

2019 CAN IN SPACE WORKSHOP

Radisson BLU Scandinavia
GOTHENBURG, SWEDEN
11TH -14TH JUNE 2019



WELCOME TO THE 2019 CAN IN SPACE WORKSHOP! Controller Area Network in Space

The 2019 CAN in Space Workshop will be held June 11-14, at the Radisson BLU Scandinavia, Gothenburg, Sweden. The workshop features a technical program of contributed papers describing the latest findings in embedded distributed systems and CAN networks with a special focus on microcontrollers. Invited speakers from academia, industry and space agencies will present.

The 2019 CAN in Space Workshop will feature 2.5 days of exhibits with numerous networking opportunities and a social program. Sponsorships are also available. Registration will include breaks, lunches, 2 receptions and a Gala Dinner.

The 2019 CAN in Space Workshop will be organized by ESA and Cobham Gaisler, Gothenburg, Sweden.

The 2019 CAN in Space Workshop will include presentations on CAN bus physical and protocol layers. With the arrival of QML qualified radiation tolerant CAN bus transceivers, CAN enabled space grade microcontrollers and flight-proven CAN IP cores, space communications engineers are now able to implement a CAN bus network for spacecraft on-board communications and controls of the same level of complexity as a terrestrial CAN-based embedded system.

A CAN bus system allows engineers to replace older, more complex wiring communications architectures with a CAN two-wire bus network. Reducing the number of wires and weight, along with lower power consumption and easier testability, will result in major cost savings for spacecraft manufacturers.

With your experience from the CAN in Space Workshop, you will walk away with the ability to integrate CAN and microcontrollers into your space systems along with learning about the latest products available.



WELCOME TO GOTHENBURG

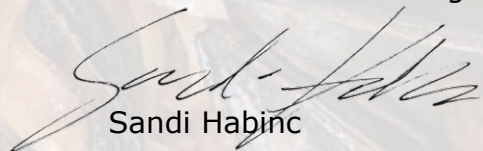
Welcome to the CAN in Space Workshop in Gothenburg, Sweden in 2019

The aim of the CAN in Space Workshop is to provide a biennial European forum for the presentation and discussion of the latest advances in the field of Controller Area Network (CAN) bus usage in systems for space, aeronautical and demanding terrestrial applications, as well as relevant methodologies for their characterization and qualification. The workshop features a technical program of contributed and invited presentation describing the latest observations in embedded distributed systems and CAN networks with a special focus on microcontrollers. The exhibit features several prominent contributors to the CAN bus infrastructure for space usage.

The CAN in Space Workshop 2019 is hosted by Cobham Gaisler together with Cobham Semiconductor & Space Solutions with the support of the European Space Agency.

Gothenburg is located in the heart of Scandinavia, easily accessible from around Europe. It is a city that has always been open to the world. Throughout our history we have embraced people and influences from outside, and through the ages the city has been developed with ideas and knowledge from around the world. International contacts, new influences and new people are, and always have been, our strengths. With a stunning archipelago on the doorstep of Gothenburg we assure you'll get a whole new conference experience.

Welcome to Gothenburg!



Sandi Habinc

General Chair

CAN in Space Workshop 2019



COBHAM

SOCIAL PROGRAMME

2019 CAN in Space Workshop

TUESDAY

JUNE 11

Welcome Reception and Exhibits Open 17:30 - 19:30

Spend time with your fellow participants and meet the exhibitors! Light refreshments will be served. Then enjoy the restaurants of Gothenburg.

2019
CAN
IN
SPACE
WORKSHOP



WEDNESDAY

JUNE 12

Lord Mayor Reception 17:30 - 19:00

Reception hosted by the City of Gothenburg at the Radisson BLU Scandinavia.

Enjoy refreshments offered by the City and the Lord Mayor of Gothenburg. Dinner on your own.

THURSDAY

JUNE 13

Gala Dinner 17:30 - 22:30

Meet in the Radisson Lobby for a 15 minute bus ride to the River Restaurant. The River Restaurant is situated on the water with beautiful views! The buses will take you back to the Radisson.



PROGRAMME

2019 CAN in Space Workshop

TUESDAY

JUNE 11



Welcome Reception & Registration Open 17:30 - 19:30

Radisson BLU Scandinavia,
Gothenburg, Sweden

*Spend time with your fellow participants!
Light refreshments will be served. Then enjoy the
restaurants of Gothenburg*

WEDNESDAY

JUNE 12

Registration open 7:30 - 8:30

Radisson BLU Scandinavia, Gothenburg, Sweden

Conference Opening 8:30 - 9:15

Chair: Gianluca Furano - ESA

Sandi Habinc - Cobham Gaisler
Gianluca Furano - European Space Agency

Invited Talk 9:15 - 10:00

**The Simple Oneweb Controller Area
Network (SOCAN) bus**
Mathieu Patte - Airbus Oneweb Satellites

Break 10:00 - 10:30

CAN APPLICATIONS IN SPACE INDUSTRY

Chair: Torbjörn Hult - Ruag

**A quick overview of use of
CAN bus at Airbus Defence and Space**
Jean Dalenq - Airbus Defence and Space

**Telemetries / telecommands handling
with CAN bus: practical applications**
Thierry van Humbeeck - Thales Alenia Space

**Equipment with CAN-TM/TC Interface for
Flexible Payloads on modern Telecom Satellites**
Jens Freese - Tesat Spacecom

**Triton-2: The ESAIL mission CANopen
high-performance platform**
Miroslav Brada - LuxSpace

Lunch 12:30 - 13:30

13:30 - 15:00

CAN HIGHER-LAYER PROTOCOLS

Chair: Oscar Mansilla - Renesas

Invited Talk

**Next CAN generation protocols including
higher-layer protocols such as CANopen FD**
Holger Zeltwanger - CiA - CAN in Automation

**CAN-TS protocol for memory constrained
embedded application**
Dejan Gačnik - Skylab

**Onboard processing of high rate sensor data
using CANopen protocol**
Pablo Ghiglino - Klepsydra

Break 15:00 - 15:30

15:30 - 17:00

CAN HIGHER-LAYER PROTOCOLS

Chair: Fredrik Johansson - Cobham Gaisler

CANopen library demonstration on SAMV71 MCU
Michał Mosdorf - N7 Space

**Proposed changes to the
ECSS-E-ST-50-15C standard**
Torbjörn Hult - RUAG Space Sweden

**Full verification of an ECSS-E-ST-50-15C
implementation based on an open-source CANopen
software stack**
Gianluca Furano - European Space Agency

- End of Sessions Wednesday -

Welcome to Gothenburg! 17:00 - 17:15

Lord Mayor of Gothenburg

Lord Mayor reception 17:15 - 19:00

Reception hosted by the City of Gothenburg
at the Radisson BLU Scandinavia

*Enjoy refreshments offered by the City and
the Lord Mayor of Gothenburg.*

PROGRAMME

2019 CAN in Space Workshop

THURSDAY

JUNE 13



Registration open 8:00 - 8:30
Radisson BLU Scandinavia, Gothenburg, Sweden

CAN APPLICATIONS 8:30 - 10:00

IN SPACE INDUSTRY
Chair: Sandi Habinc - Cobham Gaisler

Invited Talks

CAN-bus usage in High resolution Earth Observation missions
Ahmed Salem Belal - Mohammed Bin Rashid Space Centre

New Space era with Controller Area Network bus
Dejan Gacnik - SkyLab

CAN-bus usage in OHB satellites
Holger Michel - OHB System AG Bremen

Break 10:00 - 10:30

Invited Talks 10:30 - 12:30

Chair: Jean Dalenq - Airbus

The bird camera that flew to the Moon
Elsa Modin - Hasselblad Foundatio

CAN/CANopen implementation on small satellite platform
Alessandro Avanzi - SITAEL

Compact Reconfigurable Avionics – Reconfigurable Data Handling Core
Arne Samuelsson - Cobham Gaisler

Implementation of CAN-bus in high reliability LEON3FT platforms for low cost NewSpace systems
Stefan Strålsjö - AAC Microtec

Lunch 12:30 - 13:30

13:30 - 15:00

CAN IMPLEMENTATIONS

Chair: Alessandro Avanzi - Sitael

How to improve quality in the CAN physical layer
Kent Lennartsson - Kvaser

GRCANFD: CAN-FD controller with DMA engine and AHB or AXI interface
Joaquin España Navarro - Cobham Gaisler

CAN XL
Kent Lennartsson - Kvaser

Break 15:00 - 15:30

15:30 - 17:00

MICROCONTROLLERS WITH EMBEDDED CAN SUPPORT

Chair: Dejan Gacnik - SkyLabs

GR716 Microcontroller for Embedded Space Applications
Fredrik Johansson - Cobham Gaisler

Microchip ARM CAN Solutions for Space
Eric Tinlot - Microchip Technology Nantes

Microcontrollers with embedded CAN support
Armand Dilworth - Cobham Advanced Electronic Solutions

- End of Sessions Thursday -

Bus transfer at 17:30 17:30 - ..
Radisson BLU Scandinavia

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Gala Dinner
The River Restaurant

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PROGRAMME

2019 CAN in Space Workshop

FRIDAY
JUNE 14



Registration open **8:00 - 8:30**
Radisson BLU Scandinavia, Gothenburg, Sweden

8:30 - 10:00

CAN DEVICE DESIGN

Chair: Gianluca Furano - ESA

CAN-bus usage for small-satellite propulsion systems

Houssem Laroussi - ThrustMe

An Overview of Intersil CAN Transceivers and SET Performance of Intersil CAN Transceivers in a Two Node CAN Bus System

Allan Robinson - Renesas Electronics Corporation

CAN Bus based Constellation Interface Unit

Ari Aho - RUAG Space Finland

Break **10:00 - 10:30**

10:30 - 12:00

CAN SYSTEM DESIGN

Chair: Armand Dilworth - Cobham

Integrated Design Environment for CAN Networks in Space Applications – IDE4CAN

Sławomir Stankiewicz - AVL Software & Functions

TSIM3 - emulating the CAN interface of the GR716 microcontroller

Julius Barendt - Cobham Gaisler

Reliable Cable Network

Volodymyr Burkhay - Space IC

- The End of CAN in Space 2019 -

VENUE - CONFERENCE HOTEL



THE RADISSON BLU SCANDINAVIA HOTEL

Is the host hotel for the CAN in Space Workshop. All technical sessions, lunches and exhibits will be at the Radisson Blu. The hotel is within walking distance to many shops and restaurants and very close to the central train station and bus stop from the airport.

The rates will include breakfast, free WiFi and VAT. A fitness center is located next to the hotel for a fee.

The rate is 1645.00 SEK with rooms available from June 9-15, 2019.

The CAN in Space Room block ends May 8, 2019.

We encourage attendees to stay at the Radisson Blu Scandinavia Hotel.

Reserve your room now!

If you have any questions, you may contact us at conference@gaisler.com.

Radisson BLU Scandinavia Hotel

Södra Hamngatan 59

P.O. Box 288

S-401 24 Göteborg, Sweden

Tel: +46 31 758 5000



ROOMS

All rooms and suites were renovated in 2017-2018 and equipment like laptop-sized safe, smart TV, minibar, kettle, hairdryer, iron and ironing board are standard.

Take advantage of the daily Super Breakfast Buffet each morning and a mini bar in the evening. Free Wi-Fi is available throughout the hotel. Pets are unfortunately not allowed at the hotel.



SPA & YOGA STUDIO

As you walk down the stairs you are met by a pleasant tranquility. In the old historical parts of the hotel, you will find a unique environment with stone vaults and flowing water.

The story goes that here, among the old moat walls and casemates soldiers sat and waited for the Danish in the 17th century.

Welcome to another world
- a place where you can unwind.



BAR & RESTAURANT

Enjoy the flavors of Sweden by ordering fresh creations prepared by the hands of our expert chefs. The Bar & Bistro features soups, sides, desserts and savory entrees of meats and pastas. In March 2019 two new a la carte restaurants will open.

ROOM SERVICE:
Open 24 hours daily

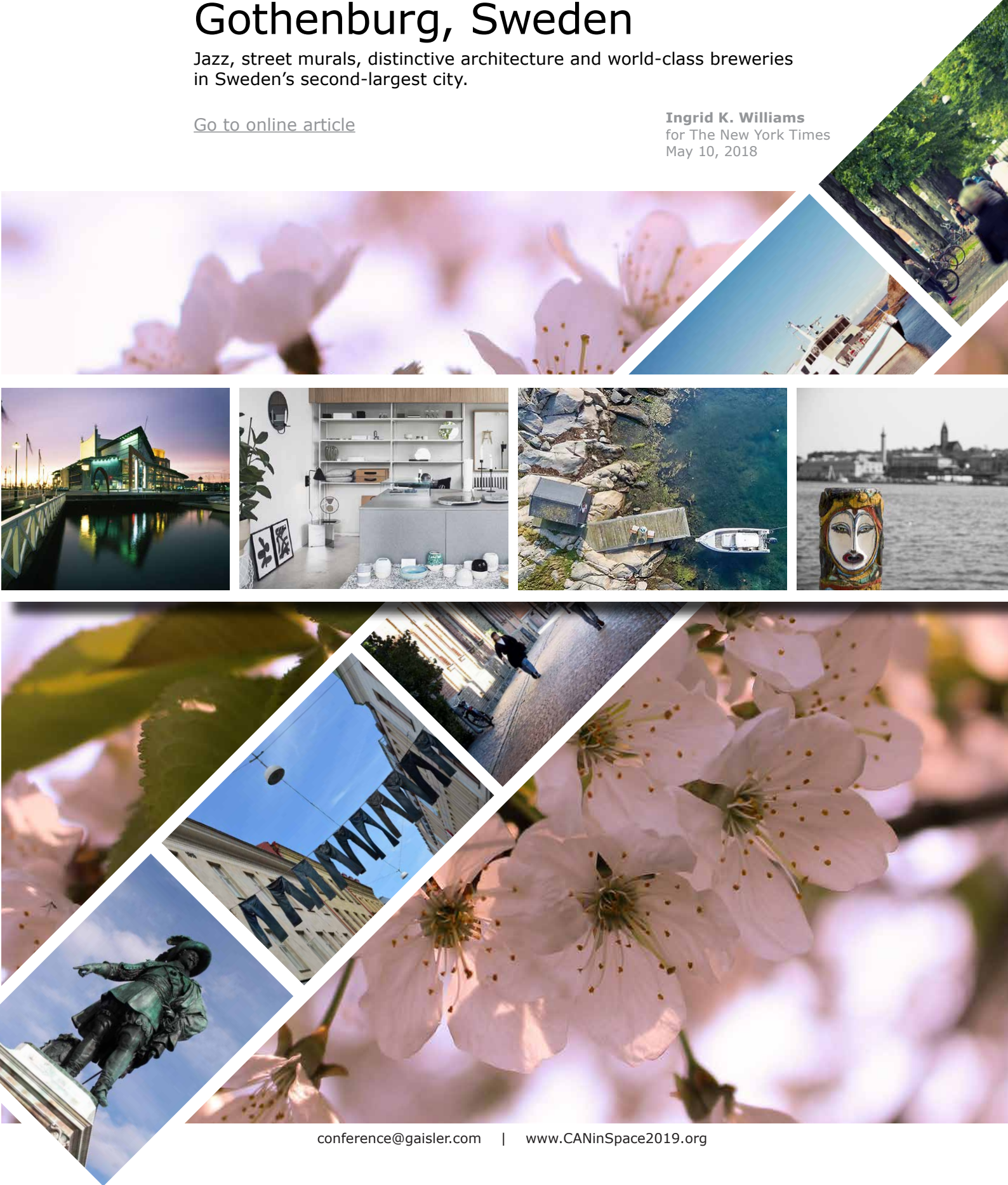
THE NEW YORK TIMES TRAVEL PORTRAIT▶

“36 Hours in Gothenburg, Sweden

Jazz, street murals, distinctive architecture and world-class breweries
in Sweden's second-largest city.

[Go to online article](#)

Ingrid K. Williams
for The New York Times
May 10, 2018



DISCOVER GOTHENBURG

On the following pages you will find suggestions for local activities during your stay in Gothenburg.
For more detailed information, please visit: www.goteborg.com

All information presented below has been retrieved from www.goteborg.com



GOTHENBURG (GÖTEBORG) is the second largest city in Sweden with a population of 550,000. Located on Sweden's west coast, it is on the doorsteps of a beautiful archipelago.

THE CULINARY CITY

Discover Gothenburg's amazing cafés, bars and restaurants.

World class restaurants, experimental food rebels, trendy bars and a rolling armada of food trucks – Gothenburg has it all. Book your trip, skip lunch and come hungry.

INTERNET & WIFI

There are several wifi hotspots around Gothenburg that gives you internet access.
<https://www.goteborg.com/en/good-to-know/internet-and-wifi/>



GOTHENBURG ARCHIPELAGO

From the city centre to the islands.

You'll reach the car-free southern islands by ferry from Stenpiren Travel Centre or the boat terminal Saltholmen. To get to the northern islands you take the ferry from Lilla Varholmen on Hisingen.



FESKEKÔRKA

A Mecca for seafood-lovers.

The fish market hall Feskekôrka, ('fish church' in Swedish) is an indoor fish and shellfish market where you can buy all kinds of seafood delicacies caught on the day.

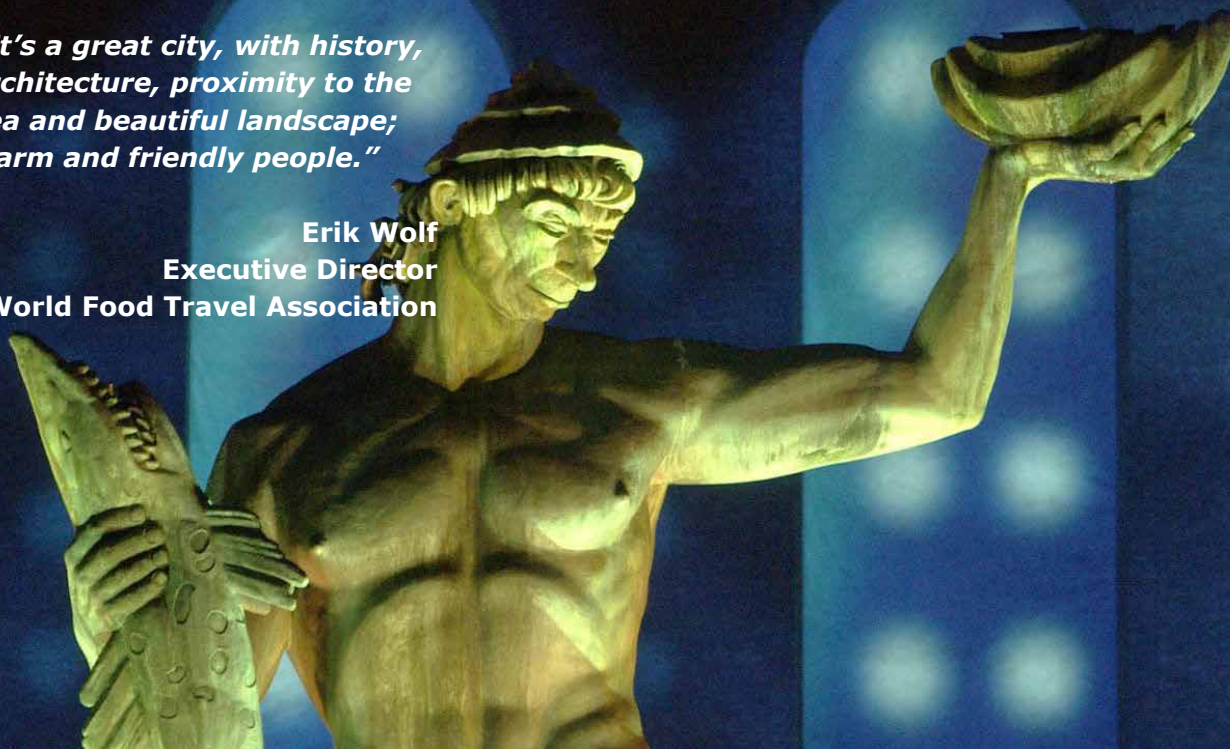


TAKE A WATERSIDE CITY TOUR ON THE PADDAN BOAT

This classic tour with a Paddan canal boat winds around the moat and canals of the city.

"It's a great city, with history, architecture, proximity to the sea and beautiful landscape; warm and friendly people."

Erik Wolf
Executive Director
World Food Travel Association



POSEIDON, THE SEA GOD, BY CARL MILLES

is one of Gothenburg's most famous landmarks situated at the top of the main boulevard Avenyn at the square Götaplatsen. The statue was inaugurated in September 1931.

THE SQUARE GÖTAPLATSEN

was constructed for the World Fair in Gothenburg in 1923 and a fountain was placed in the same location as Poseidon, before the statue was inaugurated nearly ten years later. The square is surrounded by beautiful buildings on three sides: **THE CONCERT HALL, THE CITY THEATRE AND GOTHENBURG MUSEUM OF ART.**

DISCOVER A WORLD OF DESIGN IN GOTHENBURG

Exciting design shops that will inspire you.

Gothenburg is a vibrant and creative city full of inspiring design shops. Here you will find everything from artisanal ceramics to iconic furniture pieces.



LISEBERG

Scandinavia's largest amusement park.

There is something for everyone at Liseberg, where you'll find the most fun in Scandinavia. Forty-one rides and attractions offer thrills, spills and laughter for kids and grown-ups.



TRÄDGÅRDSFÖRENINGEN

A beautiful garden located in the heart of the city.

The Garden Society of Gothenburg, Trädgårdsföreningen, is one of the best preserved 19th century parks in Europe. Here you can find thousands of roses, carpet beddings and lush woodlands. The palm house from 1878 houses exotic plants in a Mediterranean climate.



TAKE A 'FIKA BREAK' IN HAGA

This charming neighbourhood has a wonderful selection of cafés and small artisan shops. You might like to try a giant cinnamon bun on Haga Nygata.