints). Toulouse France, (1998) pp. 237-246.

S.Kaart, J.C. Schouten, C.M. van den Bleek, ‘Improving conversion and selectivity of catalytic reactions in bubbling gas-solid fluidized bed reactors by control of the nonlinear bubble dynamics’, *Catalysis Today* **48** (1999) 185-194.

S.Kaart, J.C. Schouten, C.M. van den Bleek, ‘Synchronizing chaos in an experimental chaotic pendulum using methods from linear control theory’, *Physical Review E* **59** (1999) pp. 5303-5312.

T.H.J.J. van der Hagen, A.J.C. Stekelenburg, S. Kaart, J.C. Schouten,’ Investigations on start-up flow oscillations in natural circulation BWRs’, Proceedings of the 1996 National Heat Transfer Conference, Houston USA, (1996) Vol. 9 pp. 188-197.