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Develco Products in new research project about greener and faster internet

Traffic on the internet has skyrocketed since year 2000, and today it accounts for 10% of the world's energy consumption. This is a tendency that will only increase in the future. Therefore, the need for new infrastructure with energy-efficient broadband solutions is big, and a Grand Solutions project with support from the Innovation Fund Denmark will now support Denmark's leading position in the field. Develco Products is participating in INCOM to further advance IoT technology and take the next steps towards enhanced IoT security.

The internet is like a network of roads, where data moves around independently. If you imagine that the number of these roads increase by 40% a year without the infrastructure being expanded accordingly, it is not hard to imagine that congestion quickly occurs.

With Internet of Things, Industry 4.0 and the rapidly increasing number of online applications such as medical diagnostics, self-driving cars and cloud services, the internet traffic will only increase – and so will the huge amount of energy needed to power the internet.

We have gone from simple communication connecting houses and homes via landlines, to strong mobile devices connecting people in motion through calls and data, to now, in addition to that, connecting things in an Internet of Things, in which things and machines communicate with each other. This part is growing with more than 30% yearly and is expected to connect more than 20 billion devices by 2020. All this communication is also happening on the internet.

All of this consumes huge amounts of energy, we will soon run out of space in the infrastructure, and security is still an increasing focus area.

In a new three-year Grand Solutions project of 100 million Danish kroner, which is supported by Innovation Fund Denmark with 60 million Danish kroner, Technical University of Denmark (DTU), Aarhus University and 12 Danish companies get together. The project is called INCOM, and its focus is on creating new solutions for the next generation of communication infrastructure. Furthermore, the project has more than 15 associated partners, the majority of which come from the industry.

"It is probably only few people that know that all the wireless connections we use so diligently today are in fact only wireless to a certain extent. Then, the traffic is carried by wired optical connections across countries and under oceans. This is when INCOM enters the picture because the world has an urgent need to make these connections stronger and greener," says Professor Leif Katsuo Oxenløwe from DTU Photonics Engineering, who is the creator of the new Innovation Fund Denmark project.

The hubs of the Information Age are data centers connected by intercontinental optical cables that transmit information from machine to machine and from human to human at high speed - in just 30 years, half of the world's population has been connected to the Internet.

However, the development does not come without a large energy bill. Global communication consumes so much energy that it emits more than 2% of all human-generated CO₂, and data traffic rises annually by approx. 40%. Therefore, the requirements for the new infrastructure are primarily that it must deliver higher capacity with significantly lower energy consumption. In addition, it should have a greater degree of reliability, minimal delays and increased safety.

INCOM will make it possible to reduce the number of light sources to operate the internet by refining a so-called "frequency frame" so that one laser can replace several hundreds of lasers. It provides huge power savings across the network and in data centers, and at the same time, it allows increased data speeds of more than 400 GBit/s. INCOM also works to integrate light circuits on a chip that will seriously

reduce price and power consumption, as much of the signal processing that is now taking place electrically can be made directly in the optical domain. The energy consumption for converting light into electricity is thus completely eliminated.

"Over the past few years, we have established Aarhus University as a photon integration center that connects Danish end-users with European tech platforms. Together with our project partners, we want to bring this technology closer to the market. At the same time, we will investigate and implement new, simple, energy-efficient and scalable end-to-end security systems across the IoT infrastructure," says Associate Professor Martijn Heck from the Department of Engineering at Aarhus University.

The combined effect of the stable Danish society with strong infrastructure in telecommunications, data and green energy attracts large data centers and an increasing number of high capacity intercontinental submarine cables. A continued strong Danish position and growth in this highly competitive market requires major and risky efforts. This is especially true in industries that need to be able to use innovative solutions from universities early on and bring them to the market in the form of new products and services.

The need to build new infrastructure with energy-efficient broadband solutions offers great opportunities. Danish universities have great expertise in the right technical areas, and Danish companies are ready to use the new technologies and bring them to the global market. INCOM's purpose is to make this possible and thereby create growth in the industry. Thus, five years after a successful INCOM project, each of the participating companies expects to increase their annual turnover from few to several hundred million Danish kroner and increase their total employment by around 100 jobs.

"Denmark has historically benefited from helping to solve the major global challenges. Today, solutions in science and technology coupled with a strong innovation and start-up agenda throughout society, is the way forward if we want to solve the challenges and improve Denmark's leading position globally. In particular, I am pleased to see that INCOM's objectives contribute to Denmark's Digital Agenda and Denmark's support for the UN's World Goals. I hope to see a lot of INCOM spin-out companies throughout the duration of the project," says Minister for Higher Education and Science, Tommy Ahlers.