WHAT IS A HTHT MINOR?
A HTHT-minor fits within the UT profile: High Tech, Human Touch. The minor is offered in English and accessible for both national and international students. The goal of the HTHT-minor is to illuminate specific societal themes for which the UT develops High Tech Human Touch solutions. These solutions are created by conducting high-quality research. Both the form and the content of the minors are High Tech Human Touch (multidisciplinary) and are profiling for the student.

The UT offers most HTHT-minors in a coherent package of 2 (30 EC). There are also HTHT minors of 15 EC that do not belong to a package. You can choose one of these minors and combine this with one minor of a package. If possible, you can even choose 2 minors from different packages.

MINOR INFORMATION
How do we maintain cities in nearby future? And, how can we guarantee reliable critical infrastructures for a growing urban population? Existing infrastructures such as streets & utility networks are currently ageing. This creates major reconstruction and maintenance peaks and challenges myriads of infrastructure owners and directors of public space to construct (subsurface) assets without interfering or disturbing inner city traffic streams around houses, shops and businesses.

The Smart Ways to Get Smart Cities Smarter-module (1) introduces you to Civil Engineering & its challenges in urban space; (2) learns about state-of-the-art technologies that can be used to streamline urban construction projects, and (3) provides hand-on experience during an industry-based city-engineering design project.

Themes and disciplines covered: civil engineering, construction automation, robotics & sensors, geophysics & GIS.
The 2016/2017 module will consist of two blocks: **Block 1** provides an introduction to construction management and engineering in smart city environments. Students explore, discuss and critically reflect on the Smart City concept. **Block 2** comprises of hands on learning and design. Students get in touch with industry and conduct hands-on experiments with new technologies, tools and methods for non-invasive inner city engineering. The content of the blocks is explained below.

**Block 1: Introduction to Smart City Construction**
This (two to three week) block focuses on construction in smart cities. During these weeks, knowledge about the basics of civil engineering and construction processes is obtained. Students learn about demographic developments, and the influence of embedded systems/technologies on construction industry. A mini-market will be organized to present real-life inner-city engineering problems. These projects are, for example: Smarter Pipe Moling, 2D/3D Subsurface Scanning, Sensors in City Subsurface, Smart Soil Brushing, Modelling pedestrian behaviour during Events, Traffic Detour Management, and European Traffic Management in Smart Cities. During this market session, students meet practitioners, learn about their challenges and problems, and are allocated to a project.

**Block 2: Design project Smart City Construction**
The remainder of the module is devoted to understanding, applying and improving the state-of-the-art technologies for Smart Construction in Cities. After writing an action plan, students start designing an improved method or tool for inner city engineering. In parallel, students attend lectures to gain more knowledge about, for example: 1) smart traffic engineering, (2) sensors, robotics, and rapid prototyping (3) GIS, geophysics & site investigation (4) construction automation, and (5) systems engineering.

Based on the acquired knowledge, students use our campus to develop prototypes, experiment, test, verify and validate their design. These activities will be supervised by both a professor and practitioner. At the end, the groups deliver a report and present this during a mini-symposium.

**Grading and assessment (subject to change; see OSIRIS):**
- **Block 1:** proposals (sufficient); written assignment (30%)
- **Block 2:** homework exercises (sufficient); consultancy report (60%); mini-symposium presentation (5%); individual reflection (5%)

Future's cities need streamlined, non-invasive city engineering processes

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For more information about this minor and for general information about minors:
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