



At the Mobile World Congress (MWC) 19 in Barcelona the Forkbeard stand was visited by the Norwegian Minister of Digitalization, Nikolai Astrup (middle), greeted by Forkbeard's CEO Wilfred Boijj (left) and Terje "Terry" Aasen Senior Vice President of Forkbeard (right).

**EKSTRA**

## FORKBEARD INDOOR NAVIGATION

**Indoor navigation should be able to tell you exactly where in the store you'll find the spaghetti.**

**Norwegian company wants to create a global standard for indoor navigation.**



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**ORIGINALLY PUBLISHED IN TEKNISK UKEBLAD 3. MARS 2019 - 14:50  
(TRANSLATED FROM NORWEGIAN TO ENGLISH WITH PERMISSION FROM AUTHOR)**

Norwegian Sonitor has obtained a unique position within its indoor positioning technology. Several have tried to compete with them, but none of them have done it with audio signals. The competitors mostly use radio frequency signals. In some cases, it works fine, but radio frequency based technologies have a significant disadvantage; These signals pass through walls, windows and floors, and then it isn't easy to pinpoint your location inside a specific room. Suddenly you can be notified that the tracked object is in another room or floor.



Foto: Odd R. Valmøt

Forkbeard is the English name of the son of the Danish Viking king known as Bluetooth, which became the name for a now ubiquitous short-range radio frequency communication technology. While Forkbeard succeeded his father, the company has no plans to follow that. They mean the two technologies complement each other.

**"It might seem a strange name for a company, but Svend Tveskæg, Forkbeard in English, was the son of Harald Btátann, Bluetooth in English, who succeeded his father," says Forkbeard-chief Wilfred Booij.**

Sonitor has achieved a significant position in the healthcare facility sector, especially in the United States, where finding and tracking people and medical equipment represents a big need. In the USA they have been fighting in court for patent rights.

During the Mobile World Congress 19 in Barcelona in late February, the company presented their technology from the new spun out subsidiary, Forkbeard Technologies AS.

## **Better positioning**

Forkbeard's technology isn't going to replace Bluetooth, but cooperate with it. The Bluetooth technology alone cannot offer particularly accurate positioning, so it will be a supplement for the much more accurate Forkbeard ultrasound positioning.

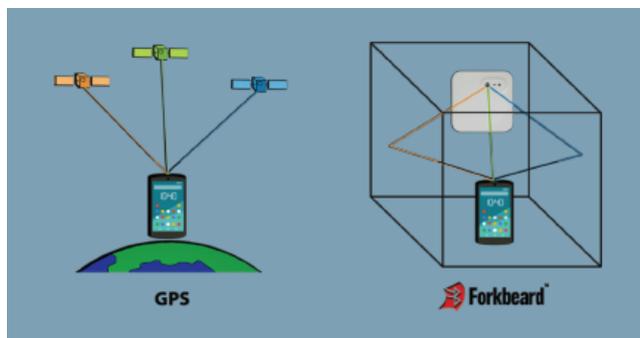
The point is to enable smartphone or other smart device positioning. Then you are able to know where people are, and the users can orient themselves with high accuracy. To equip any Android or iOS smart phone with such capabilities, all you need is to download the Forkbeard positioning software in an app. The smartphone already has Bluetooth, and the onboard smartphone microphone and processors are good enough to detect and process the ultrasound signals emitted while indoors.

"We have made a small combined radio- and ultrasound beacon that can be mounted on the wall or in the ceiling of a room, which we call ultraBeacon. This device transmits a unique ultrasound signal every second and also signals via Bluetooth in addition to communicating with a router to the Forkbeard cloud software. This is an inexpensive device, and it runs on standard batteries. Four AA-batteries will last for at least 5 years", says Booij.

## Very Difficult

According to the textbook, what Forkbeard have done should not be possible, but then again the book might be wrong:

The microphones in a cell phone aren't sensitive enough to pick up weak sounds in the regular ultrasound register. That is why they use audio signaling right above 20khz, just above what a human can hear, but that a smartphone can. The ultrasound beacon also has a transducer which can produce audio at 40khz for future usage, but not for smartphones.



"In addition to the long battery life, this device is self-configuring. When you hang it on the wall or underneath the ceiling, it measures up the room using ultrasound, so it is effortless to use. That is something that nobody else does. The two transducers are piezoelectric and work as both speakers and microphones", he says

## Echo challenge

Echo from surfaces is a problem for electric and acoustic systems,

"Competitors using radio-based navigation must use complex algorithms to suppress reflections. We can receive both 10 and 20 audio reflections from surfaces inside a room, and we use them to increase the location precision", says Booiij.

## Huge market

**He believes the technology has the potential to increase efficiency in hospitals, retail stores as well as other markets. They can tell customers in the store where the specific merchandise are located with high accuracy when they navigate with an indoor map on their smartphone. Just like GPS navigation outdoors.**

In modern, large retail stores it isn't easy to find what you are looking for, and there is rarely someone around to ask. In the future you can ask your smartphone instead; where is the crisp bread or the spaghetti? And at hospitals; where is the x-ray ward or my doctor's office?



*The ultrasound beacon placed in a room, transmitting audio signals to smartphones just above the limit of what a human can hear, is very inexpensive. The wall or ceiling mounted beacon also runs for 5 years on regular AA batteries, which is very important for the users.*

Foto: Odd R. Valmot

"We are much more indoors than outdoors. With the Forkbeard technology platform we create the foundation for much innovation among our solution and licensing partners. We can do something, but there are great opportunities for others to develop solutions", says Booij.

### **New business model**

If you are comparing how the Forkbeard technology works with something else, they resemble how GPS helps navigation outdoors, but Forkbeard is doing the same indoors with a net of indoor GPS satellites. But unlike GPS, which the USA pays for and others can use, Forkbeard wants to charge for its services in the cloud. The functionality will be delivered as a software development kit to app developers, and will probably be free for consumers. When the traffic gets going, it will be routed from the transducers via the Forkbeard cloud, and here they can apply some form of payment model."We can actually distribute both products and software, and transact payments in the cloud," Booij says.

### **Protected**

With the experiences Sonitor has gained from the American market, and with challengers who want a share of the market, they made sure to protect their technology thoroughly. Last year they submitted 16 patent applications, and they are preparing several more.

## Market entry

The technology they showed at the Mobile World Congress 19 in Barcelona was launched late last year, and limited deliveries are starting late this year. The plan is that next year everyone who wants will get access to the products.

"We approach both the consumer and the professional smartphones' market. By locating devices used to scan merchandise in stores and in warehouses, we can add precise positioning data. It provides value-added information in such processes. The retail business gets to know where the customers are and can analyze location against what they purchase. In Norway, there is a debate on whether it should be possible to have cell phones in classrooms. We can detect a student's smartphone presence in the classroom, and certain undesirable and distracting apps can be automatically blocked when the student is inside the classroom, and then unblock them when the student exits. Theoretically, we can also block certain apps when a smartphone is in the driver's seat position while driving a car", says Terje "Terry" Aasen who leads business development- and alliances at Forkbeard Technologies. He has also been leading the establishment of Sonitor in the United States, where the company has almost 90 percent of its market.

The reception is excellent when he visits the American companies and present the Forkbeard value proposition. They understand how important it is that ultrasound signals are stopped when they literally meet the wall, and they often tell him that the Forkbeard technology sounds like the holy grail of indoor positioning technology performance.



*Visitors cewing up to see the Forkbeard technology demonstrated at MWC19 in Barcelona*

He does not want to disclose who they talk to, other than that they are in touch with both huge and smaller organizations. If we were to guess who might be interested, it is easy to think of Google, Apple or Microsoft. This offers the potential to extend their maps to indoor use and create a new huge market.

**"This can become much greater than Sonitor, and it can happen quickly", says Boij**