

# NTF

**NORDIC TEST FORUM**

invites to

# TestForum 2013

*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.*

Tuesday and Wednesday, November 26<sup>th</sup> and 27<sup>th</sup>, 2013

**Swissôtel, Tallinn, Estonia**



## Test Forum 2013 November 26<sup>h</sup> & 27<sup>th</sup> Tallinn, Estonia

On behalf of the committee I'd like to invite you in Tallinn to the annual NTF conference. The 2013 edition of TestForum has an outstanding technical program. We invited key experts from all over the world to share the news and technological breakthroughs in their respective areas. Nearly half of the presentations will be given by speakers outside the Scandinavian and Nordic region. USA, Germany, France is a short list of speakers' geography. At the TestForum 2013 you will see many new faces in addition to your old fellows and friends.



Among the highlights of the Technical Program it is a pleasure to point out a few excellent speakers. **Al Crouch (USA)** will review the "**Differences between IEEE 1149.1-2013 and IEEE P1687**" in his keynote address. The latest testability standards open up an unprecedented flexibility in performing JTAG-based test execution. Mastering their full power is important in order to achieve test coverage limits as well as timing budgets.

**Erik Jan Marinissen (Belgium)** will show connections between board-level (PCBA) test and the 3D chip test in his invited tutorial "**From 2D Boards to 3D Chips: Test and DfT Challenges and Solutions**". We already see the first 3D chips on the market and need to be prepared to handle them properly during the board-level and product-level test.

**Lars Johansson (Sweden)** will discuss the benefits of synthetic test in his tutorial called "**Synthetic Test**".

Other presentations cover a range of important aspects of test domain, which find use in leading industries throughout the world. Besides the regular talks, we have organized an evening Panel Debate about the future of electronics test beyond year 2020. TestForum attendees will have a chance to challenge the invited experts with curious and controversial questions as well as share their own personal views on this exciting topic.

The technical and business discussions will continue during the conference dinner, which will be held in the heart of the Old Town, a UNESCO heritage site. A free drink will be offered to you back at the conference hotel in the cozy bar. Besides the technical program, you'll have a chance to enjoy the location itself. Below I'd like to cite a few hints from the local organizer Artur Jutman:

*"This year's NTF's TestForum conference takes place in the picturesque city of Tallinn, Estonia, where late November dresses the streets in a colorful Christmas costume. Make sure you stay an extra night after the conference if it is your first visit here. Walk the narrow cobblestone streets all the way to the Upper Town to see the deep black hole of the Baltic Sea and feel the warmth of the bright city streets beneath your feet. Then walk down to the Town Hall square and sip a glass of hot wine at the Christmas market."*

Every year, TestForum is an event for professionals, which is important to attend. Missing this opportunity means missing the forefront of the electronics industry's test technology.

On behalf of the committee, I wish to welcome you to TestForum 2013!

Yours sincerely



Knut Båstoløkken  
Chairman of Nordic Test Forum

## Key Note Speaker

### *Al Crouch*

Chief Technologist – Core Instruments  
ASSET InterTech, USA

Al Crouch has enjoyed a +25 year career in DFT, DFx, and Test Automation having worked for silicon companies such as TI, DEC, and Motorola; as well as test and debug startups DAFCA and Inovys. Al currently focuses on creating products to access and use Embedded Instruments with JTAG and IJTAG. Al is the Vice-Chair of the IEEE P1687 Standard's working group; is the Co-Chair for the iNEMI BIST working group; and is an active member of the P1838 3D Test Standard working group. Al has numerous publications, including a former bestselling industry text on DFT, and is a named inventor on more than 15 patents. Al is a senior member of the IEEE.



## Invited Speaker

### *Erik Jan Marinissen*

Principal Scientist  
IMEC, Belgium

Erik Jan Marinissen is responsible for the research on test and design-for-test of 3D-stacked ICs at IMEC. Previously, he worked at NXP Semiconductors and Philips Research, both in Eindhoven, the Netherlands. Marinissen holds a PDEng degree in Software Technology (1992), from TU Eindhoven. Marinissen's research interests include all topics in the domain of test and debug of micro-electronics. He is co-author of over 180 journal and conference papers and co-inventor on ten granted US and EP patent families. Marinissen is recipient of the ITC 2008 and ITC 2010 Most Significant Paper Awards and Best Paper Award at the IEEE International Board Test Workshop 2002. He served as Editor-in-Chief of IEEE Std 1500 and is Founder and Chair of the IEEE P1838 Working Group on 3D test access. Marinissen is a founder of workshops on 'Diagnostic Services in Network-on-Chips' (DSNOC), '3D Integration', and 'Testing of Three-Dimensional Stacked Integrated Circuits' (3D-TEST). Marinissen is a Fellow of IEEE and Golden Core Member of Computer Society.



## Tutorial

### *Lars Johansson*

Technical Director  
Syntronic Research and Development, Sweden

Lars Johansson has a degree in computer science and electrical engineering from Kungliga Tekniska Högskolan in Stockholm, Sweden. Lars has among others worked at Swedish Telecom Radio with TV and Radio broadcasting, klystron and high power tube transmitters. Later at Ericsson AB Lars developed RF-Measurement methods for mobile base station systems and at Ericsson's design center in Kista with RF-design for mobile base station transceivers. At Ericsson Research in USA Lars was team leader for an RF-Team who developed Ericsson's first CDMA and first 800MHz band GSM mobile phone. Since 2003 has Lars been at Syntronic as Technical Director and Senior Systems Engineer for RF and Microwave solutions, and also responsible for two Vinnova research projects, a software defined test platform "Synthetic Test for LTE" and a "Detector ASIC for Cognitive Radio".



## **Nordic Test Forum in Brief**

*Test Forum* is an annual event that *Nordic Test Forum (NTF)* runs every fall/early winter. NTF may also run thematic events during a year, but these are focused events addressing basically only one topic area, each in the area of test and inspection of electronics, whereas TestForum typically has 3-thematic areas and cover the broader balance of test and inspection as well.

*Test Forum* 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 Sweden, Norway and Denmark established the network, *Nordic Test Forum*. Later on, this activity (including the *Test Forum* event was extended to include all the Nordic countries. The language of the official presentations is English. Content and focus of the Test Forum varies over time, but always within topic areas in focus at a given point in time.

*Test Forum* 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 Test Forum 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 Test-Forum, and this balance and interaction is pursued in presentations, panel discussions, and in the planning of the events.

### **Test Forum 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 Test Forum**

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 Test Forum event and NTF organization**

Knut Båstoløkken	Kitron AS, Norway (Chairman)
Birger Schneider	DELTA, Denmark (Treasurer)
Bjørn B Larsen	NTNU, Norway
Stig-Gunnar Jensen	Eltek AS, Norway
Mick Austin	JTAG Technologies Finland, Finland
Artur Jutman	Tallinn University of Technology, Estonia
Erik Larsson	Lund University, Sweden
Lars Kongsted-Jensen	EP-TeQ A/S, Denmark
Magnus Rönqvist	Syntronic Test Systems AB, Sweden
Mauri Aalto	Teleste Corporation, Finland
Bill Eklow	Cisco Systems, USA (associate member)

## 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 Test Forum events
- Membership list

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

## Test Forum 2013 Local Organizer

The local organizer is:

**Artur Jutman**  
Tallinn University of Technology  
Dept. of Computer Engineering  
Akadeemia tee 15a,  
12618 Tallinn

Phone: +372 620 2246  
Fax: +372 620 2253  
E-mail: [artur@pld.ttu.ee](mailto:artur@pld.ttu.ee)

## Technical Program of Test Forum 2013

### Nordic Test Forum (NTF) Annual Assembly, November 25<sup>th</sup> 2013

The NTF organization holds an annual general assembly a day before the Test Forum 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>, 2013

Time	Titles	Speakers or additional info
8:30-9:00	Registration	
<b>9:00-9:15</b>	<b>Welcome/Introduction</b>	Knut Båtstøløkken
<b>9:15-10:15</b>	<b>Key Note Session</b>	<i>Chairman: Knut Båtstøløkken</i>
9:15-10:15	Differences between IEEE 1149.1-2013 and IEEE P1687	Al Crouch, ASSET InterTech (presented by Jennifer Dworak)
<b>10:15-10:45</b>	<b>Exhibitor Forum: short presentations</b>	<i>Chairman: Mick Austin</i>
10:45-11:15	Coffee Break / Exhibition	
<b>11:15-12:45</b>	<b>Session1: Test Strategies and Test Quality</b>	<i>Chairman: Birger Schneider</i>
11:15-12:15	Controlling test and manufacturing processes using WATS	Mads Dahl, Eltek Tom Andres Lomsdalen, Virinco
12:15-12:45	NI FlexRIO instruments for building innovative measurement systems for RF applications	Orbel Sevoyan, National Instruments
<b>12:45-13:45</b>	Lunch	
<b>14:00-15:30</b>	<b>Session 2: JTAG Based Test</b>	<i>Chairman: Artur Jutman</i>
14:00-14:30	Measuring passive components using IEEE1149.1	Marko Turpeenoja, BASS Solutions
14:30-15:00	Bit Error Rate Test (BERT) by FPGA Embedded Instruments	Thomas Wenzel, Göpel electronic
15:00-15:30	Interactive debug of CPU and peripheral hardware via 1149.1 Port	Marc van Houcke, JTAG Technologies
15:30-16:00	Coffee Break / Exhibition	
<b>16:00-17:00</b>	<b>Session 3: Functional Test</b>	<i>Chairman: Lars Kongsted-Jensen</i>
16:00-16:30	Test system HW design that lasts for ever	Linda Hellum, Kitron
16:30-17:00	Life cycle of testing	Jaakko Ala-Paavola, Espotel
17:00-17:30	Fruit & Refreshments / Exhibition	
<b>17:30-19:00</b>	<b>Panel debate: "What does Board Test look like in 5-10 years? Will Structural test be relevant?"</b>	<i>Panel moderator: Birger Schneider</i>
<b>19:30</b>	<b>Departure to the restaurant in the Old Town</b>	
20:00	Dinner in the restaurant Troika at the Town Hall square	
23:00	Social get-together in the Horisont Bar back at Swissôtel (one free drink is offered)	

Please note, that the conference dinner on November 26th will be held outside the conference hotel. We will visit a medieval restaurant Troika located in the Old Town 1.2 km away from Swissôtel. All Test Forum participants are kindly requested to be in the hotel lobby at 19:30 where we will start our walk to the restaurant. The evening will be finished in the Horisont Bar back at Swissôtel.

## Wednesday, November 27<sup>th</sup>, 2013

Time	Titles	Speakers or additional info
<b>9:00-10:30</b>	<b>Session 4: Test Strategies and Test Quality</b>	<i>Chairman: Mauri Aalto</i>
09:00-09:30	DfX & Test Coverage	Christophe Lotz, ASTER Technologies
09:30-10:00	COMPASS: The repair software and quality assurance software for all test systems	Lothar Diez, SPEA
10:00-10:30	VPC Mass Interconnect - Scalable Solutions	Werner Pinter, Virginia Panel
10:30-11:00	Coffee Break / Exhibition	
<b>11:00-13:00</b>	<b>Session 5: Invited speaker and tutorial</b>	<i>Chairman: Magnus Rönqvist</i>
11:00-12:00	From 2D Boards to 3D Chips: Test and DfT Challenges and Solutions	Erik Jan Marinissen, IMEC
12:00-13:00	Synthetic Test	Lars Johansson, Syntronic
13:00-14:00	Lunch	
<b>14:00-15:30</b>	<b>Session 6: Embedded instrumentation</b>	<i>Chairman: Erik Larsson</i>
14:00-14:30	Accessing embedded instruments through the life-cycle of a chip using P1687	Farrokh Ghani Zadegan, University of Linköping
14:30-15:00	Securing your system with P1687	Jennifer Lynn Dworak, Southern Methodist University
15:00-15:30	Board and SoC Test Instrumentation for Ageing and No Failure Found	Artur Jutman, Testonica Lab
15:30-15:45	Closing Session: concluding remarks	<i>Knut Båtstøløkken</i>

### Exhibition

As usually, a mini exhibition will take place in frames of Test Forum 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.

### Poster Sessions – Important information for presenters!

As a new activity, we this year institute a Poster Session. It consists of a poster board for each poster presentation, approximately 1,5 m wide x 0,75 m high. The intention is that presenters can put copies of their main slides up on the poster board wall right after a session ends. That will enable attendees and presenters to get into a more detailed discussion on specific issues of the presentation that may otherwise not be handled in the short Q&A interval after each presentation. Each presenter will have a poster board available. After the break, the poster boards need to be cleared to make room for poster for the following session.

The poster material itself can be as simple as simple A4 copies of essential slides, and possibly some additional info, and/or it can be more advanced printouts supporting the views of the previous presentation.

We hope that the poster session will contribute further to the exchange of concepts and ideas and lead to fruitful discussions, hence stimulate the general transfer of knowledge.

## Registration and hotel booking

The **Conference Fee** is EUR 390 for NTF members, EUR 195 for students and EUR 425 for others. The fee includes participation, food and refreshments from Tuesday morning to Wednesday afternoon as well as forum proceedings on the USB memory. Exhibitors pay EUR 750, 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 seminar registration, but the room rate is paid directly by each participant to the hotel (i.e. not included in the seminar fee). **The room rate** is EUR 110 single room and EUR 125 double room per night, including breakfast.

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

The **registration deadline is Wednesday 6<sup>th</sup>, November, 2013**, 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 2013 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.: Suzanne Holte  
Tel.: +45-2088 5972  
Email: [suzanne@nordicestforum.org](mailto:suzanne@nordicestforum.org)

Please indicate, whether you register as:

- |  |         |
|--|---------|
| • NTF member   | EUR 390 |
| • A non-member   | EUR 425 |
| • A student (with valid student ID)                          | EUR 195 |
| • An exhibitor, i.e. want to exhibit in the small exhibition | EUR 750 |

Please indicate whether you need a room at the conference hotel:

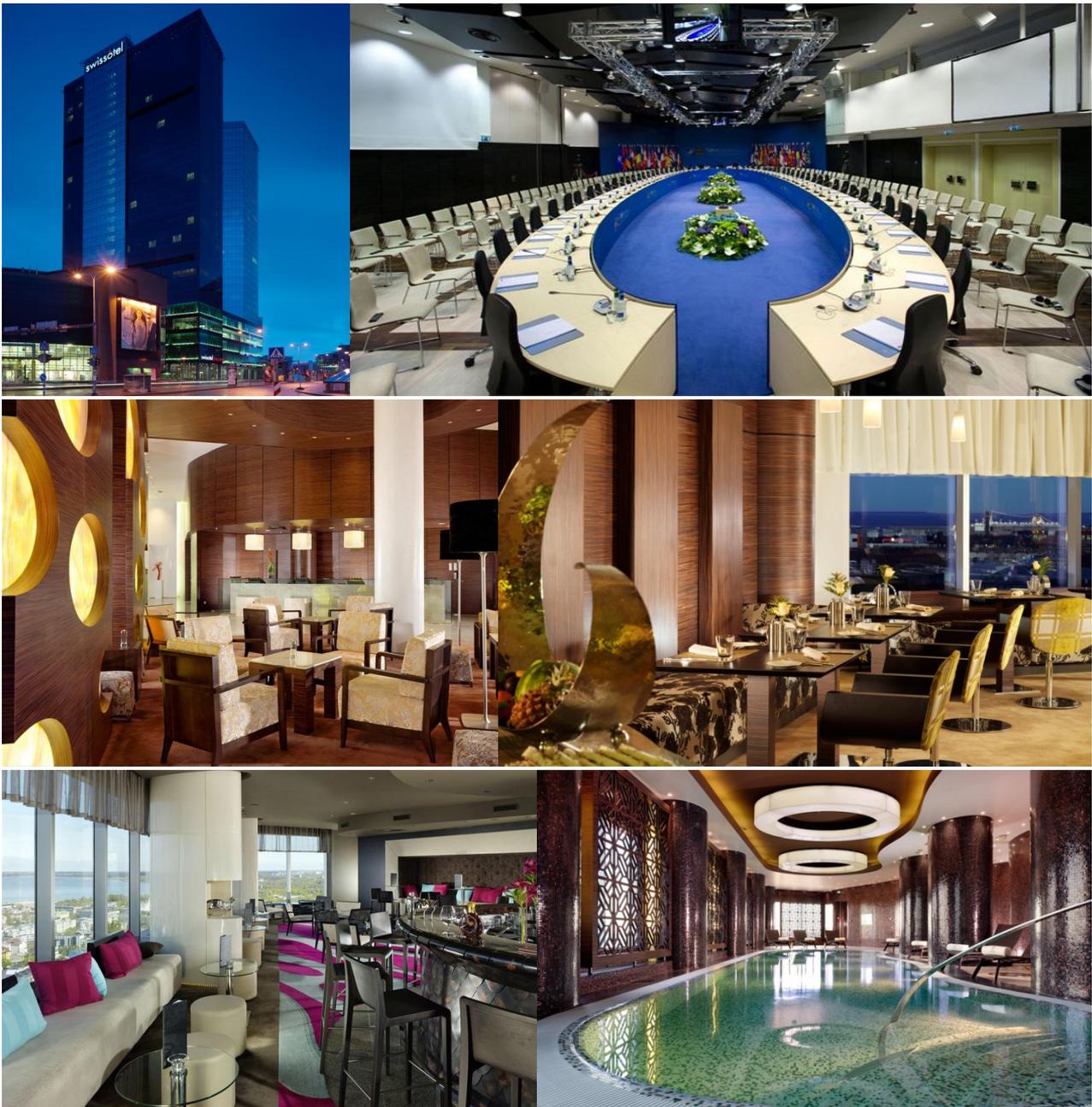
- Dates of arrival and departure
- Single or double room

## Swissôtel, Tallinn, Estonia

Nordic Test Forum 2013 will take place in 5-star Swissôtel Tallinn that is situated right in the heart of Tallinn's business center and within only a short stroll from the medieval old town a UNESCO World Heritage Site with distinctive cobblestone streets, cozy cafes, lively pubs, and gourmet restaurants.

Swissôtel Tallinn, the tallest building in the city, boasts impressive views of the old town and the Baltic Sea, while offering its guests a world of ease, 5-star luxury and Swiss hospitality. The hotel's Spa & Sport center offers a wide selection of treatments, from hydrotherapy to hot stone massages, providing a perfect retreat after a long conference day.

The location in the very heart of the city brings all possible adventures in Tallinn close together giving you the possibility to find yourself in the middle of the city life or enjoy its peace and quietness. The business area, tourist sights and museums, major attractions and theatres are easily accessible on foot. Tallinn's International Airport is only 10 minutes away by car.



## 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 is a budgetary alternative to the taxi. The journey to the downtown takes 15-25 minutes. Single-ride tickets sold by the driver in the bus cost EUR 1,60. There are also better ticket offers, including e.g. a 3-day city-wide ticket for EUR 5,00 valid on all public transportation routes (buss, tram, trolleybus). In the latter case, one needs to buy a special [Public Transport Card](#) in advance. 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 are about 20 journeys per day to/from Helsinki and one daily departure to/from Stockholm. The timetable can be found [here](#) and [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 (5-minute ride). Public bus no. 2 can be also used.

### By Helicopter

For those who enjoy alternative means of transportation, there is an exclusive helicopter connection between Tallinn and Helsinki. It takes only 18 minutes to travel between the passenger port of Helsinki and Tallinn downtown. Copterline's terminal is situated close to the Passenger Port. Detailed info is available at the [Copterline's website](#).

### 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](#).

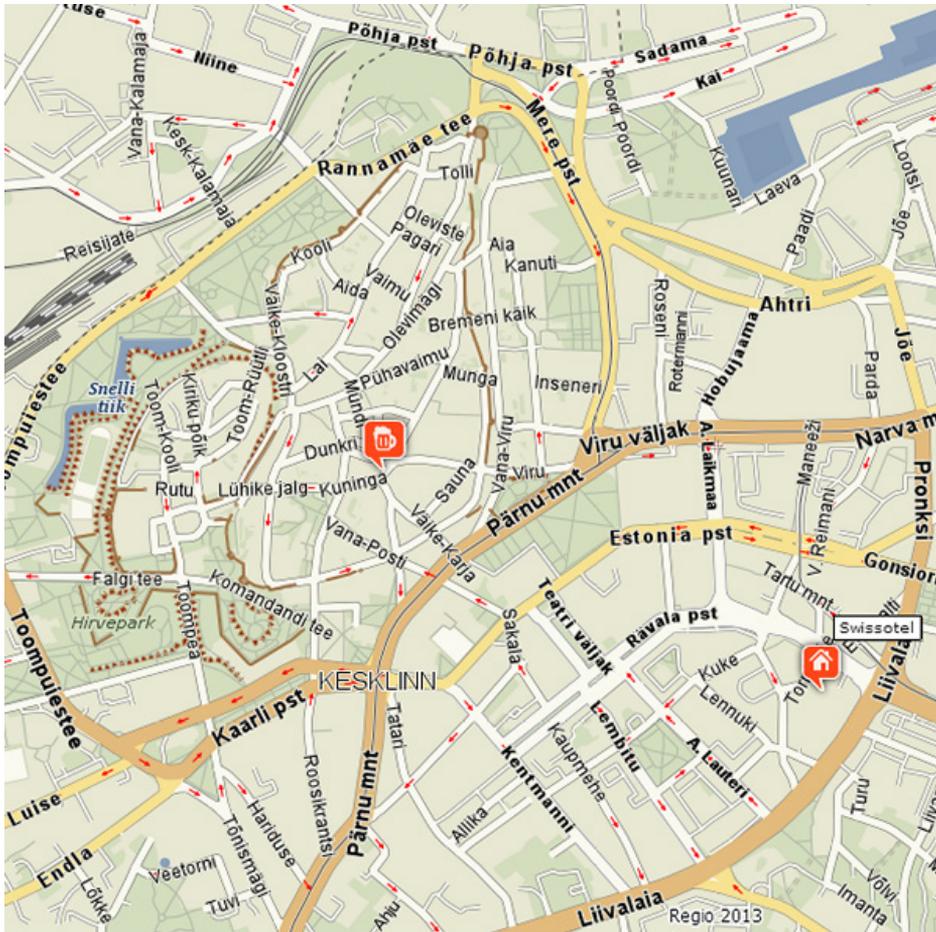
**Visa Info**

Estonia is a part of Schengen visa area. If you are not sure about visa regulations between your country and Estonia, [check the following page](#). Other useful consular information is available at the website of [Estonian Ministry of Foreign Affairs](#). The official currency of Estonia is EURO.

**Map of Tallinn downtown**

Test Forum 2013 will take place in Swissôtel that is situated right in the heart of Tallinn’s business center.

Please note, that the conference dinner on November 26th will be held outside the conference hotel. We will visit a medieval restaurant Troika located at the Town Hall square in the Old Town 1.2 km away from Swissôtel. All Test Forum participants are kindly requested to be in the hotel lobby at 19:30 where we will start our walk to the restaurant. The evening will be finished in the Horisont Bar back at Swissôtel.



# Welcome to TestForum 2013

