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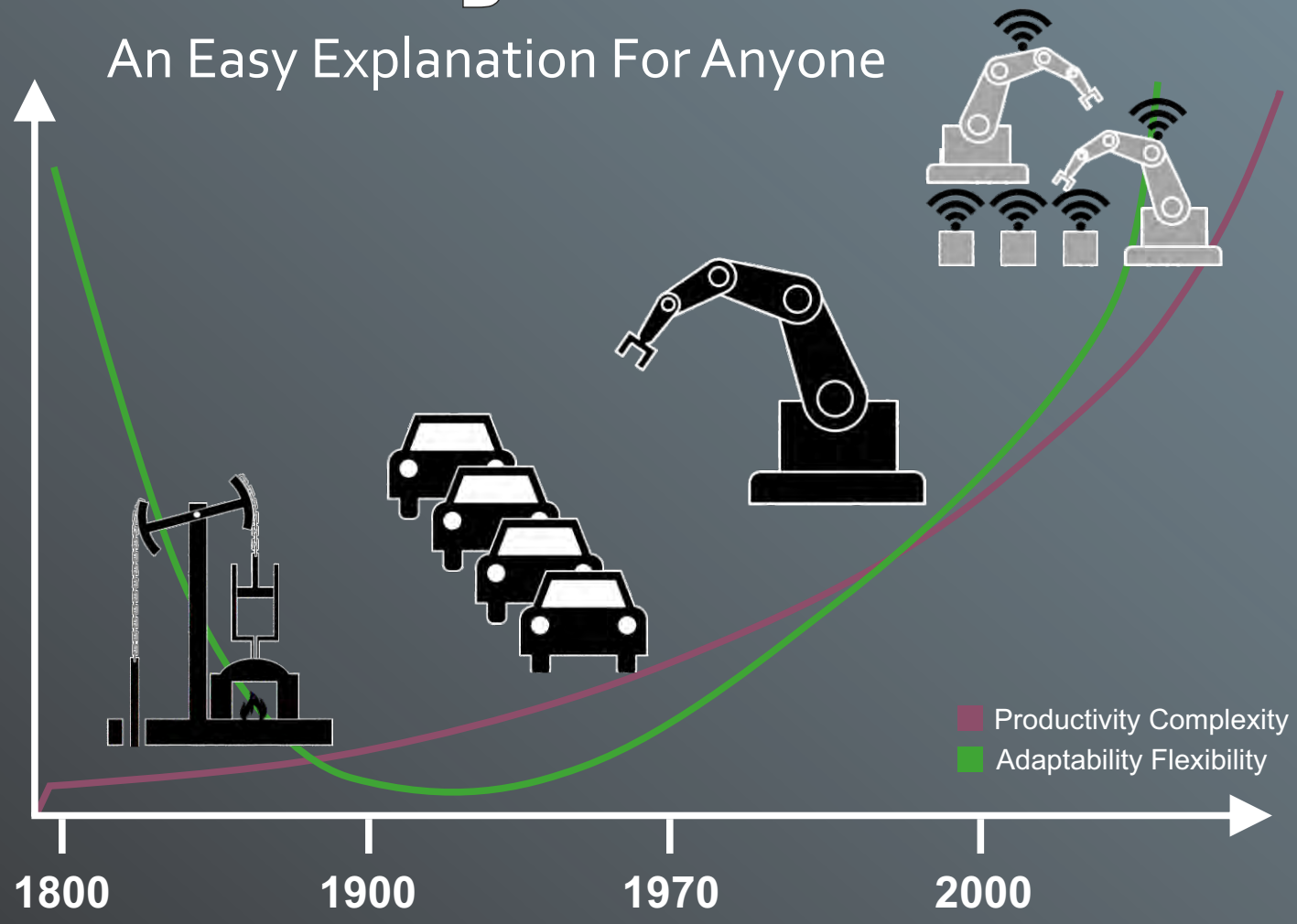
Industry 4.0

An Easy Explanation For Anyone



1st	2nd	3rd	4th
Mechanization, Water Power, Steam Power	Mass Production, Assembly Line, Electricity	Computer and Automation	Cyber Physical Systems Smart Factory

In this Edition:

COVER STORY

HEADLINES

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

Over 3 decades
Chips & Embedded
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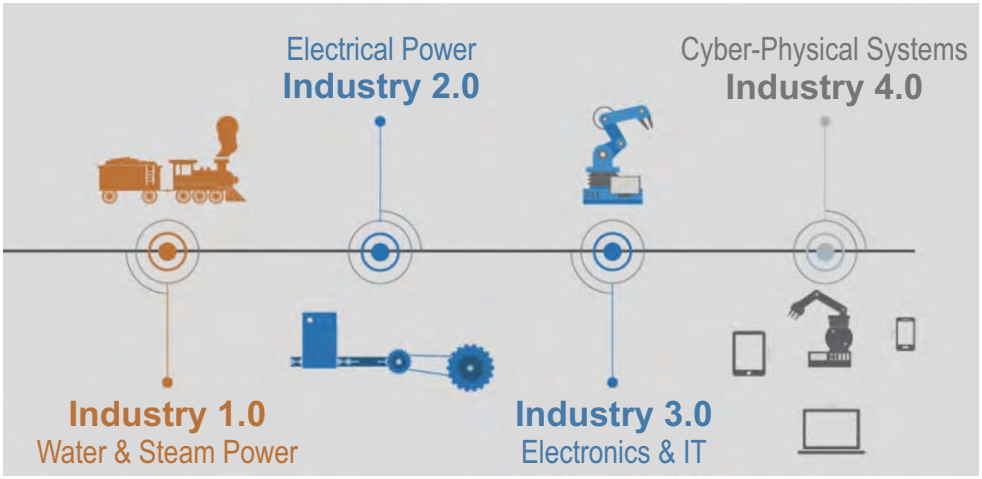
Time to Understand Industry 4.0



What is Industry 4.0?
Here's A Super Easy Explanation For Anyone

By: Bernard Marr, Contributor | Sep 2, 2018, 11:59pm

We're in the midst of a significant transformation regarding the way we produce products thanks to the digitization of manufacturing. This transition is so compelling that it is being called Industry 4.0 to represent the fourth revolution that has occurred in manufacturing. From the first industrial revolution (mechanization through water and steam power) to the mass production and assembly lines using electricity in the second, the fourth industrial revolution will take what was started in the third with the adoption of computers and automation and enhance it with smart and autonomous systems fueled by data and machine learning.

Even though some dismiss Industry 4.0 as merely a marketing buzzword, shifts are happening in manufacturing that deserves our attention.

Industry 4.0 optimizes the computerization of Industry 3.0

When computers were introduced in Industry 3.0, it was disruptive thanks to the addition of an entirely new technology. Now, and into the future as Industry 4.0 unfolds, computers are connected and communicate with one another to ultimately make decisions without human involvement. A combination of cyber-physical systems, the Internet of Things and the Internet of Systems make Industry 4.0 possible and the smart factory a reality. As a result of the support of smart machines that keep getting smarter as they get access to more data, our factories will become more efficient and productive and less wasteful. Ultimately, it's the network of these machines that are digitally connected with one another and create and share information that results in the true power of Industry 4.0.

Industry 4.0 applications today

While many organizations might still be in denial about how Industry 4.0 could impact their business or struggling to find the talent or knowledge to know how to best adopt it for their unique use cases, several others are implementing changes today and preparing for a future where smart machines improve their business. Here are just a few of the possible applications:

Identify opportunities: Since connected machines collect a tremendous volume of data that can inform maintenance, performance and other issues, as well as analyze that data to identify patterns and insights that would be impossible for a human to do in a reasonable timeframe, Industry 4.0 offers the opportunity for manufacturers to optimize their operations quickly and efficiently by knowing what needs attention. By using the data from sensors in its equipment, an African gold mine identified a problem with the oxygen levels during leaching. Once fixed, they were able to increase their yield by 3.7%, which saved them $20 million annually.
Optimize logistics and supply chains: A connected supply chain can adjust and accommodate when new information is presented. If a weather delay ties up a shipment, a connected system can proactively adjust to that reality and modify manufacturing priorities.

Autonomous equipment and vehicles: There are shipping yards that are leveraging autonomous cranes and trucks to streamline operations as they accept shipping containers from the ships.

... to next page

What is Industry 4.0?
Here's A Super Easy Explanation For Anyone

... from previous page

Adobe Stock

Robots: Once only possible for large enterprises with equally large budgets, robotics are now more affordable and available to organizations of every size. From picking products at a warehouse to getting them ready to ship, autonomous robots can quickly and safely support manufacturers. Robots move goods around Amazon warehouses and also reduce costs and allow better use of floor space for the online retailer.

Additive manufacturing (3D printing): This technology has improved tremendously in the last decade and has progressed from primarily being used for prototyping to actual production. Advances in the use of metal additive manufacturing have opened up a lot of possibilities for production.

Internet of Things and the cloud: A key component of Industry 4.0 is the Internet of Things that is characterized by connected devices. Not only does this help internal operations, but through the use of the cloud environment where data is stored, equipment and operations can be optimized by leveraging the insights of others using the same equipment or to allow smaller enterprises access to technology they wouldn't be able to on their own.

While Industry 4.0 is still evolving and we might not have the complete picture until we look back 30 years from now, companies who are adopting the technologies realize Industry 4.0's potential. These same companies are also grappling with how to upskill their current workforce to take on new work responsibilities made possible by Internet 4.0 and to recruit new employees with the right skills.

Bernard Marr Contributor

Bernard Marr is an internationally best-selling author, popular keynote speaker, futurist, and a strategic business & technology advisor to governments and companies. He helps organisations improve their business performance, use data more intelligently, and understand ...

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ADLINK's DDS-based TSS Software is Aligned to the FACE™ Technical Standard for the Aviation Sector

Future Airborne Capability Environment (FACE)

Newcastle upon Tyne, UK | 17-Dec-2018

ADLINK Technology Inc has today announced that its Data Distribution Service (DDS) based Transport Services Segment (TSS) software is aligned to Edition 2.1.1 of the FACE™ Technical Standard.

ADLINK provides leading Edge Computing solutions that drive data-to-decision applications across industries globally.

"ADLINK is a leading DDS vendor in the aviation industry offering a well-established solution aligned to the FACE Technical Standard," said Mike Roberts, solutions architect at ADLINK. "ADLINK's Vortex OpenSpliceTM solution is part of our Vortex Intelligent Data Sharing Platform and is being used globally by our customers in mission-critical defense and aerospace applications, ranging from radar processors to simulation and next-generation network-centric systems. Our DDS expertise has grown from our strong track record of enabling real-time device, Edge and cloud data sharing by providing standards-based, open architecture defense and aerospace solutions.

Vortex DDS is a crucial enabler for systems that have to deliver high volumes of data reliably and securely with stringent end-to-end qualities-of-service. The software plays a vital role in many mission-critical systems by ensuring that the right information is delivered to the right place at the right time.

ADLINK has developed its Vortex DDS implementation as a reference to align to the FACE Technical Standard Edition 2.1.1 TSS, using DDS as the underlying transport layer. This is fully compatible and interoperable with the commercially supported Vortex OpenSplice V6.10 solution.

ADLINK's TSS reference implementation provides a mapping-layer between the FACE Transport Services Application Programming Interfaces (API) and the standard OMG-DDS API. The TSS implementation supports both C++ and Java APIs and enables portable components to share and exchange data using DDS.

For more information about Vortex DDS, please visit ADLINK's website at https://www.adlinktech.com/en/data-distribution-service.aspx or contact us at ist_info@adlinktech.com

About FACE™ Consortium

The Open Group FACE™ Consortium is taking a leadership role in developing open standards for avionics systems of the future. The FACE Consortium was formed as a government and industry partnership to define an open avionics environment for all military airborne platform types. The FACE Approach provides the open avionics standard and business strategy for making military computing operations more robust, interoperable, portable and secure. The standard enables developers to create and deploy a wide catalog of applications for use across the entire spectrum of military aviation systems through a common operating environment.
MORE: https://www.opengroup.org/face

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Imec and CEA-Leti join forces on Artificial Intelligence and Quantum Computing

LEUVEN (BELGIUM), November 19, 2018 — During the state visit of His Excellency Emmanuel Macron President of the French Republic, the Belgian research center imec and the French research institute CEA-Leti, two world-leading research and innovation hubs in nanotechnologies for industry, announced that they have signed a memorandum of understanding (MoU) that lays the foundation of a strategic partnership in the domains of Artificial Intelligence and quantum computing, two key strategic value chains for European industry, to strengthen European strategic and economic sovereignty. The joint efforts of imec and CEA-Leti underline Europe's ambition to take a leading role in the development of these technologies. The research centers' increased collaboration will focus on developing, testing and experimenting neuromorphic and quantum computing – and should result in the delivery of a digital hardware computing toolbox that can be used by European industry partners to innovate in a wide variety of application domains – from personalized healthcare and smart mobility to the new manufacturing industry and smart energy sectors.

Edge Artificial Intelligence (eAI) commonly refers to computer systems that display intelligent behavior locally on the hardware devices (e.g chips) . They analyze their environment and take the required actions to achieve specific goals. Edge AI is poised to become a key driver of economic development. And, even more importantly perhaps, it holds the promise of solving many societal challenges – from treating diseases that cannot yet be cured today, to minimizing the environmental impact of farming.

Decentralization from the cloud to the edge is a key challenge of AI technologies applied to large heterogeneous systems. This requires innovation in the components industry with powerful, energy-guzzling processors.

"The ability to develop technologies such as AI and quantum computing – and put them into industrial use across a wide spectrum of applications – is one of Europe's major challenges. Both quantum and neuromorphic computing (to enable artificial intelligence) are very promising areas of innovation, as they hold a huge industrialization potential. A stronger collaboration in these domains between imec and CEA-Leti, two of Europe's leading research centers, will undoubtedly help to speed up the technologies' development time: it will provide us with the critical mass that is required to create more – and faster – impact. and will result in plenty of new business opportunities for our European industry partners," says Luc Van den hove, president and CEO of imec.

"Two European microelectronics pioneers today are joining forces to raise the game in both high-performance computing and trusted AI at the edge, and ultimately to fuel European industry success through innovations in aeronautics, defence, automobiles, Industry 4.0 and health care," said Emmanuel Sabonnadière, CEA-Leti CEO said. "This collaboration with imec following earlier innovation-collaboration agreements with the Fraunhofer Group for Microelectronics of the Fraunhofer-Gesellschaft, the largest organization for applied research, will focus all three institutes to the task of keeping Europe at the forefront of new digital hardware for AI, HPC and Cyber-security applications."

Imec and CEA-Leti are inviting partners from industry as well as academia to join them and benefit from access to the research centers' state-of-the-art technology with proven reproducibility – enabling a much higher degree of device complexity, reproducibility and material perfection while sharing the costs of precompetitive research.

About imec
Imec is the world-leading research and innovation hub in nanoelectronics and digital technologies. The combination of our widely acclaimed leadership in microchip technology and profound software and ICT expertise is what makes us unique. By leveraging our world-class infrastructure and local and global ecosystem of partners across a multitude of industries, we create groundbreaking innovation in application domains such as healthcare, smart cities and mobility, logistics and manufacturing, energy and education.
As a trusted partner for companies, start-ups and universities imec brings together more than 4,000 brilliant minds from over 85 nationalities. Imec is headquartered in Leuven, Belgium and has distributed R&D groups at a number of Flemish universities, in the Netherlands, Taiwan, USA, China, and offices in India and Japan. In 2017, imec's revenue (P&L) totaled 546 million euro. Further information on imec can be found at www.imec-int.com.

About Leti (France)
Leti, a technology research institute at CEA Tech, is a global leader in miniaturization technologies enabling smart, energy-efficient and secure solutions for industry. Founded in 1967, Leti pioneers micro-& nanotechnologies, tailoring differentiating applicative solutions for global companies, SMEs and startups. Leti tackles critical challenges in healthcare, energy and digital migration. From sensors to data processing and computing solutions, Leti's multidisciplinary teams deliver solid expertise, leveraging world-class pre-industrialization facilities. With a staff of more than 1,900, a portfolio of 2,700 patents, 91,500 sq. ft. of cleanroom space and a clear IP policy, the institute is based in Grenoble, France, and has offices in Silicon Valley and Tokyo. Leti has launched 60 startups and is a member of the Carnot Institutes network. This year, the institute celebrates its 50th anniversary. More: www.leti-cea.com.

CEA Tech is the technology research branch of the French Alternative Energies and Atomic Energy Commission (CEA), a key player in innovative R&D, defence & security, nuclear energy, technological research for industry and fundamental science, identified by Thomson Reuters as the second most innovative research organization in the world. CEA Tech leverages a unique innovation-driven culture and unrivalled expertise to develop and disseminate new technologies for industry, helping to create high-end products and provide a competitive edge.

EQT to acquire leading open source software provider SUSE

02 July 2018

EQT VIII to acquire SUSE, a leading global provider of open source infrastructure software for enterprises
EQT VIII is partnering with CEO Nils Brauckmann and his team to support SUSE's next period of growth and innovation, and to strengthen its position as leading open source player both organically and through add-on acquisitions
SUSE to further build its brand and unique corporate culture as a stand-alone business

The EQT VIII fund ("EQT" or "EQT VIII") has agreed to acquire SUSE, a leading global provider of open source infrastructure software for large enterprises, from the global infrastructure software business Micro Focus International plc ("Micro Focus") for an enterprise value of USD 2.535 billion. The transaction is subject to Micro Focus shareholder and customary regulatory approvals.

Founded in 1992, SUSE is the world's first provider of an enterprise-grade open source Linux operating system. With sales of USD 320 million in the 12 months ended October 31, 2017 and approximately 1,400 employees worldwide, SUSE is today a market leader in enterprise-grade, open source software-defined infrastructure and application delivery solutions for on premise and cloud-based workloads. During the ownership of Micro Focus, SUSE has operated as a semi-independent business under the leadership of Nils Brauckmann, executing on a clearly defined growth charter. SUSE has also successfully expanded its product portfolio, including solutions for cloud and storage as well as container and application delivery technology.

EQT VIII will support SUSE's next period of growth and innovation as an independent company. The strategy includes strengthening its position as a leading open source player, both organically and through add-on acquisitions, leveraging EQT's long-term experience in the software space. Priorities will be to further build SUSE's public cloud business and to expand its next-generation product offerings in order to strengthen SUSE as a leading provider commercializing open source for enterprise customers.

"Today is an exciting day in SUSE's history. By partnering with EQT, we will become a fully independent business," said Nils Brauckmann, CEO of SUSE. "The next chapter in SUSE's development will continue, and even accelerate, the momentum generated over the last years. Together with EQT, we will benefit both from further investment opportunities and having the continuity of a leadership team focused on securing long-term profitable growth combined with a sharp focus on customer and partner success. The current leadership team has managed SUSE through a period of significant growth and now, with continued investment in technology innovation and go to market capability, will further develop SUSE's momentum going forward."

Johannes Reichel, Partner at EQT Partners and Investment Advisor to EQT VIII, adds: "We are excited to partner with SUSE's management in this attractive growth investment opportunity. We were impressed by the business' strong performance over the last years as well as by its strong culture and heritage as a pioneer in the open source space. These characteristics correspond well to EQT's DNA of supporting and building strong and resilient companies, and driving growth. We look forward to entering the next period of growth and innovation together with SUSE."

The transaction is subject to approval from Micro Focus shareholders and other relevant authorities.

Jefferies acted as lead financial advisor and Arma Partners acted as financial advisor to EQT VIII. Milbank, Tweed, Hadley & McCloy LLP and Latham & Watkins LLP acted as legal advisors to EQT VIII.

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EQT Press office, +46 8 506 55 334

About SUSE
SUSE, a pioneer in open source software, provides reliable, software-defined infrastructure and application delivery solutions that give enterprises greater control and flexibility. More than 25 years of engineering excellence, exceptional service and an unrivaled partner ecosystem power the products and support that help our customers manage complexity, reduce cost, and confidently deliver mission-critical services. The lasting relationships we build allow us to adapt and deliver the smarter innovation they need to succeed – today and tomorrow.

More info: www.suse.com

About EQT
EQT is a leading investment firm with approximately EUR 50 billion in raised capital across 27 funds. EQT funds have portfolio companies in Europe, Asia and the US with total sales of more than EUR 19 billion and approximately 110,000 employees. EQT works with portfolio companies to achieve sustainable growth, operational excellence and market leadership.

More info: www.eqtpartners.com

ADLINK Announces Two New CompactPCI® 2.0 Processor Blades Powered by Latest Intel® Xeon®, Core™ and Atom® Processors

3U cPCI-3630 and 6U cPCI-6636 further enhance ADLINK's extensive, rugged CompactPCI processor blade portfolio and provide technology upgrade solutions for railway transportation, military, aviation and industrial automation

San Jose | 22 Oct 2018

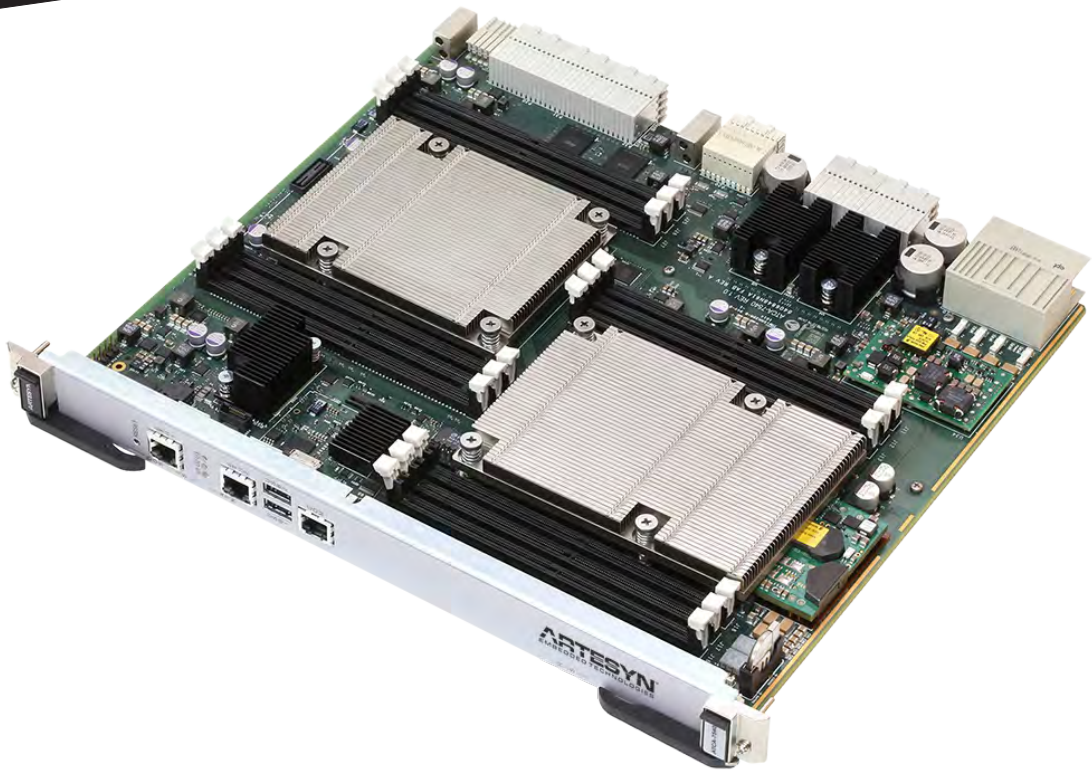
ADLINK Technology, a global provider of leading Edge Computing solutions that drive data-to-decision applications across industries, today released two new CompactPCI® 2.0 processor blades, the cPCI-3630 and cPCI-6636.

ADLINK's cPCI-3630 is a 3U CompactPCI processor blade featuring the 64-bit Intel Atom® Processor X Series SoC (formerly Apollo Lake-I) and up to 8GB soldered DDR3L-1600 MHz ECC memory. The Intel Atom® Processor X Series integrates the low-power 9th generation graphics engine and provides excellent graphics, media and display support. Available in single-slot (4HP) or dual-slot (8HP) width form factors, the cPCI-3630 utilizes various daughter boards to provide a broad range of I/O functionality. One of the dual-slot variants supports an XMC site on layer 2. Storage options include an onboard 32GB SSD, CFast or mSATA socket and 2.5" SATA drive space on the layer 2 riser card.

ADLINK's cPCI-6636 is a 6U CompactPCI processor blade powered by the 6th/7th generation Intel® Xeon® E3 and Intel® Core™ i3/i5/i7 Processors with Intel® HM170 or CM236 Chipsets. The cPCI-6636 supports up to 32GB DDR4-2133 memory with 16GB soldered onboard and up to 16GB via SODIMM socket. In addition to the significant performance boost enabled by the latest Intel® processors, the cPCI-6636 also supports a variety of faceplate I/O interfaces in both single-slot (4HP) and dual-slot (8HP) width form factors. The dual-slot version cPCI-6636DZ supports 6x RS-232 serial ports and 8x USB 3.0 for high speed transmission. Storage options include one 2.5" SATA drive space, one 7-pin SATA connector and one CFast slot by adapter board. An XMC connector via PCIe x8 adapter board is supported in place of the CFast on another dual-slot variant cPCI-6636D.

"ADLINK is an executive member of the PICMG (PCI Industrial Computer Manufacturers Group) consortium, which initially introduced CompactPCI in 1999. By participating in PICMG, we are able to contribute expertise that guides future CompactPCI development and helps us position the architecture as a top choice in extreme rugged environments. ADLINK envisions CompactPCI as a viable technology for another decade or longer," said Eric Kao, General Manager of Networking, Communication & Public Sector Business Unit (NCP) at ADLINK. "The launch of the cPCI-3630 and cPCI-6636 is another testament to our commitment to building an even more comprehensive and cost-effective CompactPCI portfolio, enabling customers to effectively mitigate budget constraint, smoothly and seamlessly take on technology migration and product integration, and deliver the industry desired supply longevity."

Featuring ADLINK's Smart Embedded Management Agent (SEMA) for online system health monitoring, the cPCI-3630 and cPCI-6636 support independent operation in both host and peripheral slots without CompactPCI bus communication (satellite mode). While the EN 50155 compliant cPCI-3630 provides an ideal solution for railway transportation, medical and industrial automation that require optimal computing performance for data transfer with lower power consumption, the cPCI-6636 offers a high-density solution for military, aviation and other mission-critical applications that require robust computing in a rugged and reliable CompactPCI system. **CONTACT:** Click Here



COTS Bladed Server Architecture for High Performance Defense Applications **WHITER PAPER**

Download this free white paper today on "COTS Bladed Server Architecture for High Performance Defense Applications".

AdvancedTCA® (or ATCA®) technology has proven itself to be one of the most successful open, bladed architectures for high-performance, ultra-reliable network computing. The PCI Industrial Computer Manufacturer Group (PICMG®) ratified the original ATCA open standard specification 15 years ago, has enhanced it over the years, and continues be an active organization of vendors and users. ATCA has defined a system architecture that supports systems which are compact, light and power efficient—which has become an ideal choice for military, aerospace and security systems.

Since 2012, a number of large military programs have adopted ATCA technology. This paper addresses the forces driving the requirements of high performance embedded computing (HPEC) for military and aerospace applications, including the modular open system approach (MOSA), commercial off-the-shelf (COTS), and reduced size, weight, power and cost (SWaP-C) as it applies to ATCA.

Deutsche Telekom, Aricent launch open source mobile edge compute platform

20 September 2018 | SOURCE DT

Deutsche Telekom and engineering firm Aricent have taken the wraps off an open source mobile edge compute platform designed to help operators rapidly develop and launch 5G applications and services.

According to the companies, the global edge computing market is expected to be worth $3 billion by 2025. In addition to the latency benefits of hosting applications and services at the edge of the network, edge computing – and in particular open source edge computing – lends operators much greater agility and allows them to monetise new 5G services from the outset, they said.

"We believe that edge computing will be a critical success factor to achieve the full benefits of 5G for our customers," said Tomasz Gerszberg, SVP Edge Computing, Deutsche Telekom. "And we believe in joining forces with our ecosystem partners to accelerate innovation and the adoption of new technology."

There is no firm date for when Deutsche Telekom and Aricent's jointly-developed platform will be made available. Deutsche Telekom and Aricent said select components will start to roll out in 2019. The companies said they plan to strengthen their strategic partnership over the next three years, with Deutsche Telekom tapping Aricent's consultancy, design, engineering and R&D services.

"Edge computing will provide value as it will deliver engaging and worthwhile subscriber experiences, and operators need the capabilities to bring that to fruition," said Walid Negm, CTO of Aricent. "We are very excited to be partnering with Deutsche Telekom on this open source initiative. Our innovative solution enables forward looking operators to leverage their network and collaborate with application developers to leapfrog the competition and gain a competitive edge - at the edge."

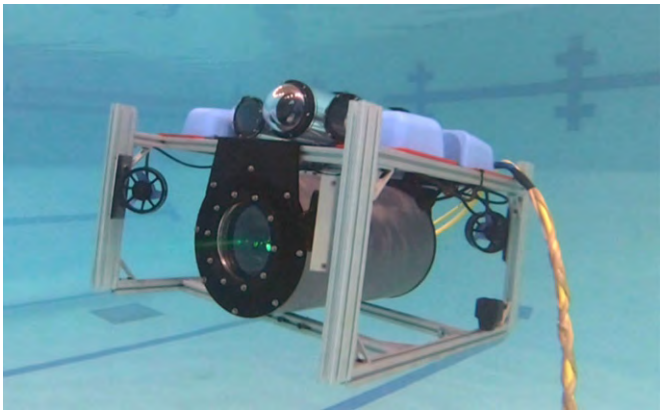
Deutsche Telekom is pushing hard on edge computing, which as well as making services more responsive, promises to make devices lighter and less power-hungry because processing and storage are hosted on the network.

At Mobile World Congress this year, the telco launched a new subsidiary, MobiledgeX, which is tasked with providing developers with the tools they need to come up with new applications and services that make the most of edge computing.

https://mobileeurope.co.uk/press-wire/bayern-s-neuer-proves-safe-pair-of-hands-for-dt-as-operator-launches-new-5g-company

Conquering Underwater-Communication Challenges with Electro-optics, Radar

Researchers are making progress on enhancing communications between two undersea nodes, or from below the surface to the above air, using advanced electronic, optical, and even sonar/radar components.



Bill Schweber | Oct 11, 2018

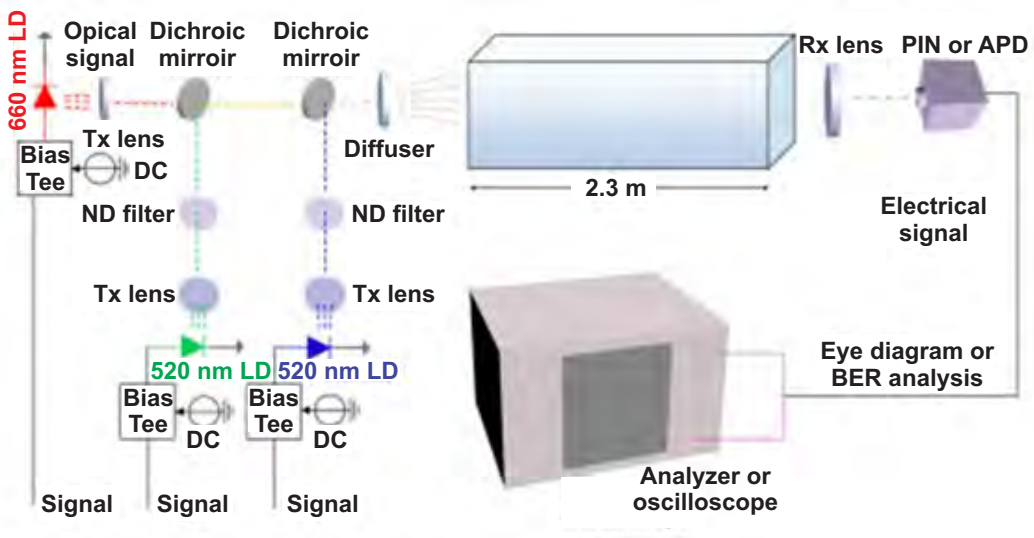
The proliferation of autonomous underwater vehicles is adding to the urgency of developing reliable techniques for robust, reliable links, both between these vehicles as well as to them from above the surface. While the U.S. Navy and others have (in the past) used extremely low frequency (ELF) carriers at around 100 Hz (yes, that's hertz) combined with antennas spanning several square miles and multi-megawatt power amplifiers (see references) to achieve single-digit bit rates, that approach is clearly not practical here.

In a word, underwater communication is difficult challenge, due to the inherent physics of the situation and the electromagnetic characteristics of water, especially salt water. Still, significant research efforts have been directed toward alternative solutions made feasible by advances in electro-optics, millimeter-wave radar, and signal-processing algorithms. Three examples show the progress thus far:

Laser-Diode Array

Researchers at Fudan University, (Shanghai, China) and University of Toronto (Ontario, Canada) used a combined red/green/blue (RGB) laser-diode array to achieve transmission rates up to 3.4 Gb/s at up to 2.3 m with a single laser-diode triplet, and an even-faster aggregate 9.7 Gb/s using an on-off keying (OOK) modulation and wavelength-division multiplexing (WDM).

They combined underwater solid-state lighting (SSL) and WDM to create an underwater, wireless optical-communication (UWOC) system based on a combination of standard laser diodes with GaN-based blue (450 nm) and green (520 nm) devices, plus a red AlGaInP (660 nm) diode, all stabilized to around 25°C using a Peltier thermoelectric cooler. The overall design applied a combination of mirrors, lenses, and optical filters, with the received laser signal captured by a PIN or avalanche photodiode (Fig. 1). Details are presented in their paper "Laser-based white-light source for high-speed underwater wireless optical communication and high-efficiency underwater solid-state lighting."



1. Setup of the RGB LED-based white-light system uses underwater solid-state lighting and wavelength-division multiplexing for an underwater wireless optical communication. (Source: Fudan University)

Narrow-Beam Laser

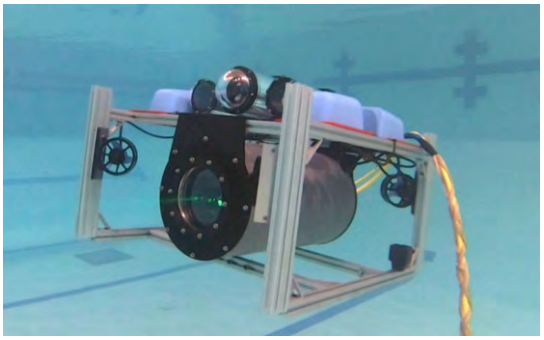
At MIT's Lincoln Laboratory, researchers are trying to solve a similar underwater-link problem by applying the narrow-beam laser technology used in the Lunar Laser Communication Demonstration (LLCD) project, where a pulsed laser beam transmitted data from a satellite orbiting the moon to Earth at a record-breaking download speed of 622 Mb/s. In their project, summarized here, they were able to acquire and track narrow optical beams between two mobile vehicles.

... to next page

Conquering Underwater-Communication Challenges with Electro-optics, Radar

... from previous page

As noted by researcher Nicolas Hardy, "We implemented an acquisition scanning function that is used to quickly translate the beam over the uncertain region so that the companion terminal is able to detect the beam and actively lock on to keep it centered on the lasercom terminal's acquisition and communications detector." As a result, two underwater vehicles were able to locate, track, and effectively establish a link, despite the independent movement of each vehicle underwater (Fig. 2).



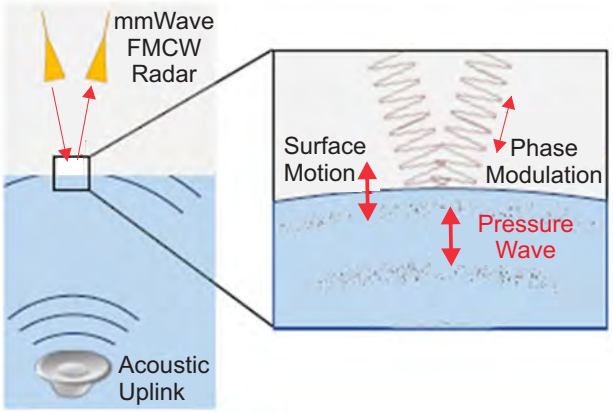
2. The researchers performed tests with the undersea optical communications system at a local pool near Lincoln Laboratory, showing that two underwater vehicles could efficiently search and locate each other. (Source: MIT)

Their approach used wide-bandwidth signaling features in the communications waveform to determine the relative position between the two vehicles with high precision, once the two terminals have locked onto each other and are communicating. After detecting the remote terminal's beacon, the local terminal can lock on and pull into coarse-track mode in less than one second, with the relative bearing and range known to within a few centimeters.

Translational Acoustic RF

Finally, MIT Media Lab researchers are working on the challenge of communicating from underwater to an overhead airborne receiver. Their translational acoustic-RF communication (TARF) system enables underwater nodes to directly communicate with airborne nodes by transmitting standard acoustic signals in a sonar-like scenario. The approach exploits the fact that that underwater acoustic signals travel as pressure waves, and that these waves cause incredibly minute displacements at the water's surface when they reach and impinge on the water-air boundary.

The system uses a specialized airborne radar that extracts and decodes these surface displacements, which are on the order of few microns. Then, via advanced signal-processing algorithms, these displacements are quantified even though they're buried in random surface-noise reflections as well as shifts in baseline height between the surface and aircraft (Fig. 3).



3. Surface vibrations from the underwater source translate into phase modulation, and a radar-based receiver is used to capture the phase of the wireless reflection changes caused by minute surface vibrations. (Source: MIT)

Their very readable paper "Networking across Boundaries: Enabling Wireless Communication through the Water-Air Interface" provides full details of an approach that seems to be "magic," but does work. The acoustic-source speaker operates at 150 Hz, driven by orthogonal frequency-division multiplexing (OFDM) encoding. For the airborne radar, they used a millimeter-wave frequency-modulated carrier wave (FMCW) receiver to capture the reflections from the water surface. Finally, using knowledge of the water "channel" characteristics (to the extent that it's possible), they implemented highly advanced algorithms to decode the returns.

In this one-way channel, there's obviously no possibility of feedback between source and receiver, which constrained their choices for some of the modulation- and channel-specific decisions they made. Nonetheless, they were able to demonstrate a link operating at up to 400 bits/s despite surface waves with amplitudes up to 16 cm (peak-to-peak), which is 100,000 times larger than the surface perturbations induced by their underwater acoustic transmitter that they were measuring.

References

"Appendix B: Submarine Communications Shore Infrastructure"
"Extremely Low Frequency Communications Program"
"USN ELF Communications System"

A professional drone for the price of a toy drone – How is that possible?

8th October 2018 |"The price driver with professional drones is not the technology, unfortunately very often it's just the brand name you pay for." DroneX Pro Inventor Nils Lasznuson

In the last 12 months, we in the editorial office have tested almost all the drones available on the market between USD 100 to USD 1500. Unfortunately, most models under USD 100 are difficult to control even in light wind. Also, the camera often does not deliver high quality photos and videos as promised.

It is quite different with this model called "DroneX Pro" Is this cheap drone really as good as tests in expert magazines say it is? We ordered one and examined it intensively. We were thrilled.

Why is this extremely high-quality drone so inexpensive?

The DroneX Pro was designed by two Norwegian engineers and drone lovers. The drones they already had were very difficult to maneuver and the quality of the video and photos did not meet their expectations.

Automatic flight aids

After a few weeks of intensive research and phone calls, they noticed to their amazement that the high-quality technology in expensive brand drones comes mainly from the SAME supplier companies and was not at all expensive.

They found out that most expensive brand drones are not pricey because of their technology but rather because of the brand name.

Motivated by the ambition to launch a much better drone at a fraction of the price of the profit-hungry brands, they created the DroneX Pro. In this video you can see DroneX Pro in action:

What makes the DroneX Pro so special?

This drone makes beginners look like professionals. The professional control is included with the delivery and makes manoeuvring easy even for beginners. In our editorial office, many colleagues had never flown a drone before and they got it right the first time.

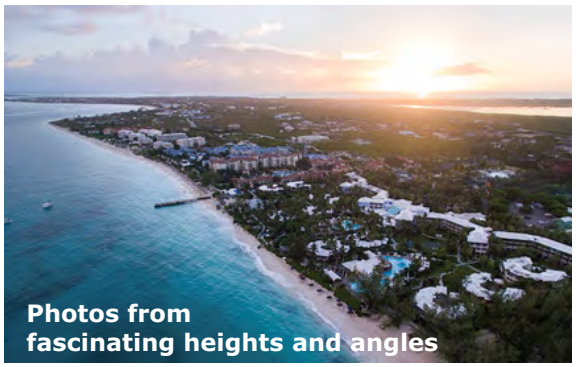
3-axis gimbal stabilizer

Automatic flight aids

Intelligent flight modes bring the drone to a safe landing, track people or objects, keep flight altitude, detect obstacles, and accomplish 3D spins or cool spins and flips when needed.

3-axis gimbal stabilizer

The high-quality hidden 3-axis gimbal can stabilize the camera even at high speed for sharp pictures and shake-free videos. Even with wind, the videos are razor-sharp and are transmitted in real-time from your environment - like a HD live stream.



Photos from fascinating heights and angles

Photos from fascinating heights and angles

The quality of the video transmission is especially crucial for a pleasant flight experience. The wide-angle lens provides the user with 100Mbps, which is the same as ultra-HD images. This gives wonderful, crystal clear images even from breath-taking heights

Ultra-panorama photos

In addition to horizontal and vertical shooting, the camera combines multiple images into crystal clear panoramic photos in just 3 seconds. Everyone loves a beautiful picture. No matter if you just want to shoot a snapshot or expand your portfolio.

Ultra-panorama photos

... to next page

A professional drone for the price of a toy drone – How is that possible?

... from previous page

Fold in and take with you

When folded, the drone is barely larger than a fist. It fits into a belt bag or a backpack! You do not need a film crew when flying the DroneX Pro. Simply tell the drone what to pursue and it will take care of the rest. Impress friends, work colleagues, and family with exciting shots of your life.

Why is this drone so popular?

This drone costs only a fraction of what professional brand drones do. It comes in a sleek, compact design and can be taken anywhere. It is quiet in the air and has an improved flight time of about 17-21 minutes.

This drone makes beginners look like professionals. Flying feels completely natural. At the time of the test flight, a few older colleagues were in the newsroom and they worked out how to use it within seconds. Even on their first drone flight ever. It is unbelievable how easy and fluent the operation with the provided controller is.

Our conclusion - buy it while it's still so cheap!

Demand for this model has grown rapidly in recent weeks. According to DroneX Pro, their inventory is in short supply since the launch due to numerous pre-orders and the reasonable launch price. However, the manufacturer guarantees all October buyers the low price of the first edition for under $ 100!
Breath-taking videos and pictures of your next holiday or event are now possible with this drone. Impress your friends and family with exciting pictures from your life. This drone is such fun and really makes everyone look cool.
Check Availability »

World premiere: Alstom's hydrogen trains enter passenger service in Lower Saxony

Bremervörde, 16 September 2018 - It was a world premiere being celebrated by Alstom, one of Europe's largest railway manufacturers, the Minister of Economy and Transport of Lower Saxony, the Federal Ministry of Transport and the transport authorities of Landesnahverkehrsgesells--chaft Niedersachsen (LNVG) and Eisenbahnen und Verkehrsbetriebe Elbe-Weser (EVB) in Bremervörde on Sunday 16 September. Before the many guests and members of the press from Germany and abroad, the world's first hydrogen fuel cell train rolled into the station. The Coradia iLint, built by Alstom in Salzgitter, Germany, is equipped with fuel cells which convert hydrogen and oxygen into electricity, thus eliminating pollutant emissions related to propulsion. From 17 September onwards, two such trains will enter commercial service according to a fixed timetable in Lower Saxony.

For the time being, it is travellers in EVB's Elbe-Weser network who can look forward to a world-first journey on the low-noise, zero-emission trains that reach up to 140 km/h. On behalf of LNVG, the Coradia iLint trains will be operated on nearly 100km of line running between Cuxhaven, Bremerhaven, Bremervörde and Buxtehude, replacing EVB's existing diesel fleet. The new trains will be fuelled at a mobile hydrogen filling station. The gaseous hydrogen will be pumped into the trains from a 40-foot-high steel container next to the tracks at Bremervörde station. With one tank, they can run throughout the network the whole day, thanks to a total autonomy of 1000 km. A stationary filling station on EVB premises is scheduled to go into operation in 2021, when Alstom will deliver a further 14 Coradia iLint trains to LNVG.

"This is a revolution for Alstom and for the future of mobility. The world's first hydrogen fuel cell train is entering passenger service and is ready for serial production," emphasises Henri Poupart-Lafarge, Chairman and CEO of Alstom. "The Coradia iLint heralds a new era in emission-free rail transport. It is an innovation that results from French-German teamwork and exemplifies successful cross-border cooperation."

Dr. Bernd Althusmann, Lower Saxony's Minister of Economy and Transport, whose department has supported LNVG's purchase of another 14 hydrogen trains with more than €81 million, is impressed: "With the test operation starting today, Lower Saxony is performing real pioneering work in local transport in cooperation with Alstom and EVB.

GM Cuts Are a Warning for All "OPERATIONS"

The cutbacks reflect a transformation underway, with nearly every type of business becoming oriented toward computers, software and automation.

Authors Tom Krisher, Josh Boak

General Motors

Dec 03, 2018 | DETROIT (AP) — For generations, the career path for smart kids around Detroit was to get an engineering or business degree and get hired by an automaker or parts supplier. If you worked hard and didn't screw up, you had a job for life with enough money to raise a family, take vacations and buy a weekend cottage in northern Michigan.

Now that once-reliable route to prosperity appears to be vanishing, as evidenced by General Motors' announcement this week that it plans to shed 8,000 white-collar jobs on top of 6,000 blue-collar ones.

It was a humbling warning that in this era of rapid and disruptive technological change, those with a college education are not necessarily insulated from the kind of layoffs factory workers know all too well.

The cutbacks reflect a transformation underway in both the auto industry and the broader U.S. economy, with nearly every type of business becoming oriented toward computers, software and automation.

"This is a big mega-trend pervading the whole economy," said Mark Muro, a senior fellow at the Brookings Institution who has researched changes being caused by the digital age.

Cities that suffered manufacturing job losses decades ago are now grappling with the problem of fewer opportunities for white-collar employees such as managers, lawyers, bankers and accountants. Since 2008, The Associated Press found, roughly a third of major U.S. metro areas have lost a greater percentage of white-collar jobs than blue-collar jobs. It's a phenomenon seen in such places as Wichita, Kansas, with its downsized aircraft industry, and towns in Wisconsin that have lost auto, industrial machinery or furniture-making jobs.

In GM's case, the jobs that will be shed through buyouts and layoffs are held largely by people who are experts in the internal combustion engine — mechanical engineers and others who spent their careers working on fuel injectors, transmissions, exhaust systems and other components that won't be needed for the electric cars that eventually will drive themselves. GM, the nation's largest automaker, says those vehicles are its future.

"We're talking about high-skilled people who have made a substantial investment in their education," said Marina Whitman, a retired professor of business and public policy at the University of Michigan and a former GM chief economist. "The transitions can be extremely painful for a subset of people."

GM is still hiring white-collar employees, but the new jobs are for those who can write software code, design laser sensors or develop batteries and other devices for future vehicles.

Those who are being thrown out of work might have to learn new skills if they hope to find new jobs, underscoring what Whitman said is another truism about the new economy: "You've got to regard education as a lifetime process. You probably are going to have multiple jobs in your lifetime. You've got to stay flexible."

Whitman said mechanical engineers are smart people who could transfer their skills to software or batteries, but they'll need training, and that takes time and money.

"In the past with these kinds of changes, eventually new jobs have been created," she said. "Will it happen this time, or is the change taking place too fast for everybody to be absorbed? I don't know."

... to next page

GM Cuts Are a Warning for All "OPERATIONS"

... from previous page

Although the job cuts took him and co-workers by surprise, Tracy Lucas, 54, a GM engine quality manager, decided to take the buyout and change careers. His children are grown and on their own, and with 33 years in at GM, he will get a pension and health care.

The buyout will also give him about eight months of pay, enough time to take his newly earned master's degree in business administration and look for different work. He said he will be glad to leave some tedious management tasks behind but will miss seeing through a lot of work to reduce engine warranty claims.

He is leaving in part, he said, to save a job for younger co-workers. GM got 2,250 white-collar workers to take buyouts, and will have to complete the cutbacks by way of layoffs.

"I really hate that we have to go into the whole process of tapping people on the shoulder," Lucas said. "I don't think the second wave is going to be pretty at all. It's going to be brutal."

The white-collar cutbacks — combined with more to come at Ford, which is likewise making the transition from personal ownership of gasoline-burning vehicles to ride-sharing and self-driving electric cars — could hamper the renaissance underway in Detroit, which is emerging from bankruptcy and a long population decline.

Many of these automotive industry engineers and managers are pulling down six-figure salaries, and some may have to move out of the Detroit metro area for new jobs.

The Brookings Institution's Muro wonders whether auto companies will bring more electrical engineers and software developers to Michigan or put them in places where such jobs are already clustered, such as San Francisco, Seattle, Boston or near major research universities.

"This is how regions change and labor markets change," Muro said.

GM says it will hire in the Detroit area, but its autonomous-vehicle workforce has grown to over 1,000 at offices in San Francisco and Seattle.

Nearly all of the 8,000 white-collar cutbacks will be in metropolitan Detroit, largely at GM's technical center in Warren, a suburb north of the city. That's equal to about 4 percent of the managerial and engineering jobs in the Detroit-Warren area, according to the Labor Department. Managerial salaries in the area average $124,000.

Ford, which is just beginning its salaried workforce downsizing, hasn't said how many will go. But even if it's half of GM's total, the white-collar losses around Detroit will approach those during the financial crisis of a decade ago, when the metro areas shed 14,450 managerial and engineering jobs. That was 8.9 percent of those types of jobs in the metro areas.

Layoffs are also likely to spread to auto parts suppliers, which won't need to design and build as many parts for gas-powered cars.

While GM says cutting these positions is necessary to save money to invest in the new technology, there are possible long-term costs to shedding so many experienced workers in one swoop, especially if the switch to electric vehicles stalls, said Joel Cutcher-Gershenfeld, a management professor at Brandeis University. If that were to happen, the cutbacks could leave GM without the vital expertise it needs.

Even the most skilled white-collar workers need to spend less and be prepared to change jobs or locations to stay employed, said Rick Knoth, a retired GM industrial engineer who survived a 2008 downsizing by taking an early retirement package after 37 years with the company.

Knoth said he is confident most engineers are smart enough to turn their skills into a new career. But all white-collar employees need to be ready for change because it comes fast, he said.

"The world isn't like it used to be, that's for sure," he said. "You can't count on anything." _ END

General Motors Calls for National Zero Emissions Vehicle (NZEV) Program

NZEV program could add more than 7 million electric vehicles on the road by 2030

SOURCE: GM Press

On Oct. 26, 2018, General Motors will file comments to the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks. In its comments, General Motors proposes the establishment of a National Zero Emissions Vehicle (NZEV) program to support a 50-state solution, promote the success of the U.S. automotive industry and preserve U.S. industrial leadership for years to come.

General Motors anticipates the NZEV program, as recommended, has the potential to place more than 7 million long-range EVs on the road by 2030, yielding a cumulative incremental reduction of 375 million tons of CO2 emissions between 2021 and 2030 over the existing ZEV program.