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and achieves Sales in the Billions with Industry 4.0 and more based on A.I., 5G & Sensors as demonstrated at the Hannover Fair

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Daniel Dierickx CEO & co-Founder
Acting Chief Editor at e2mos

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Bosch achieves sales in the billions with Industry 4.0

The factory of the future is becoming reality

- Growth: Bosch plans to generate annual sales of a billion euros with connected systems for manufacturing and logistics
- Productivity: "Industry 4.0 pays off. Digital and connected solutions are making factories more efficient, more flexible, and more productive," says Bosch board of management member Rolf Najork
- Technology: at Hannover Messe, Bosch is presenting an autonomous transport system, visual fault detection using artificial intelligence, and 3D printing in conjunction with 5G
- Partnership: Sweden is the partner country of Hannover Messe and a key market for Bosch

Stuttgart, Germany -- March 27, 2019 -- Industry 4.0 has definitely become a part of the factory scene, where it is paying off: over the past four years, Bosch has made more than 1.5 billion euros with Industry 4.0 applications. As early as 2022, Bosch wants to generate annual sales of over a billion euros with Industry 4.0.
The company is presenting the factory of the future at Hannover Messe: autonomous transport vehicles deliver components to digital workspaces, robotics solutions support workers in manufacturing, and quality inspection is performed with the help of artificial intelligence (AI). Thanks to 5G, communication between machines and systems runs smoothly and in near real time. Bosch is turning vision into reality.

Industry 4.0 improves competitiveness

Bosch recognized the potential of Industry 4.0 early on: the company began connecting manufacturing and logistics in 2012. This strategy improves competitiveness, and Bosch's Industrial Technology business sector is seeing robust growth: according to preliminary figures, last year it grew by 8.9 percent. After adjusting for exchange-rate effects, this growth measured 11 percent. Sales rose to 7.4 billion euros. "Industry 4.0 pays off. Digital and connected solutions are making factories more efficient, more flexible, and more productive," says Bosch board of management member Rolf Najork, who oversees the business sector. Bosch projects are bearing this out. For example, Bosch's plant at Blaichach in southern Germany introduced modern manufacturing technologies that increased ABS and ESP volumes to 200 percent over six years – without expanding facilities or making acquisitions.

Bosch enters the intralogistics market with autonomous transport systems

What use is highly automated manufacturing if the materials don't arrive at the production line on time and in the right quantities? "If you take the idea of the factory of the future to its logical conclusion, distinctions break down and you see that manufacturing and logistics have to be thought of as one element. This is the only way for Industry 4.0 to succeed in practice," Najork says. At Hannover Messe, Bosch Rexroth is presenting the ActiveShuttle: this autonomous transport vehicle carries materials from the warehouse to the precise spot on the production line where they need to be. An integrated hub platform facilitates autonomous loading and unloading, so there's no need for workers to lift a finger. Equipped with laser scanners, the ActiveShuttle finds its own route, can recognize other vehicles and people – and can also learn: the transport system creates its own map of the site and updates it continuously.

Software creates the foundation for Industry 4.0

The three pillars of success in the factory of the future are people, machines, and data. To ensure they work together harmoniously, they need intelligent software. "Industry 4.0 would be inconceivable without software. With our Bosch Connected Industry operating unit, we are further expanding our leading position in Industry 4.0 and pooling our software and services expertise under the name Nexeed," says Dr. Stefan Aßmann, who heads up the Bosch Connected Industry business unit. This unit helps the company's customers monitor transports, manufacture products quickly and efficiently, and deliver those products safely, securely, and on time. To give one example: using Nexeed Track and Trace, the freight itself transmits information on its location, temperature, and vibrations. This means logistics experts can monitor freight status at all times and determine if the goods will arrive on time.

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Bosch achieves sales in the billions with Industry 4.0

The factory of the future is becoming reality

... from previous page

Artificial intelligence is a key technology of the future

With the help of artificial intelligence, machines can learn how to be smart and to anticipate. This harbors huge potential as machines relieve people of time-consuming, strenuous tasks. “Bosch regards AI as a key technology. Our goal is for all Bosch products to be equipped with AI, or for AI to have played a part in their development and manufacture, by the middle of the next decade,” Najork says. To meet that goal, Bosch is focusing on AI that is safe, robust, and explainable. At Hannover Messe, Bosch will present ViPAS, an AI-based system for visual quality control. Equipped with a gripper arm, cutting-edge camera technology, and intelligent software, the system is simple and convenient to operate. In a pilot project at the Bosch plant in Nuremberg, ViPAS completed 12,000 test procedures with a success rate of 99.9 percent. This means ViPAS sorted the parts as “OK” or “not OK” with near-perfect accuracy. The next step is to further refine ViPAS in-house to get the technology ready for use at various plants.

5G accelerates Industry 4.0

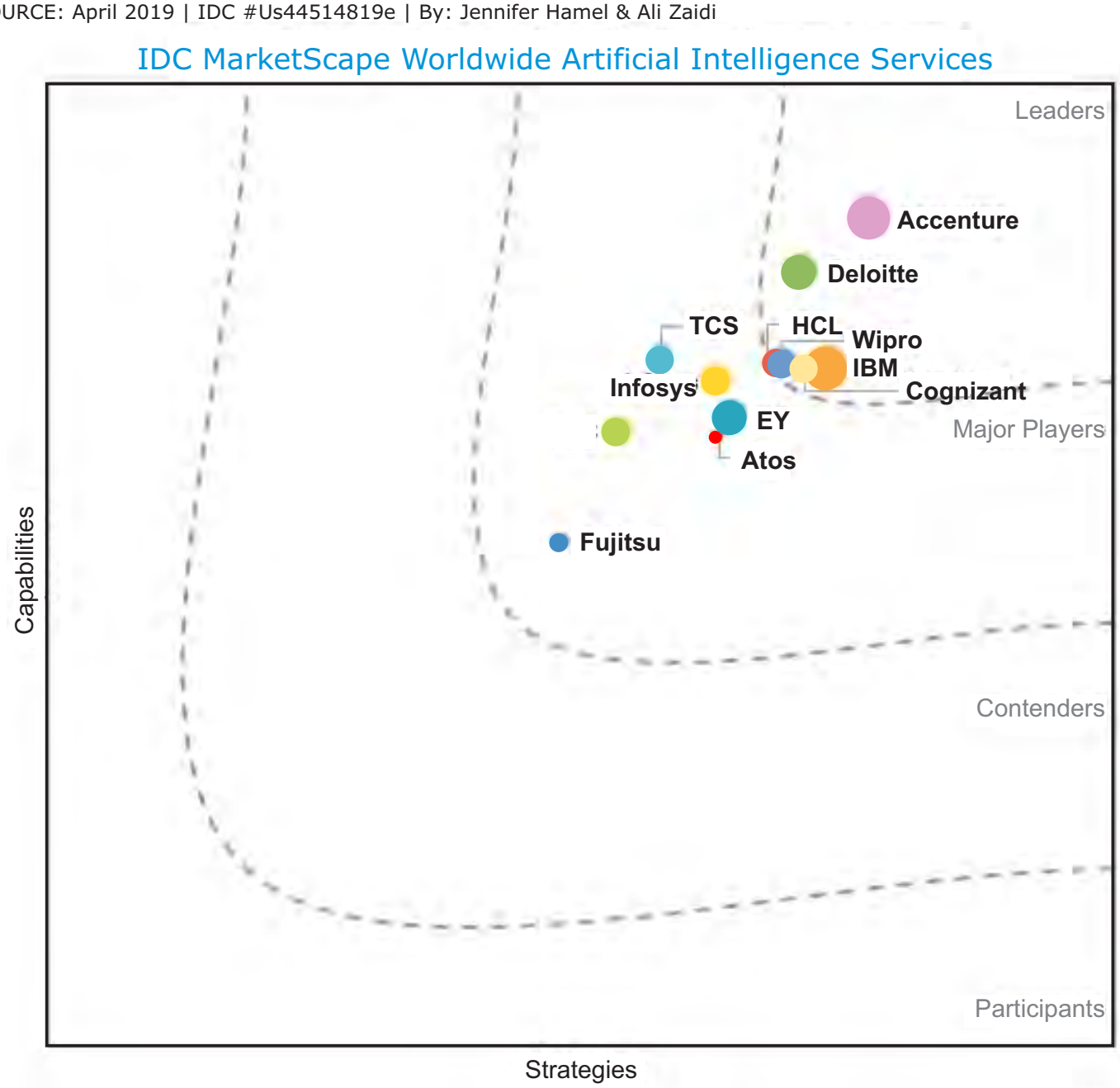
The new 5G mobile communications standard plays a key role in many Industry 4.0 applications. 5G transmits data up to 100 times faster than the previous standard. Reliability has increased while data transmission delays have fallen to a minimum. “5G will be the central nervous system in the factory of the future,” predicts Andreas Müller, a Bosch researcher and chairman of the 5G Alliance for Connected Industries and Automation (5G-ACIA). To shape the new mobile standard right from the outset so that it meets the future needs of industry, Bosch took on the chair of the organization, which was set up in 2018. To date, the initiative has brought together more than 40 companies and research institutions from around the world. Bosch plans to test 5G in its own plants before the end of this year. At Hannover Messe, Bosch will be joining with its partners Nokia, Qualcomm, and BigRep to present the advantages of the new standard. To do so, the companies are bringing connectivity to a 3D printer for the first time with the help of 5G. This will make it possible to take some of the control elements that would normally be integrated into the machine and outsource them to a local manufacturing cloud. Machines with this feature are leaner, cheaper, and easier to maintain.

Sweden is a strategically important partner for Bosch

Bosch and Sweden are connected by a long tradition. The international supplier of technology and services has had a presence in this year's Hannover Messe partner country since 1904. Bosch currently employs more than 1,600 associates at nine locations in Sweden, generating sales of around 1.1 billion euros there in 2018. Here, too, Bosch is focusing on connected solutions for improving quality and service. For example, Bosch Rexroth's plant in Mellansel in eastern Sweden connects its Hägglunds brand high-performance hydraulic systems with sensors and cloud-based applications, and employs machine learning methods. This results in greater productivity and improved availability of the drive systems. One customer that has put the Industry 4.0 solution into practice is LKAB at the iron ore mine in Kiruna, the northernmost city in Sweden.

IDC MarketScape:
Worldwide Artificial Intelligence Services 2019 Vendor Assessment

SOURCE: April 2019 | IDC #Us44514819e | By: Jennifer Hamel & Ali Zaidi



IDC OPINION

This IDC study represents a vendor assessment of the 2019 artificial intelligence (AI) services market through the IDC MarketScape model. This research is a quantitative and qualitative assessment of the characteristics that explain the success of a vendor in the marketplace and help anticipate its ascendancy. This IDC MarketScape covers a variety of vendors participating in the worldwide AI services market. This evaluation is based on a comprehensive framework and a set of parameters expected to be most conducive to success in providing AI services in both the short term and the long term. A significant component of this evaluation is the inclusion of the perception of AI services buyers of both the key characteristics and the capabilities of these providers. Buyers were surveyed across all three of IDC's macroregions. Key findings include:

☐ Across all AI services vendors, three areas of strength were platform strategy, innovation and R&D strategy, and strategy to increase the revenue per employee ratio, as well as the core capabilities of offering breadth, customer service, and growth sustainability.

☐ Buyers adopting AI services balance multiple, often competing business priorities, including reducing costs and becoming more efficient in operations while investing for tomorrow's business and driving innovation across their organizations. As buyers' top measure of success of an AI services engagement is achievement of their desired business outcomes, it is imperative that vendors align their AI services capabilities to address buyers' top business priorities.

☐ CIOs/CTOs were the most common sponsor for AI services engagements at just over 24%, but nearly 60% of sponsors were in roles outside the information technology function, such as line-of-business head, chief analytics/data officer, or CEO. Nearly 90% of buyers reported that some or most of their AI services engagements involved some other emerging technology solutions, such as IoT, mobility, social, cloud, or robotic process automation (RPA).

Complete study: plese visit IDC www.idc.com (Twitter: @IDC - idc-community.com)

A.I. Application Example with TELCO Service Providers

Atos and Google Cloud create AI – powered chatbot for T-Mobile NL to increase customer satisfaction

Atos, a global leader in digital transformation, has announced, together with its partner Google Cloud, a contract with T-Mobile Netherlands to deliver a new scalable chatbot, which uses Artificial Intelligence (AI), as part of the telecommunications company's digital transformation plan. Bringing together Atos' industry knowledge and expertise with the latest AI and ML technologies from Google Cloud, this multi-channel chatbot will streamline customer queries, increase customer satisfaction and reduce costs.

Atos worked closely together with T-Mobile Netherlands to develop the new chatbot in order to provide a tailor-made solution to meet its specific requirements. It will be connected to T-Mobile Netherlands customer website and social media channels, as well as to customer and product databases.

Based on a successful chatbot PoC (proof of concept) project carried out in November last year, which achieved a high level of user intent recognition*, the new contract includes the build of the chatbot, plus plans to develop it further through AI. The aim is to create a modern, more personalized, intuitive customer care experience, with faster insights into customer data.

"We recognize the potential benefits of AI, and with this new enhanced chatbot we will be able to offer our customers an improved and more efficient service." said Kim Larsen, CTIO, T-Mobile, Netherlands.

"We are delighted to have been selected by T-Mobile Netherlands. This is true testament to our experience and expertise in this sector, as well as to our strong partnership with Google Cloud, which will bring further added value to the product. T-Mobile's customers will now have a more personalized and smooth user experience when communicating via chatbot." said Robert Vassoyan, Senior Executive Vice-President, Group Chief Commercial Officer at Atos.

This contract is one of many, across various industries and sectors, that Atos has secured in its global partnership with Google Cloud.

About Atos

Atos is a global leader in digital transformation with 120,000 employees in 73 countries and annual revenue of € 13 billion. European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions through its Digital Transformation Factory, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies and industry knowledge, Atos supports the digital transformation of its clients across all business sectors. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, Unify and Worldline. Atos is listed on the CAC40 Paris stock index.

Visit the Atos News Room: https://atos.net/en/newsroom

AI Chipmaker Hailo Releases Industry-Leading Deep Learning Processor

Hailo Delivers Unprecedented Performance Enabled by Innovative Processing Architecture Specifically Designed for Deep Learning Applications. The Paradigm-Changing Chip is Being Sampled with Select Customers.

Tel Aviv, Israel, May 15th, 2019 – Leading AI chipmaker Hailo released today the Hailo-8TM, the world's top performing deep learning processor. Hailo is now sampling its breakthrough chip with select partners across multiple industries, with a focus on automotive. The chip is built with an innovative architecture that enables edge devices to run sophisticated deep learning applications that could previously run only on the cloud.

Key disadvantages exist in the current architecture of the embedded processing infrastructure, designed based on a 70-year-old underlying structure. Hailo addresses these issues with its holistic solution, which completely rethinks the existing pillars of computer architecture – memory, control, and compute – and incorporates a key, comprehensive Software Development Kit (SDK) co-developed with the hardware.

Hailo's groundbreaking processor significantly outperforms all other edge processors with area and power efficiency far superior than other leading solutions by a considerable order of magnitude – all at a size smaller than a penny. By designing an architecture that relies on the core properties of neural networks, edge devices can now run deep learning applications at full scale more efficiently, effectively, and sustainably than traditional solutions, with lower costs.

Hailo is working with leading OEMs and tier-1 automotive companies in fields such as advanced driver-assistance systems (ADAS), as well as players in industries like smart cities and smart homes, to empower smarter edge and IoT devices. These industries often require the use of high-performance cameras to perform tasks such as semantic segmentation and object detection in real time – tasks which Hailo's chip can perform at full resolution, while consuming only a few Watts. Hailo's redesign also solves untenable heat dissipation issues and removes the need for active cooling systems in the automotive industry. Its advanced structure translates to higher performance, lower power, and less latency, enabling more privacy and better reliability for smart devices operating at the edge.

According to preliminary results comparing Hailo-8TM to best-in-class devices running NN benchmarks such as ResNet-50, Hailo-8 consumes almost 20 times less power while performing the same tasks.

Device	Resolution	FPS	Total Power [Watt]	Total Power Efficiency [TOPS/W]
Hailo-8™	224×224	672	1.67	2.8
Nvidia Xavier AGX	224×224	656	32	0.14

"In recent years, we've witnessed an ever-growing list of applications unlocked by deep learning, which were made possible thanks to server-class GPUs," said Orr Danon, CEO of Hailo. "However, as industries are increasingly powered and even upended by AI, there is a crucial need for an analogous architecture that replaces processors of the past, enabling deep learning to run devices at the edge. Hailo's chip was designed from the ground up to do just that. We are excited to help customers drive their intelligent devices to new limits. A new age of chips means a new age of technology."

Target Markets

Automotive Autonomous Vehicles, ADAS	Smart City Video Analytics	Smart homes Security, Assistes	Drones Sense, Avoid and Navigate
Smartphones Intelligent Assistant	Industrial Predictive Maintenance, Inspection	AR/VR/MR Advanced User Experiences	Wearables High Performance at Minimum Power

About Hailo

Hailo, an AI-focused Israel-based chipmaker, has developed a specialized deep learning processor that delivers the performance of a data center-class computer to edge devices. Hailo's AI processor is the product of a rethinking of traditional computer architecture, enabling smart devices to perform sophisticated deep learning tasks such as imagery and sensory processing in real time, with minimal power consumption, size, and cost. The deep learning microprocessor is designed to fit into a multitude of smart machines and devices, including autonomous vehicles, smartphones, drones, virtual assistants, AR/VR platforms, and wearables. The company was founded in 2017 by members of the Israel Defense Forces' elite intelligence unit. **Please visit us:** https://www.hailo.ai/

A digital mmW radar IC for automotive use

Steve Taranovich | May 13, 2019 | Source EDN

The company known as Uhnder is emerging from 'stealth mode' with their first chip and a paper they published at the ISSCC 2019, A 192-Virtual-Receiver 77/79GHz GMSK Code-Domain MIMO Radar System-on-Chip. Company co-founder Manju Hegde told me that they are planning a launch later in 2019.

Magna, a large automotive supplier that goes back to 1957, became their first customer very early on. Magna will deploy a next-gen, automotive-grade, mass-market sensor using the Uhnder digital radar on chip (RoC), leading to better automated and autonomous driving. See this video of Magna's ICON radar for high-resolution automotive radar.

Their product is the first digital automotive radar (The military had digital radar earlier). Fred Harris worked on the military digital radar architecture for the Stealth Bomber several years ago. He is the co-inventor of the Blackman-Harris filter, and, as part of the extended Uhnder team, is lending his expertise. Their team took that military digital radar architecture and began the development of their automotive/commercial IC. Right now all the other automotive radars are analog modulated via FMCW.

The radar SoC

It's just amazing to me what can be done with CMOS IC process technology today. Take a look at their IC block diagram in Figure 1.

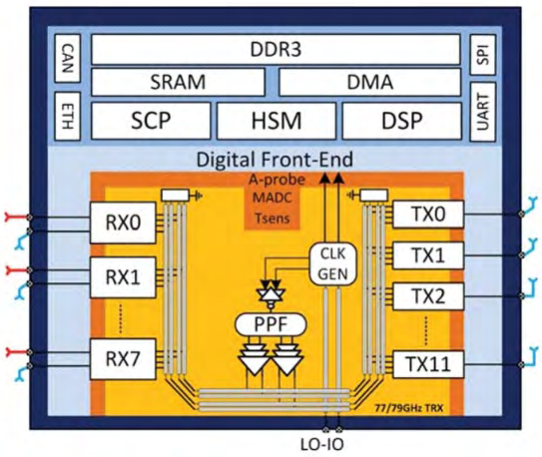


Figure 1 The radar SoC block diagram, including the 12TX / 8×2 RX 77/79 GHz MIMO transceiver, digital signal processing, memory, and interfaces (Image courtesy of Reference 1)

Uhnder's radar chip uses a phase modulated continuous waveform (PMCW)3,4. This architecture features automotive radar in the 79 GHz band for medium (MRR) and short range radar (SRR), as well as the 76 Ghz to 77 Ghz for long range radar (LRR), also used by frequency-modulated continuous wave (FMCW) radar presently in use for automotive. The 79 GHz SRR can have a very wide bandwidth up to 4 GHz. Uhnder creates their PMCW architecture using a CMOS process.

With the advent of fast, low power, high speed ADCs developed in a CMOS process for 60 GHz communications, PMCW becomes an advantage because of the wide IF bandwidth that the CMOS ADC has, plus there are less IP and patents blocking access to the market for PMCW right now. An IEEE Radar Conference paper (Reference 4) concluded that, in a comparison of bi-phase PMCW and FMCW for 79 GHz automotive radar, PMCW was superior in performance and implementation.

One aspect of PMCW is that there is no range Doppler ambiguity with that architecture. The range response of the PMCW radar is thumbtack-like, meaning that both high range and Doppler resolution are achieved. Waveform generation of PMCW is very simple: the bi-phase modulation implementation is straightforward.

Uhnder started their design with interference-free codes for MIMO in code-domain, such as code-division multiple access (CDMA) has for communications. This is a robust detection method, with higher angular resolution, which enables distinct identification of two objects close together at some distance. They used the CDMA codes to modulate a carrier between 76 GHz and 81 GHz. With this digital code modulation (DCM) technique, they have several advantages over FMCW. One advantage is that for the analog portion of the chip, for the same number of channels, Uhnder has achieved an 8 to 10× smaller area than most competitors. Another advantage is that because they are coherent and use code domain diversity, with 12 transmit and 16 receive channels, they are able to get 192 virtual receivers (VRX), plus they are able to time-multiplex two sets of antennas to enable coverage of azimuth and elevation profiles.

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A digital mmW radar IC for automotive use

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Their design also enables the detection of interference from multiple other radar systems. The CDMA format allows for multiple transmitter/receivers not to interfere with each other. This is needed especially because moving into the 2022 to 2024 timeframe, there will be many, many cars with radar. Another key advantage of PMCW radar is that it uses a binary sequence, that allows for TX orthogonality by code/waveform design. This advantage is demonstrated in the paper in Reference 4 with a 4×4 PMCW MIMO radar that can detect two targets, with a radar cross-section (RCS) of 5 and 20 dBsm, at the same distance (same range bin) but at different angles with a high angular resolution.

And finally, they decided to go with a complete CMOS architecture with their IC. Low power is an obvious advantage with CMOS. The on-chip high speed ADC is quite complex, so CMOS is the best choice to keep the power dissipation of the IC low. The architecture also uses multiple transmitter/receivers which also benefit from the use of CMOS. The high bandwidth connectivity on the single monolithic chip gave the IC designers flexibility in locating where the memory would be placed, how much is needed due to high bandwidth, and other needs.

As for the system level, this is the highest resolution radar on the market. This is truly a 4-D radar system with four dimensions x,y,z (or polar co-ordinates) plus velocity. Also, because of the modulation used they can resolve large targets from small targets in close proximity; Uhnder claims that their angular resolution is better than anyone else has.

Two radar modes

This radar operates in two modes: MIMO mode where they transmit different codes to all the transmitters and they can receive those simultaneously in all the receivers. Since PMCW uses binary symbols, there is an advantage in MIMO radar that needs near-perfect orthogonal waveforms on the different TX antennas if they transmit signals simultaneously, which is needed for fast illumination of objects like in a driving scenario. The binary interference-free codes make orthogonality possible4. They can also operate the chip in the phased array mode, where they digitally phase the transmitters to send the same code across the transmitters for phased array and beam steering.

There is a great deal of programmability on chip because they traded off analog simplicity for more processing power, allowing for increased flexibility. The company claims that this is the first software-defined radar. There are a great many features that can be configured in software and some very powerful DSPs on chip that customers can program if they wish in order to differentiate their product. This flexibility starts with the analog and goes all the way through to the software.

I can't wait to see this radar in action in test cities in the near future. This architecture, coupled with V2X (see the related articles below to learn more) will make autonomous driving much more safe and reliable.

Steve Taranovich is a senior technical editor at EDN with 45 years of experience in the electronics industry.

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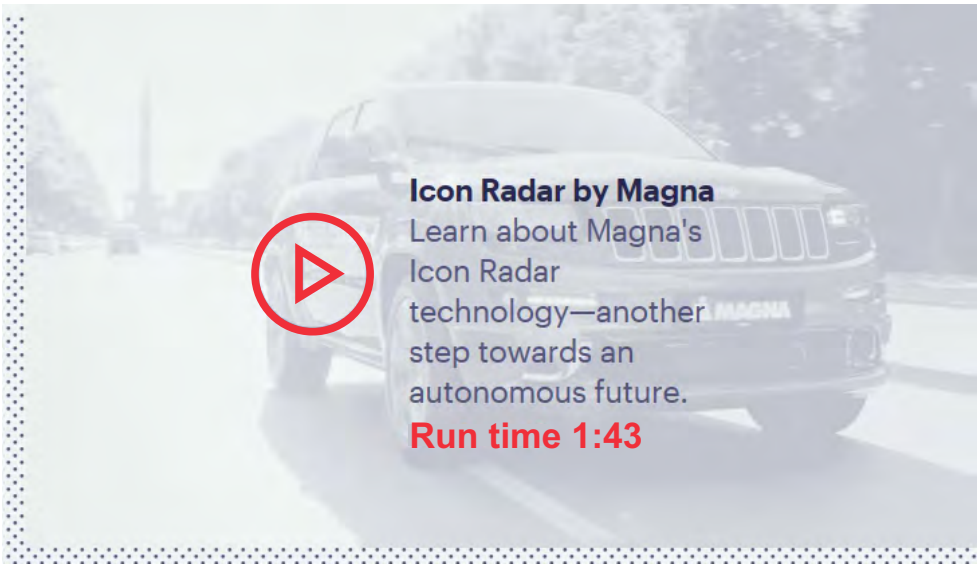

The Atos Quantum Learning Machine is in the Field

Get ready for the Quantum revolution

As a computing leader in Europe, Atos is facing moore law declining and evergrowing requests of computing power, thus firmly engaged the quantum shift.

Atos launched in 2016 the quantum program piloted by a high level advisory board and supported by R&D investments and laboratory.

This program defined 4 priorities:

- Quantum algorithms – focused on machine learning
- Next generation architectures – designing new quantum-powered accelerators
- Quantum safe cryptography – prepare the cryptography safe from quantum computer attacks
- Quantum programming platform – complete programming and simulation environment for software development, education and training: The Quantum Learning Machine

Atos Quantum Learning Machine: develop quantum applications today

The Atos Quantum Learning Machine is a complete on-premise environment designed for quantum software developers. It is dedicated to the development of quantum software, training and experimentation.

The Atos Quantum Learning Machine will emulate execution as a genuine, quantum computer would. Thanks to the bespoke software and hardware developed by Atos, it has superior simulation capabilities, much more than any other affordable appliance: from 30 to 40 Qubits.

Quantum Learning Machine: deep dive

This appliance is composed of differents highly innovative elements:

- a scalable and large in-memory infrastructure
- an extensible data representation model (quantum circuit model)
- a quantum assembly programming language (based on universal QASM)
- a high level hybrid language (based on Python)

Atos Quantum Assembler (AQASM) is a core component of this appliance, enabling even to program new quantum gates or mix existing gates and accept quantum programs from others frameworks.

Already widely adopted

Thanks to its scalability, openness and unrivalled power, Atos Quantum Learning Machine is already adopted by major quantum players:

- Hartree Centre (UK)
- Argonne National Laboratory (USA)
- Technical University (Denmark)
- Oak Ridge National Laboratory (USA)
- CEA – Atomic Energy Commission (France)
- Campus Hagenberg (Austria)

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including for Customers & Projects Difficult to Find, to Access and to Convince

It is Time for CEO's to understand what their company is really doing to find New Customers

The most complex strategic business questions are best answered with facts

Here are some Vendor's REFERENCES:
IBM Telecom IT, Intel, Microsoft Embedded, Cisco/Tail-f Systems,
Motorola, Emerson, Artesyn, Adlink, Kontron,
Enea (RTOS - Linux), Green Hills Software, Telco Systems,
Procera Networks/Vineyard Networks Visibility, Texas Instruments,
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JumpGen, Radisys, Wintegra, Xilinx, Wind River, SBS Technologies,
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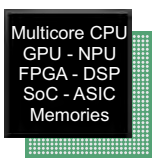

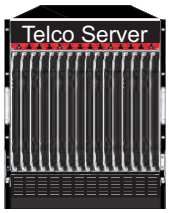

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