



# TESTFORUM 2019

Tue-Wed, November 26<sup>th</sup> and 27<sup>th</sup>, 2019

**Sokos Hotel Viru, Tallinn, Estonia**

*A Nordic event for exchange of experience and know-how  
within the field of production test of electronics.*

*Meet colleagues and experts, gain knowledge about trends  
and best practices in the area of test of electronics.*



## **TestForum 2019 November 26<sup>th</sup> & 27<sup>th</sup> Tallinn, Estonia**

For test engineers in the electronics industry, TestForum is the yearly event, where access to best practices in test engineering, exchange of ideas, networking, alternative approaches and news from test conferences and workshops worldwide blend in a constructive and inspiring manner. TestForum 2019, this year in Tallinn, Estonia, is no exception. We have set up a balanced program, focusing on test strategies, test quality, structural test including JTAG testing, test automation, functional test, including fixturing and test interfaces and garnered with other mixed approaches in test engineering.

This year's Keynote talk will be given by Welix Klaas, Ericsson Eesti, and he will share with us the journey to intelligent manufacturing and augmented reality experienced by a major manufacturer like Ericsson. Welix Klaas has been an active participant on this road to progress, and will among other things highlight on gains and challenges.

At the end of the first day, we will have an interesting panel discussion on the topic: "Should a test remain stable through lifetime of a product – or adapt to realities?" Practices in test program development and maintenance are very different from company to company, and from business segment to business segment. We aim to have experienced panelist share with us, how they see optimum approaches in this vital part of test engineering.

Hence, I invite you to an interesting and inspiring event in practical test engineering. As usual in Test Forum events, networking is another important facet and during breaks and meals you will have great opportunities for technical and business discussions. The mini exhibition at TestForum offers yet another element of learning more about opportunities to improving your company's approach in quality engineering.

On behalf of the program committee, I am looking forward to seeing you at TestForum 2019 in Tallinn on November 26 and 27, 2019

Yours sincerely



Knut Båstoløkken  
Chairman of *Nordic Test Forum*

## Keynote Speaker

**Welix Klaas**

**IoT Program Manager, Ericsson Eesti AS**



Welix became more deeply involved with technology and engineering not until his Master studies in TalTech where he joined Formula Student Team Tallinn – a team of engineering students who design, build and compete with electric formula racing cars – and reached top 3 ranking in the world. Together with few team mates they founded a company to design and build battery packs for electric vehicles, which evolved into a global startup offering IoT solutions for bicycles, scooters and motorcycles.

Prior experience building up an IoT startup has brought Welix to develop intelligent manufacturing at Ericsson factory in Tallinn. As an IoT Program Manager he is engaged in multiple intelligent manufacturing projects: work environment monitoring sensors – an IoT project that was kickstarted at Ericsson internal hackathon; indoor precise localization that was initiated as an experimental project together with Ericsson Research; Private-LTE to replace Wi-Fi with indoor mobile network to wirelessly connect industrial equipment and devices; Augmented Reality for Troubleshooting – a tool that was created and developed in Ericsson Tallinn site to increase efficiency and improve collaboration for troubleshooting of Ericsson products; and fully automated manufacturing lines for final assembly and product testing.

## Nordic Test Forum in Brief

*TestForum* is an annual event that *Nordic Test Forum (NTF)* runs every fall/early winter. *TestForum* typically has 3-thematic areas and cover a broad balance of test and inspection.

*TestForum* has its roots back the late eighties, where it originated as an event for the Norwegian electronics industry. However, from the late part of 2001 a group of people from Norway, Sweden and Denmark established the network, *Nordic Test Forum*. Later on, this activity (including the *TestForum* event) was extended to include all the Nordic countries. The language of the official presentations is English. Content and focus of the *TestForum* varies over time, but always within topic areas in focus at a given point in time.

*TestForum* has its main emphasis on issues relevant to production managers, engineers and technicians working in the fields of production, test, inspection and validation of electronics. At *TestForum* events we offer technically relevant presentations on methodology, tools, modules/instruments and available technology. The interaction between users and suppliers within the focus areas is an important asset of *TestForum*, and this balance and interaction is pursued in presentations, panel discussions, and in the planning of the events.

### TestForum Aims at:

- Creating and sustaining a relevant, balanced and coherent interaction between users as well as between users and suppliers of solutions for test, inspection, validation and production of electronics.
- Providing an up-to-date view on new methodologies and tools for relevant test, inspection, validation and production of electronics.
- Establishing a relevant and balanced view on equipment, systems, tools and software from tool vendors in the domain.

### Target Audience of TestForum

Engineers and technicians, managers and planners within the fields of electronics production and test, inspection and validation. Includes also decision makers in organizations that procure equipment, tools and systems for production and test, inspection and validation of electronics.

### Executive Committee of TestForum event and NTF organization

Knut Båtstøløkken	Kitron AS, Norway (Chairman)
Birger Schneider	DELTA, Denmark (Treasurer)
Bjørn B Larsen	NTNU, Norway (Secretary)
Stig-Gunnar Jensen	Eltek AS, Norway
Mick Austin	JTAG Technologies, Finland
Artur Jutman	Testonica Lab, Estonia
Erik Larsson	Lund University, Sweden
Lars Kongsted-Jensen	EP-TeQ A/S, Denmark
Magnus Rönqvist	Syntronic Test Systems AB, Sweden
Mauri Aalto	Neste Engineering Solutions, Finland
Paulius Musteikis	UAB Kitron, Lithuania
Mattias Ericsson	AddQ, Sweden
Mats Klarholm	Columbia Elektronik, Sweden
Thomas Goetz	Keysight Technologies (associate member), Germany

## Become a Member of Nordic Test Forum

If you are involved in production test, validation test, and inspection of electronics and your professional work is related to activities in the Nordic countries as a test professional, design engineer, manufacturer, supplier of solutions, consultant, etc., you may register as member of Nordic Test Forum (NTF) in order to benefit from:

- Exchange of know-how in testing
- Increased contact network in the Nordic countries
- Surveillance and information of International activities in the area of test and inspection
- Discounts at NTF seminars and TestForum events
- Membership mailing list

Please register on the WEB page: <http://www.NordicTestForum.org>

## TestForum 2019 Local Organizer

The local organizer is:

**Artur Jutman**

Testonica Lab OÜ  
Akadeemia tee 15A,  
12618 Tallinn  
Estonia

Phone: +372 6202246

E-mail: [artur@testonica.com](mailto:artur@testonica.com)

## Technical Program of TestForum 2019

### Nordic Test Forum (NTF) Annual Assembly, November 25<sup>th</sup> 2019

The NTF organization holds an annual general assembly a day before the TestForum conference. This year it will be held on **November 25<sup>th</sup> at 20:00**. The agenda and motions will be dispatched to the members in a separate mailing.

### Tuesday, November 26<sup>th</sup>, 2019

Time	Titles	Speakers or additional info
08:30-08:50	Registration	
<b>08:50-09:00</b>	<b>Welcome / Introduction</b>	Knut Båtstøløkken
<b>09:00-10:00</b>	<b>Key Note Session</b>	<i>Chairman: Knut Båtstøløkken</i>
09:00-10:00	Ericsson Estonia Journey to Intelligent Manufacturing and Augmented Reality Troubleshooting	Welix Klaas, Ericsson Eesti AS
<b>10:00-10:30</b>	<b>Exhibitor Forum: short presentations</b>	<i>Chairman: Mick Austin</i>
10:30-11:00	Coffee Break / Exhibition	
<b>11:00-12:30</b>	<b>Session 1: Test Strategies, reliability, structural test</b>	<i>Chairman: Stig-Gunnar Jensen</i>
11:00-11:30	In search for the right way of production testing	Lauri Anttila, Planmeca Oy
11:30-12:00	Can NZT be used as tool to find Shorts?	Lothar Diez, SPEA
12:00-12:30	Mitigating JTAG as an Attack Surface	Reg Waller , ASSET Inter-Tech
12:30-13:30	Lunch	
<b>13:30-15:00</b>	<b>Session 2: Structural Test</b>	<i>Chairman: Mattias Ericsson</i>
13:30-14:00	New ICT technology	Frank Grossmann, ATEip
14:00-14:30	Total Solutions of TRI's Automated X-ray Inspection	Anthony Wang, TRI
14:30-15:00	Top test coverage will only be achieved in combination with AXI	Andreas Türk, GÖPEL electronic
15:00-15:30	Coffee Break / Exhibition	
<b>15:30-16:30</b>	<b>Session 3: Test Automation</b>	<i>Chairman: Magnus Rönqvist</i>
15:30-16:00	In-line RF Electronics Testing Challenges	Ramon Llavall, 6TL
16:00-16:30	Smart Electronic Factory – How Autonomous Intelligent Vehicles change it to a Smart CONNECTED Electronic Factory	Mr. Alfred Pammer, CTS, Germany
16:30-17:00	<b>News from conferences</b>	<i>Chairman: Artur Jutman</i>
17:00-17:30	Fruit & Refreshments / Exhibition	
<b>17:30-19:00</b>	<b>Panel debate:</b>	<i>Panel moderator: Birger Schneider</i>
	"Should a test remain stable through lifetime of a product – or adapt to realities?"	
<b>19:30</b>	<b>Dinner</b>	

## Wednesday, November 27<sup>th</sup>, 2019

Time	Titles	Speakers or additional info
<b>09:00-10:30</b>	<b>Session 4: Functional test, fixturing and test interfaces</b>	<i>Chairman: Mats Klarholm</i>
09:00-09:30	Simple DIY functional tester	Artur Jutman, Testonica Lab
09:30-10:00	Maximising Functional Test Fixture Performance by Eliminating Cables	Gary Clayton, MacPanel
10:00-10:30	Contact technologies for high reliable repetitive testing	Mads Haastrup, ODU
10:30-11:00	Coffee Break / Exhibition	
<b>11:00-12:30</b>	<b>Session 5: JTAG Based Test</b>	<i>Chairman: Paulius Musteikis</i>
11:00-11:30	Emulation based Boundary Scan tests	Jan Heiber, GÖPEL
11:30-12:00	Functional port for accessing on-chip instruments	Erik Larsson, Lund University
12:00-12:30	Case study –Testing a PCBA with BGAs using boundary scan and JFT	Lauri Anttila, Planmeca Oy
12:30-13:30	Lunch	
<b>13:30-15:00</b>	<b>Session 6: Mixed session</b>	<i>Chairman: Lars Kongsted-Jensen</i>
13:30-14:00	Thermal design and subsequent temperature stressing – a challenge for LED lighting and power electronics	Birger Schneider, Chamaj
14:00-14:30	Embedded FPGA-based Test for BGAs Power/Ground Solder Joints	Sergei Odintsov, TalTech
14:30-15:00	New Flashing methods	Samuele Stefanoni, SMH Technologies
15:00-15:10	Closing Session: TestForum concluding remarks	<i>Knut Båtstøløkken Kitron</i>

## Exhibition

As usually, a mini exhibition will take place in frames of TestForum event where vendors are welcome to present their tools and methodologies related to production test. Exhibitors can make arrangements with NTF about exhibition space. If nothing special has been agreed, a table of about 60x120 cm<sup>2</sup>, as well as space for posters or similar material will be provided. Every exhibitor will be given 7-8-minute slot in the program for a brief introduction.

## Registration and hotel booking

The **Conference Fee** is EUR 450 for NTF members, EUR 250 for students and EUR 525 for others. The fee includes participation, food and refreshments from Tuesday morning to Wednesday afternoon as well as forum proceedings on a USB memory stick. Exhibitors pay EUR 850, which also includes the participation of a single person.

The seminar fee will be invoiced directly to the organization, from which the participant comes. In the event of cancellation after the final registration date, or in the event of failure to appear, the entire fee is still due. On request, another person from the same organization can participate instead.

The hotel rooms are booked through the hotel directly on their website <https://www.sokoshotels.fi/en/tallinn> the room rate is paid directly by each participant to the hotel (i.e. not included in the seminar fee). **The room rate** is 99 EUR single room per night, including breakfast.

When making the booking on the Sokos hotels website use the booking code **B19TESTFOR** to receive the preferred rate at the hotel.

Booking of rooms at the conference hotel is **not** mandatory for participation at the seminar.

The **registration deadline is Monday 28th, October, 2019**, in order to **guarantee hotel room**. **Registration after this date is also possible**. However, we cannot guarantee that hotel rooms are available at the conference hotel.

Registration for TestForum 2019 can be done through the NTF website by using the following link.

- <http://www.NordicTestForum.org>

Alternatively, one can contact the TestForum secretariat at

Att.: Jytte Schneider  
Tel.: +45- 2579 1120  
Email: [jytte.schneider@nordicestforum.org](mailto:jytte.schneider@nordicestforum.org)

Please indicate, whether you register as:

- |  |         |
|--|---------|
| • NTF member   | EUR 450 |
| • A non-member   | EUR 525 |
| • A student (with valid student ID)                          | EUR 250 |
| • An exhibitor, i.e. want to exhibit in the small exhibition | EUR 850 |

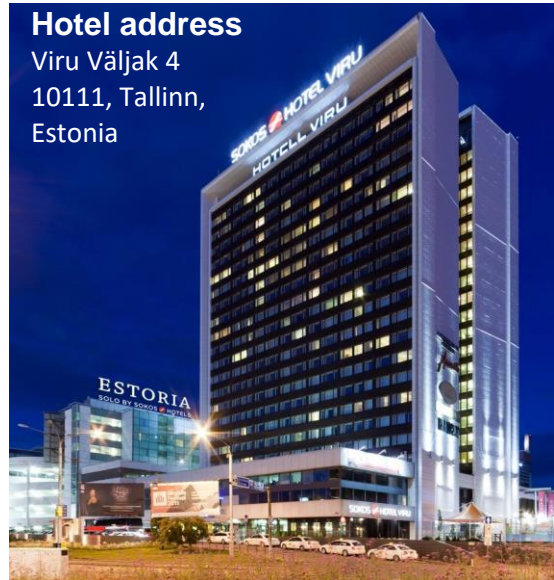


## Solo Sokos Hotel Estoria, Tallinn, Estonia

TestForum 2019 will take place at Solo Sokos Hotel Estoria, which is situated in downtown Tallinn just next to the **Old Town** a UNESCO World Heritage Site with distinctive cobblestone streets, cozy cafes, lively pubs, and gourmet restaurants.

The design hotel, **Solo Sokos Hotel Estoria**, is internationally renowned thanks to its individualized services and incredible Estonian stories. It uses masterpieces from the world's best Estonian designers, and these items have amazing shape, comfortability and smart solutions. In every hotel room, an interesting Estonian story is found: the world's longest wrestling match of 11 hours and 40 minutes or underwater chess, for example.

More details about the hotel is at:  
<https://www.sokoshotels.fi/en/tallinn/sokos-hotel-estoria>



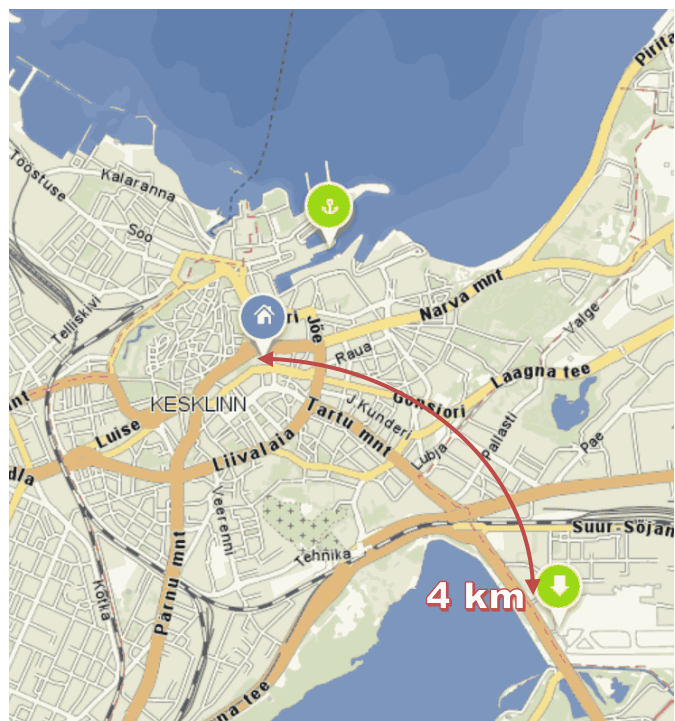
### Traveling to and from Tallinn

Tallinn is well accessible by plane, ferry, train, and bus. Below we summarize the most common ways to reach the city. However, for the most up to date travel hints and tourist information, see [Wikitravel](#).

#### By Plane

Tallinn Airport (TLL) is situated just 4 km away from Tallinn downtown and the NTF venue. The full list of connections and carriers together with the full timetable is available at the [Tallinn Airport's home page](#).

The most convenient way to travel from the airport to the downtown is a taxi where the normal fare is approximately 10 EUR. In many taxis you can use major credit cards (VISA, Eurocard/MasterCard) besides paying in cash.



The public bus no. 2 or tram no. 4 are budgetary alternatives to the taxi. The journey to the downtown takes 15-20 minutes. Single-ride tickets sold on internet (QR-ticket) cost 1€. The ticket sold by the driver costs 2€. More information about ticket types and purchase options is available [here](#).

### By Ferry

The Port of Tallinn is connected by sea routes to Stockholm, Helsinki and St. Petersburg. There is a dozen of journeys per day to/from Helsinki and one daily departure to/from Stockholm. The timetable can be found [here](#). The Passenger Port is located very close to the Old Town but probably not on a walking distance to the conference hotel. The best way to reach the conference location from the port is a taxi (3-4-minute ride). Public bus no. 2 can be also used.

### By Bus

There are bus connections to Baltic Countries, Poland, Germany, Russia, and other places in Europe. The Tallinn bus terminal is located just 1 km away from the conference venue.

### By Train

There is a railway connection from Tallinn to St. Petersburg and Moscow. For details [click here](#).

### Map of Tallinn downtown

Please note, that the conference dinner on November 26<sup>th</sup> will be held outside the conference hotel. We will visit a medieval restaurant Peppersack located next to the Town Hall square in the Old Town 500 m away from the conference hotel. All Test Forum participants are kindly requested to be in the hotel lobby at 19:20 where we will start our walk to the restaurant.

