

The assistant in your ear

In conversation with
Nikolaj Hviid,
CEO at Bragi,
the inventor of the
world's first
in-ear computer

The Dash
The Dash (retail price €299.00) is a contextual computer, and the world's first fully wireless hearable. The smart earplugs provide complete freedom of movement, maximum comfort and impressive sound, as well as measuring data including speed, step rate, distance, time, heart rate, oxygen saturation and calorie consumption. Voice output keeps users constantly updated – even with no smartphone connected.

The offices of start-up company Bragi in the centre of Munich are a hive of activity, with company representatives from Asia, staff and suppliers constantly coming and going. But Nikolaj Hviid, CEO and founder of Bragi, is quite relaxed. The development work on his product “The Dash” is basically complete; the first 12,000 units (as of February 2016) have been shipped. Hviid really seems to have hit a nerve with his discreet in-ear assistant. It was almost two years ago that Bragi completed what is to date the most successful Kickstarter crowd-funding project in Europe. Since then, the promising start-up has grown into a market-moving driver of innovative technology. Designer Hviid risked a fair bit in realising his vision of an in-ear computer. He was so convinced about his idea, in fact, that he sold his shares in the design agency he had co-founded – the biggest in Europe incidentally – and invested his money in The Dash. For him, it was not about the electronics, or a desire to create a piece of wearable tech. Rather, the Dane sees himself as someone who helps solve society's problems. He has often realised his visions with technology and design – Bragi is the sixth business he has founded. “Starting a business is a roller-coaster on steroids”, Hviid asserts. But he seems to be enjoying the ride ...

The Quintessence: How do you go from being a designer to the head of an electronics start-up?

Nikolaj Hviid: In Germany, design is seen as something artistic. But in Denmark, where I come from, it is regarded as a means to solve societal or entrepreneurial problems. And that is just what I have done. I did not necessarily want to establish an electronics business. But I wanted to solve a problem for society: to develop a discreet computer capable of assisting people. And I could only create it if I also developed the electronics for it. So I had no alternative but to establish an electronics company.

T.Q.: How did you get the idea for The Dash?

N.H.: The basic idea was to create an assistant that would help people. But for that to work, it has to be discreet – that is to say, assisting users without distracting them from the world around them, or from what they are currently doing. So any kind of display screen would be out of the question, for example. But hearing is different; it is a parallel, discreet interface. I hear everything around me, but can still distinguish everything that is going on, and carry on doing what I am doing. So my first idea was that I had to do something through the sense of hearing. ➔



The second idea was that the assistant also has to understand where I am, what I'm doing, and how I'm reacting to it. Otherwise it won't be able to help me. So sensors have to be built-in to the device that detect the surrounding environment and are capable of measuring my reactions. With that information, the device is able to understand what I as a person am doing, and help me do it. That is what is known as a "contextual computer".

The next step: since motion on a cable would interfere with the sensor data, it has to work wirelessly. So the outcome is a device that sits in the ear, has lots of sensors, and needs no wires – The Dash.

T.Q.: What specific applications did you have in mind?

N.H.: Well, if I just wanted to sell a contextual computer in an electronics store I wouldn't have a lot of success. I needed to specify applications with benefits that buyers would immediately understand. We all like listening to music, so one of our primary applications is a music player. The second primary application is that the device can be used as a headset. And thirdly, we positioned it as a fitness device. But the idea underlying it is still a contextual computer that will help me.

T.Q.: What might you imagine as "secondary" applications?

N.H.: There are innumerable possibilities: I might use The Dash to control a wheelchair by moving my head; it might monitor fire-fighters and help them communicate while on operations; or it could automatically send an emergency call if the wearer suffers a stroke, for example.

T.Q.: Are you looking to develop those applications within your business?

N.H.: No, we see ourselves as a platform provider. As a manufacturer of in-ear computers, or "audible computing".

T.Q.: Are there already companies looking to create apps for The Dash?

N.H.: Absolutely. In fact, there are even too many of them already. We have had almost 7,000 developers contact us with a view to creating something for our product.

T.Q.: What role is your crowd-funding campaign playing in realising The Dash?

N.H.: What I find great about crowd-funding is that it is not some single financial investor who decides whether my idea is good or bad, but hundreds of thousands of people. And almost 16,000 people liked our project so much that they paid money into it.

T.Q.: What do you think motivates the funders?

N.H.: People are not doing it because they like me, or because they absolutely want or need the product. Most are keen to track the project's progress. They want to share in what we are doing, and accompany us on our journey to the finished product.

T.Q.: Crowd-funders have invested more than 3.3 million US dollars in your project. Is that enough to build a new business?

N.H.: To be quite honest, crowd-funding is not primarily about procuring money, because ultimately not a lot of it is left over. Firstly, you have to deduct 10 per cent in fees for Kickstarter and Amazon Payment. Then the crowd-funders get the product at a discount, so after deducting the production costs, there's not much profit. We also have to pay for the manufacturing plant and equipment. We paid twice as much as was left over for the injection-moulding tools alone. And then there's certification – because we want to sell all over the world of course – and the shipping costs. So what remains from the Kickstarter funding is just a tiny portion of the money we actually need. So Kickstarter for me is not a financing platform. It's a PR platform.

T.Q.: So are you looking for more investors?

N.H.: No, we already have fantastic investors on board who are supporting us and helping us through their networking. Last year, we received 20 million euros in investment funding. By German standards, that is an awful lot.

T.Q.: Is Munich such an investment-friendly region?

N.H.: No, not really. Munich investors tend to be happy to invest in real estate – as is typical throughout Germany. Instead of creating jobs for their children and grandchildren, they prefer to invest in housing for them. In my view, the mentality that drove Germany's post-war boom during the 1950s has been rather lost. When I get old and look back, I want to be able to say: I provided people with a place to work in a company they really like, where they have opportunities to learn a lot. I don't want to be saying at the end of my life: I have lots of buildings. That would be terrible for me. In fact, I rent where I live. I don't own a single property.

T.Q.: A device such as The Dash incorporates know-how from a wide variety of different technical fields. How do you go about getting experts from the different disciplines to all work together?

N.H.: We have a holocratic corporate structure. That means we have no silos where different skills are isolated from each other; we create cross-functional projects. Each project includes a designer, a programmer and a hardware developer. People join a project and are taken out of it again depending on the stage it is at. The designers follow the project through to its conclusion, and the software people are on board right from the beginning.

T.Q.: What hurdles did you have to overcome in technology terms?

N.H.: There were several. Firstly, we had to make the product using the smallest components possible. It would have

been easier with a custom-made chip, but that would have been too expensive, and would not have provided us with enough flexibility to make any necessary modifications. So we use discreet components that already exist. We currently have 27 sensors in The Dash – the integration density is unbelievable. When we started, most experts said it wouldn't be feasible based on the existing state of the art ...

The device incorporates a total of five world-firsts that did not previously exist in the same size and complexity. For example, we have integrated a fingernail-sized pulse oximeter – a monitoring function previously only provided by big stationary units in hospitals. Communication between the two earplugs is facilitated through manipulation of the magnetic field, enabling us to transmit music and data at high quality levels.

All in all, we have achieved an extremely high integration density, with around 90 electronic components in each plug. We have 11 different layers, each with a maximum tolerance of 0.01 millimetres. It's a real challenge for us in terms of production engineering.

T.Q.: What role did EBV play in the project?

N.H.: EBV was a great help to us in finding a solution for communication between the left and right earplugs. They helped us persuade suppliers about our idea. EBV was very useful as an intermediary channel to the suppliers, because the suppliers also had to make significant investments in order to provide us with the necessary components.

T.Q.: How do you see the future for wearables like The Dash?

N.H.: One day, we'll all have wearable computers – no mobile phones, no TVs. We'll just have electronic contact lenses in our eyes and earplugs for the audio. We will have sensors all over our bodies. Within our generation, companies – and entire industries – that have failed to recognise these changes will have disappeared. It will be an enormous revolution. **T**

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Nikolaj Hviid

