

newsletter

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Septentrio announces AiRx2™, the first TSO-certifiable aviation receiver with field-upgradability to L5 and Galileo

Septentrio announces AiRx2™, a compact TSO-certifiable GPS+SBAS Beta-3 OEM receiver. AiRx2 is specially designed for integration in precision aviation applications such as ADS-B, LPV approach or RNP-NAV applications. Uniquely, AiRx2 is ready for in the field upgrade to GPS L5 and Galileo, and provides the perfect preparation for reaping the benefits of



GNSS modernization in aviation applications.

AiRx2 is built around the special multi-system aviation ASIC ARECo™. This ASIC was designed according to the strict aviation requirements described in DO-254, and contains capabilities to process not only GPS L1 and SBAS signals, but also GPS L5 and Galileo signals. AiRx2 is compact and low power, and is perfectly suited for applications where size con-

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An Easier Way to Write Multi-Threaded C Code

vfAnalyst is a new cloud-based tool that simplifies the process of creating multicore programs written in C. It's the first tool to provide the critical combination of analyzing program behavior down to the loop level, discovering complex data dependencies, and using that information to make threading recommendations, acting as a navigator for parallelization.

The C language is particularly prevalent in the embedded world, where not only legacy C algorithms must be re-purposed into new applications, but new C code must also be written to implement new algorithms. This creates a need both for porting existing sequential code into a multicore implementation and for creating new efficient multicore code.

Porting existing code is straightforward for vfAnalyst since the detailed behavior of the program has already been defined. vfAnalyst scrutinizes the program as it executes a high-coverage data set. From this analysis, vfAnalyst can propose different ways of parallelizing loops in the program.

Creating a new program is a bit different since there is very little code to start with. Instead, one can define a skeleton program, stubbing out critical functions with placeholders that mimic the data parameters and any reads or writes in the function. The reads and writes don't have to do anything useful; they're just there to let vfAnalyst know that it will

be touching some data. Based on this, vfAnalyst can identify the most promising thread partitions.

One then fills in the skeleton over time with real code, running the result on vfAnalyst throughout to make sure that no new interactions have arisen that might require a change in threading. The result is a program optimized for multi-threading.

The hardest part about parallelizing C code by hand is dealing with the data dependencies. Pointers create subtle data interactions that can be broken if you don't parallelize correctly or if you omit critical data synchronization. Bugs of this nature can be incredibly frustrating to locate and fix.

vfAnalyst can specifically show where threading would create such problems, and, conversely, it can locate instances where data streams can be used to keep threads in synch. It also calculates the size of buffers and FIFOs needed so that the parallel program will work identically to the sequential original. When pro-



About Vector Fabrics

Vector Fabrics simplifies the process of parallelizing C code for both enterprise and embedded applications, providing navigation aids for multi-threading and turning a months-long error-prone process into a manageable correct-by-construction task. Its first product, vfAnalyst, can assist in the parallelization of any C program on a system-agnostic basis. Vector Fabrics tools are hosted in "the cloud" and are accessible by any standard browser. Vector Fabrics is based in Eindhoven, the Netherlands.

posing threading alternatives, vfAnalyst takes these interactions into account and shows, for each option, how many threads would be created, how many data streams would be needed, and what loop speed-up would result. Once you select an option, vfAnalyst shows the impact of the decision.

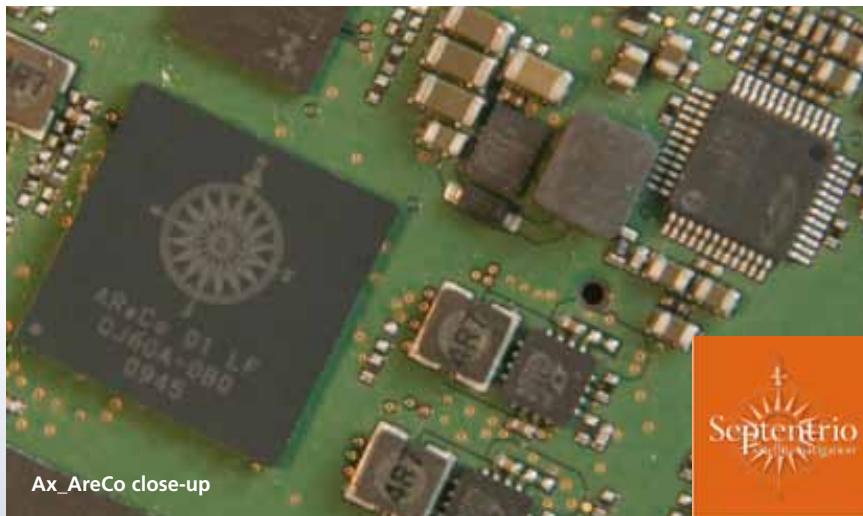
vfAnalyst is system-agnostic, meaning it doesn't care about the actual underlying processors and architecture. You can, however, annotate actual timing on various loops or functions in the program to scale the analysis, providing a more accurate estimate of the timing for a specific system. You can also annotate required timing; vfAnalyst will then provide slack information to help you drive the parallelization process only far enough to get your required performance, reducing development and implementation cost.

vfAnalyst runs in any browser, and can be accessed at vectorfabrics.com. ■



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Septentrio announces AiRx2™, the first TSO-certifiable aviation receiver with field-upgradability to L5 and Galileo



new signals and systems bring." said Peter Grognaud, Managing Director of Septentrio. "AiRx2 exploits the capabilities of these signals with our latest ASIC technology. This receiver is ideal for avionic system integrators who want to build solutions which perform optimally with signals available today, and which can evolve to incorporate new signals tomorrow." ■

About Septentrio

Septentrio Satellite Navigation NV designs, manufactures, markets and supports high-end OEM GNSS receivers for demanding professional navigation, positioning and timing applications. Septentrio has an international team of experts in all areas of satellite navigation receiver design and applications.

straints, weight and minimal power consumption are critical, such as in helicopter cockpits or for UAV applications. The receiver module further contains multiple innovative reliability features, including an embedded independent health processor, significantly reducing integration complexity for users who wish to build their

navigation solutions around the AiRx2 receiver. AiRx2 furthermore provides code and carrier data for ground reference station applications (GBAS).

"With the evolution of GNSS systems, more and more users demand the possibility to prepare for the benefits these

Is Networking contributing to Innovation?

There is no doubt: YES! Networking is contributing to innovation! Let's elaborate on this point of view.

In our today's world, (embedded) ICT is becoming ever more important in creating added value in a wide range of products and applications. As such, the utilization of embedded ICT for creating new added value, by creating new functionalities or by making new combinations of functionalities, clearly is innovative. Nevertheless, this added value creation also induces an ever increasing complexity. This ever increasing complexity in embedded ICT comes from different aspects, such as typical constraints in embedded systems (limited power, limited storage, reliability, real-time behavior...), increasing HW complexity (from 8 to 16 to 32 to 64 bit microprocessors, from single processor to multiprocessor...), increasing possibilities enabled by on-going miniaturization by

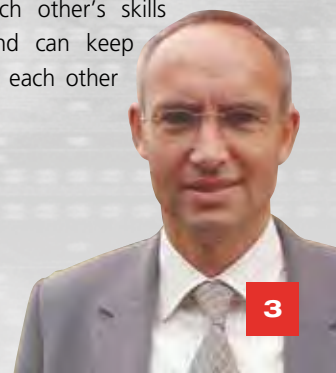
Moore's law, from stand-alone to (wirelessly) connected applications, and so on...

Because of the increasing complexity, as described above, it becomes difficult for any single organization to develop all required competencies and technologies in-house. Hence, cooperation becomes a necessity. In the creation of the new added value as described above, innovation requires cooperation, which can be implemented in many ways of complementarity: either in complementarity of functionalities (e.g. image processing + wireless communications), either in complementarity in the value chain (e.g. fabless IC design houses + wafer fabs + packaging...). Therefore, there is a clear need for clustering, where different players can help each other. It is also clear that cooperation is a necessary aspect in the concept of open innovation, where

an organization is looking beyond the borders of its own entity to find the best suitable innovation partners.

Where a cluster is a (spontaneous) group of organizations, with different skills and competencies, complementing each other, a technology networking organization gives additional value to a cluster, by enabling and structuring the contacts between the different players of the cluster. As such, a technology network is a structured and managed organization in a cluster environment, where people and organizations can meet each other and can discover each other's skills and competencies and can keep this knowledge about each other up-to-date.

Peter Simkens
Managing Director
DSP Valley



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Jabil develops IP camera

Cameras with H.264 encoding capabilities are becoming more and more attractive in the market. Low-cost encoder SOC's and cost-effective optical modules enable interesting price points and support a large feature set, that was only available in the professional market. Jabil Belgium has developed a low cost, H.264 camera for the consumer and security market. The optical module and the sensor can easily be adapted to specific customer needs.



Key Features & Specifications

- UXGA CMOS sensor 1/3.2"
- Wide-angle lens (DFOV ~120°) with IR coating
- PoE or DC powered
- Multiple stream encoding and distribution
- Motion detection using multiple ROI
- Alarm notifications (SMTP) and recording (FTP)
- Timestamp burn-in into video stream
- IP streaming via RTP/RTSP, UDP, HTTP Live
- IP streaming support for unicast and multicasting
- Containers supported: MKV, MP4, MP2TS
- Camera control via built-in webserver
- Camera device recognition based on uPnP discovery
- ePTZ capabilities for up to 720p resolution
- Optional UVC & UAC support (USB Video/Audio Device stack)



Camera

The camera is equipped with Ethernet and USB interfaces. The Ethernet interface supports Power over Ethernet (PoE) allowing the camera to be powered and controlled with a single network cable. In combination with Homeplug adapters with PoE, easy and flexible network connection is possible.

The CMOS sensor has UXGA resolution (2MP) and can stream UXGA@15fps or 720p@30fps. For surveillance purposes, the lens is wide-angle (D-FOV > 100°). The camera can be controlled using a built-in web server.

The camera supports motion detection

and alarm handling. Motion detection can be configured with multiple regions of interest. Alarm notification (SMTP) and alarm recording (FTP) are available with time-stamps burned into the video stream.

The IP streaming supports multiple clients and multiple formats, like RTP/RTSP, UDP, Http Live, unicast and multicast. The AV stream supports multiple containers (MPEG2-TS, MP4, Matroska container).

The camera uses standard external mounts like dedicated wall-mounts and table mounts.

About Jabil

Jabil Circuit, Inc., is an electronics solutions company providing electronic manufacturing services and solutions in the Americas, Europe, and Asia.

Jabil offers design (electronics, mechanical and software), production, product management, and after-market services to companies in the aerospace, automotive, computing, consumer, defense, industrial, instrumentation, medical, networking, peripherals, storage, and telecommunications industries.

About Jabil Hasselt

Jabil Hasselt delivers product design, PCB design, product validation, test solutions and fast prototyping for electronic products. We provide a one-stop-shop solution to diverse industries such as consumer, industrial and medical. With more than 30 years of experience and in-depth knowledge in product development, validation and testing, Jabil's Hasselt team provides best-in-class services for even the most complex projects, with a strong focus on lowest cost, highest quality and fast market introduction.

imec Virtual Camera (iVC), the ultimate angle on reality

At the NAB Show in Las Vegas (April 12-15, 2010) the nanotechnology research center imec presented a revolutionary new video technology for dynamic viewing and advanced image manipulation, the imec Virtual Camera (iVC).



Imec Virtual Camera turns the input from fixed cameras into a 3D space where the Director or cameraman has the total freedom to choose any angle or distance to the action. iVC gives the Director a flying camera that he can easily steer anywhere he wants to find the ultimate angle. iVC is also unique because it allows real-time advanced image manipulation on still shots, slow motion and even on live video feed. Moreover, iVC developers paid particular attention to cost effectiveness and ease of use. Imec Virtual Camera is a fully operational prototype that is now ready for licensing iVC can be easily integrated into any existing production pipeline. The video input comes from standard HD-IP cameras, without compromising the quality of the output. As HD-IP cameras cost only a fraction of conventional outside broadcasting cameras, the production cost is dramatically reduced. And, iVC is handled via a user-friendly remote control panel comparable to that of a regular boom camera or spider cam, enabling the Director or cameraman a straightforward manipulation of the virtual camera.

Imec Virtual Camera brings many new and exciting possibilities in sports, concerts or performance broadcasting. For example, with iVC, you can experience a personalized rock concert, watching it from the best seat in the stadium, or you could zoom in on the feet of the ballet dancer when they are brought together for a landing. You could follow the curve of the ball when a quarterback throws a 40 yard pass, or sit on the striker's shoulder when he is getting ready to score his legendary goal, ... Unlike other digital vision technologies, where the constraints of the specific sport have to be taken into



account during development, iVC works instantly with any sports that takes place on a flat surface (tennis, football, soccer, volleyball, basketball, baseball, ...). Moreover, iVC's advanced image manipulation also features digital signage, player tracking, instant off-side analysis,...

About imec

Imec performs world-leading research in nano-electronics. Imec leverages its scientific knowledge with the innovative power of its global partnerships in ICT, health-care and energy. Imec delivers industry-relevant technology solutions. In a unique high-tech environment, its international top talent is committed to providing the building blocks for a better life in a sustainable society.


Imec is headquartered in Leuven, Belgium, and has offices in Belgium, the Netherlands, Taiwan, US, China and Japan. Its staff of more than 1,750 people includes over 650 industrial residents and guest researchers. In 2008, imec's revenue (P&L) was 270 million euro.

Embedded Software Development Driven by Tests

EP research group - KHBO



Test-Driven Development is a practice, which quickly has gained a foothold in business application software development. Fiery advocates proclaim that it improves software quality, while reducing software development time. Though, the embedded software industry seems to be hesitant, as they rightly point towards some obstacles inherent to the embedded field. However we believe that these obstacles should not prove to be insurmountable.

 Test-Driven Development (TDD) schedules testing earlier in the development process. By writing the test before the implementation, the developer is forced to focus on expected behavior instead of implementation details.

The red-green-refactor mantra, as it is called, refers to the colors displayed in typical unit test frameworks. First a failing test is written, i.e. red. The test must fail to prove that the new functionality is not already implemented. Next, the test is made to succeed with as much implementation as needed but not anything more, i.e. green. The final step is improving the code quality without adding functionality or breaking the tests. This is also known as refactoring. Reiterating through this process will gradually build an entire test suite. As the process requires running the test suite frequently, bugs are identified early in development. A new test is added for each bug that is found, which detects regression errors. Since Boehm's law states that the earlier a bug is caught in the development cycle, the less it will cost to correct the bug, this TDD-process results in a positive return on investment. However, tests must run frequently and fast in order for TDD to be successful, meaning the program must be built, executed and tested in a short time span. This proves to be one of the main obstacles. We distinguish the following strategies for TDD on embedded, depending on the locality of tests and program.

The first strategy (1 in Figure 1) places both the test-code and program-code inside the target. However, this is a simplistic strategy and some of the

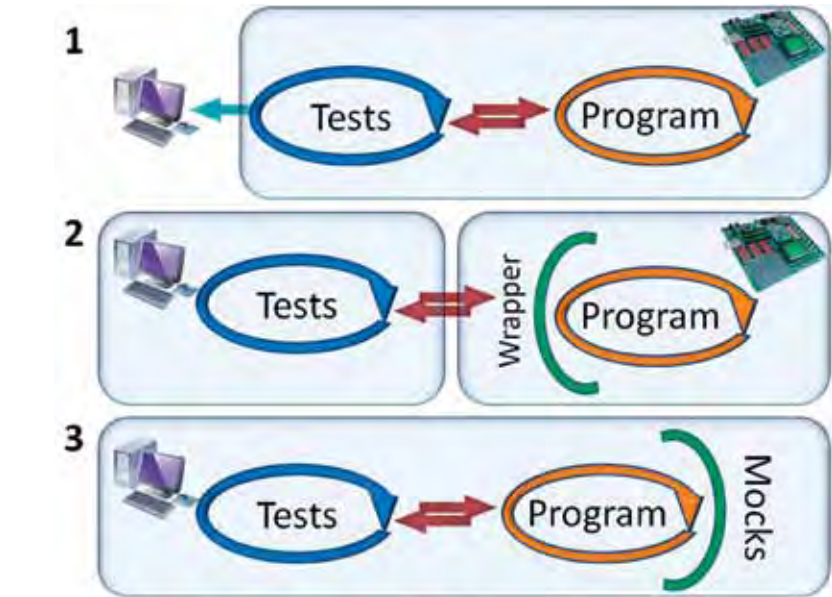


Figure 1: Strategies for TDD on embedded

sore points are uncovered immediately. Foremost is the restricted memory footprint of the test-code typical for an embedded system's limited memory size. Also, deploying the code and executing the tests on the target will quickly take considerable time, slowing the TDD cycle down. Finally, at the beginning of the project the embedded hardware might not be available yet.

The second option (2 in Figure 1) deals with the limitations of memory on the target. By moving the tests to a host environment, the burden on the embedded system is reduced. However an additional wrapper needs to be written and maintained, to enable communication between tests and program under test.

In the third strategy both program and tests are executed on a host computer. The real hardware is replaced by software faking the functionality of the hardware. This technique, mostly used in business

application software development to replace slow database connections, is called mocking. Although the fast prototyping strategy enables the fast feedback of test results vital to the TDD process, it introduces other problems. The main issues are cross-compilation and verification of correspondence of virtual and real drivers. These issues demand that development on host is verified by a testing phase on target. On the other hand the time saved by developing on host might well be worth it.

After dealing with the issues caused directly by the hardware, one impediment still remains for the embedded industry. Namely, in order to isolate the function under test, TDD makes use of polymorphic interfaces. Yet the majority of embedded software is written in C, a structural language that does not support this feature. This can be resolved by (1) using preprocessor macros, (2) function pointers or (3) using the linker to link in a

About EP

Enterprise Programming (EP) is a research group founded at the KHBO university college and is closely related to the Software Development Methodology (SOM) group at K.U.Leuven (Belgium).

Our mission is threefold, consisting of research, education and social services, not necessarily in this order of importance. Members of the research group are embedded in the educational curriculum. Be it as an instructor of courses, assistant of labs or coach of projects all related to our research interests. The EP group organizes its research in two domains. We focus on fundamental research in the domain of concurrent execution of programs, transactional and atomic behavior. On the other hand the focus of our applied research is on software process evolution in embedded systems and frameworks for game development.

stub or the real function. However these techniques are considered impractical or even possibly dangerous.

In conclusion we state that TDD definitely has its merits in embedded software development, especially with the continuous increase in complexity of embedded systems. Although writing tests imposes an extra load on developing embedded

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The technology network also facilitates an environment, where mutual trust is created, enabling early exchange of ideas, and where entrepreneurial experiences can be shared.

The networking, as practiced in DSP Valley, is embracing the above described ideas and, as a result, has indeed helped to create a lot of new partnerships, most of them with high innovation content. This makes that today, we can clearly say

software, this will be compensated by the prospect of reducing the quality assurance phase.

More information about this topic can be found on the content management system of the EP-research group reachable at <http://ep.khbo.be/TDD4ES>. Membership to this IWT funded research project provides access to detailed information. ■

that DSP Valley is not only an innovation stimulating networking organization, but also a cluster of intensively partnered businesses and research institutes. If also your company is looking for the development of new innovative solutions, you are very welcome to participate in our networking activities! ■

Sincerely,
Peter Simkens
Managing Director



Wireless Sensor Nodes are talking Gossip (3)

Here more about a user case announced in the previous newsletter.

Amsterdam, 26 April 2010, CHESS has successfully tested a full self-organizing wireless node network in the Fyra Hispeed train of the Dutch and Belgian railway companies. More than 500 MyriaNed®Nodes were placed in a long train with seven carriages. For each seat one Myria-Node with a simple LED indicates the seat is free or not. The goal of the test was to show the Myria-Nodes network was employed very easy and operates without problems. In less than 2 hours the complete network was up and running!

The technical interest was to find out the network behavior in the whole train, behavior between the clutches of the carriages and the working in an operational environment. The clutch between the carriages is a construction with a lot metal and cabling and could

be a problem to the low power radio signal of the nodes network. During the test people were walking through the train and other trains went by a side on other tracks.

The network communication was without any problems. We needed a few extra nodes at each balcony of the train to connect to the other carriage. Not only the density of the node network was helpful, but especially the self-organizing character of the MyriaNed® network takes care for a robust operating network. Because the Myria-nodes are talking Gossip. Gossip is the used 'ad hoc network protocol' located at the mac-layer (we call it Gmac) of MyriaNed®. With Gossip we don't need any network-management. With Gossip the commission of the nodes network is very easy. Also the network is auto-re-establishing: each node will auto-configure in the network, also if the connection is temporarily disconnected



for what reason ever. Finally, we have proved the working of a self-organizing wireless node network at a large scale. Don't try this with Zigbee or other protocols. ■

Collaboration with semiconductor company Huali gives imec China a jump start

Imec officially established imec China in the Zhangjiang High-tech Park in Shanghai. Imec China kicked off with the signing of a joint development project on advanced chip process technology with the semiconductor company Huali.



China's economic influence is unequivocal worldwide. With increasing intention and capability to invest into advanced technologies, China is potentially an important market for a nanoelectronics R&D center as imec. Imec China will facilitate collaboration between imec and Chinese semiconductor and system companies, universities and research institutes in the area of technology transfer, licensing, joint development and training. Imec China starts with 5 employees. Dependent on future col-

laboration agreements, imec China will attract researchers to closely collaborate with the local companies on the joint development projects.

Imec China kicked off with the signing of a significant collaboration agreement on 65nm CMOS chip technology with Huali, an advanced chip manufacturer invested mainly by Shanghai government. A team of Huali and imec researchers will fine-tune imec's 65nm base process at imec's research facilities

in Leuven, Belgium, to meet the specifications defined by Huali.

"This collaboration with Huali proves that our technologies are valuable for the Chinese market. We are looking forward to expand our collaborations with the huge high-tech potential of China;" said Luc Van den hove, President and CEO of imec. *"I would like to thank the Zhangjiang High-tech Park for their support in establishing imec China."*

FreeFlight Systems and Septentrio form strategic partnership



FreeFlight Systems and Septentrio Satellite Navigation announced a strategic partnership to develop new, advanced GPS/SBAS receivers for ADS-B, RNP and LPV applications.

As the global air traffic management system continues to move away from radar based operations to autonomous aircraft based operations, aircrafts need high integrity, high performance satellite based position and navigation sources. The new systems being developed by FreeFlight Systems and Septentrio will satisfy this need for both new and in-service aircraft.

"Our goal is to make affordable equipment that will allow any aircraft to take advantage of the new services that are available as part of the global transition to satellite based operations," said Tim Taylor, FreeFlight Systems President and CEO. *"With the Septentrio engine at the heart of our systems, we are ensuring the best possible performance in all applications and global locations."*

About FreeFlight Systems

Founded in 2001 through the acquisition of Trimble Navigation's Avionics Products Division, FreeFlight Systems is an international supplier of professional-grade avionics systems for commercial and military aircraft. With a focus on safety, simplicity, and reliability, FreeFlight Systems offers a broad array of GPS navigation systems, GNSS/SBAS sensors, radar altimeters, and ADS-B components and systems worldwide. Based in Waco, TX (USA), FreeFlight Systems was the first company to certify an airborne Wide Area Augmentation System (WAAS) receiver.

(About Septentrio: see p. 3)

The Septentrio engine meets the most stringent performance standards for precision, integrity and availability and is capable of using either the existing GPS constellation or the newer Galileo system.

"Septentrio is excited to work with FreeFlight Systems," said Peter Grogard, Managing Director of Septentrio. *"FreeFlight Systems shares with Septentrio a vision of how GNSS technology can modernize aviation in practical, realis-*

tic steps. The practical experience and extensive presence in many platforms of FreeFlight products and their early involvement in aviation modernization programs such as Capstone for ADS/B fits excellently with Septentrio's pioneering spirit in Galileo and our experience and technology for building high-quality multi-frequency and multi-constellation GNSS receivers."

Septentrio and AsteRx are registered trademarks in the United States and/or other countries. All other company names and products mentioned herein may be the property of their respective companies.

MyMax Mobile NFC Sticker

tbp electronics gets stuck into the “sticky” business of Near Field Communication

Near Field Communication (NFC) technology is by no means new—the technology expected to revolutionize how people pay for goods and services, use public transport, and share data between devices has not taken off as fast as expected by silicon vendors. The lack of NFC compatible mobile phones and the complexity of the business ecosystem integrating market players such as the mobile network operators, banks, card manufacturers, transport operators and retailers have hindered its deployment. However, the short-term problem of how to incorporate NFC functionality into phones has been overcome with the introduction of the MyMax NFC mobile sticker.



Manufactured by tbp electronics Belgium for TWINLIX, based in France, whose products are aimed at accelerating the growth of NFC applications and markets, MyMax is a thin electronic sticker designed to upgrade existing and future Bluetooth phones with NFC functionality. MyMax is expected to open the door to the development and mass deployment of NFC applications such as payment, transport, loyalty, access control and smart posters.

also logical that Belgium’s most experienced EMS telecoms provider applies its manufacturing expertise to the field of NFC technology. Let’s not forget that the Geel site was the first to industrialize Asymmetric Digital Subscriber Line (ADSL) technology and the company’s experience in broadband technology covering DSL (Digital Subscriber Line), BRAS (Broadband Remote Access Server)/NGN (Next Generation Networking), and Internet core routers.

phones. It operates either as a contactless reader or a contactless card and has 3 modes of operation—passive, internal and reader mode. As a contactless card, it operates in a fully passive way without using its internal battery and is powered by an external reader. Its internal battery is used only in reader operation and for Bluetooth communication with the phone.

In passive mode, MyMax behaves as a contactless card – any other contactless chip can be put into the sticker to make it compatible with existing applications to provide a multi-application capability.

MyMax

MyMax sticker from Twinlix works with most Bluetooth mobile phones and smart



The MyMax NFC Sticker

With analysts forecasting that mobile phone-based contactless payments will account for over \$36 billion of worldwide consumer spending by 2011; researchers Frost & Sullivan predicting that one third of all mobile phones will be equipped with NFC technology during the coming three to five years; and Jupiter Research projecting that NFC Mobile Payments will exceed \$30bn by 2012, not only does it seem to be the right time for tbp electronics to be getting in on the act but

tbp MyMax FEATURES

Size: 38mm x 29mm, Thickness: 1.8mm

Card emulation and contactless reader operation (NFC)

Communication standards:

- ISO 14443A-3
- ISO 14443B-3

Card-like operation: no battery needed

Battery recharged via a photovoltaic cell

Low battery alert on the phone screen

Integrated push button to switch on the sticker

128kB flash memory for data/applications storage

Multi-application environment for application storage/downloading

Operating temperature: -25°C to +70°C

Sticker lifetime: 2 years

Approximate communication distances:

- passive mode: 4 cm
- reader mode: 3 cm

300 phone connections with fully recharged battery

Battery recharging time varies according to light conditions:

- full sunlight: 20 minutes
- Indoor artificial light: 16 hours
- Outdoor cloudy: 1 hour

In internal mode, MyMax must be switched on to establish communication between the phone and the stickers' internal flash memory and/or integrated contactless chip. In this mode the internal contactless chip can be accessed by the phone.

In reader mode, MyMax must also be switched on, whereby it behaves as a contactless reader that reads an external RFID tag (operating at 13.56MHz) or other contactless cards to enable a transaction to take place. In reader mode, it either stores received data in its flash memory or transmits it to the phone through the Bluetooth interface. It can also communicate with another MyMax sticker in either passive or reader mode (called Peer-to-Peer).

MyMax can incorporate any contactless chip on the market. One version of the sticker incorporates INSIDE Contactless' award winning INSIDE MicroPass®, the most widely adopted contactless payment platform, and approved by all major payment brands. Twinlinx and INSIDE

Contactless are working together to obtain payment certification for MyMax from major bank card brands to help promote widespread consumer adoption of the technology. They expect banks to start NFC mobile payment deployment during 2010.

Another version of the sticker integrates the banking certified multi-application contactless Java Card chip. At the end of 2009, Twinlinx and Sagem Orga (Safran Group) unveiled the "SIMply Mobile Wallet" sticker powered by MyMax and integrating Sagem Orga's Java Card technology. Initially, the Sagem Orga Java Card™ JMV Pro CL is being used as the secure element in the sticker, allowing users to directly interact with the Java Card™ through a mobile application. New services can be added and managed securely over the air (OTA) via the SIMply Mobile Wallet sticker supporting MasterCard and Visa payment applications and offering compatibility with MIFARE technology.

Tbp electronics delivered the first MyMax prototypes to Twinlinx at the beginning of 2010 and the two companies are now well into the industrialization phase with commercial roll-out planned for September. MyMax is assembled in relatively high volume on a very thin substrate using very small 0201 and QFN Surface Mount Components – a manufacturing challenge that tbp easily overcomes thanks to its expertise in high-tech assemblies. However, tbp's role is much more proactive and goes much deeper than that of standard assembly, the company's know-how in design for manufacture and test of telecom products has enabled it to assist TwinLinX in the selection of design rules that make the design more manufacturable and testable.

So, with Near Field Technology finally set to take off this year, let's hope the technology lives up to its promise of being—*the technology that makes life better in the future*—not only for consumers, but for developers and businesses!

Near Field Communication (NFC) and how it works

Near Field Communication is a standards-based, short-range wireless connectivity technology that enables simple and safe two-way interactions among electronic devices. With NFC technology, consumers can perform contactless transactions, access digital content and connect devices with the simplicity of a single touch. NFC also eases the set-up of longer-range wireless technologies, such as Bluetooth and Wi-Fi.

NFC technology allows mobile devices to "read" information stored in "tags". These tags can be affixed to everyday objects such as posters, bus stop signs, street signs, medicine labels, certificates, food packaging, and more. The NFC Forum (www.nfc-forum.org) has developed the "N-Mark" trademark so that consumers can easily identify where their NFC-enabled devices can be used.

A wide range of devices and machines that are likely to become NFC enabled

include:

- Mobile phones
- Turnstiles
- Vending machines
- Parking meters
- Check-out cash registers or "point-of-sale" equipment
- Cash machines
- Office, house, and garage doors
- Personal computers
- Posters, street signs, bus stops, local points of interest (with NFC-readable tags only)
- Product packaging

Based on inductive-coupling, where loosely coupled inductive circuits share power and data over a distance of a few centimeters, NFC devices share the basic technology with proximity (13.56MHz) RFID tags and contactless smartcards, but have a number of key new features. NFC devices are unique in that they can change their mode of operation to be in



reader/writer mode, peer-to-peer mode, or card emulation mode. The different operating modes are based on the ISO/IEC 18092 NFC IP-1 and ISO/IEC 14443 contactless smart card standards.

- In reader/writer mode, the NFC device is capable of reading NFC Forum-mandated tag types, such as in the scenario of reading an NFC Smart Poster tag. The reader/writer mode on the RF interface is compliant to the ISO 14443 and FeliCa schemes.
- In Peer-to-Peer mode, two NFC devices can exchange data. For example, you can share Bluetooth or WiFi link set up parameters or you can exchange data such as virtual business cards or digital photos. Peer-

to-Peer mode is standardized on the ISO/IEC 18092 standard.

- In Card Emulation mode, the NFC device appears to an external reader much the same as a traditional contactless smart card. This enables contactless payments and ticketing by NFC devices without changing the existing infrastructure.

NFC Standards are acknowledged by ISO/IEC (International Organization for Standardization / International Electrotechnical Commission), ETSI (European Telecommunications Standards Institute), and ECMA (European association for standardizing information and communication systems). The NFC standard supports vary-

ing data rates to ensure interoperability between pre-existing infrastructures. The current data rates are 106kbps, 212kbps and 424kbps.

Information supplied courtesy of the NFC Forum - www.nfc-forum.org



Embedded Systems for the Smart Home

How can embedded technology help to reduce our electricity bill without compromising on our daily comfort? What challenges lay ahead for domestic control applications? And how does this all fit with the story of Smart Grids? This was the topic for a DSP Valley technology seminar on April 27th, 2010. Seventy participants showed their interest in the domain of Smart Domestic Technology and Appliances and came to the Ubicenter in Leuven to be submersed in a lecture program and mini-exhibition.

The first speaker to enlighten the audience with his vision on the topic was prof. Geert Deconinck from the ESAT-ELECTA department of the University of Leuven (Belgium). He gave a general overview on smart grids, smart meters and the possible technologies to be used for the next generation of energy monitoring. The professor also stated that there is a significant difference between "intelligent metering", "automatic meter management" and "automated meter reading", although they are all commonly referenced as "Smart metering".

The second speaker to take the floor was Patricia Van Reeth from AnSem. She focused primarily on the communication standards to be used in the "Smart Home": What are the solutions that are available today and what will be the standards and technologies that will make it tomorrow? Perhaps a combina-

tion of different technologies will prove to be an ideal mixture. She wrapped-up with an overview of the technology that AnSem can provide to enable the "Smart Home".

The last presenter before the break was Albert Wambecq from Alcatel-Lucent. He shared his view on the value chain in the "Smart Home". He depicted a so-called E-box as a Home Energy Management Platform to enable several services tied to households and/or commercial buildings as and when they become relevant or available on the market.

After the coffee, Richard Visée from SystematC Design shared his dream about smart sensing applications to reduce energy waste. He showed that all the technology needed to create such a smart sensor, from the sensing part, over the processing component to the energy harvesting, is already known and available today. We just need to create that sensing application.

Lex James from Philips Applied Technologies elaborated on the change in behavior of the customers that is needed when evolving to a "smart" way of controlling our energy in the domestic environments. He stated that the user has to be helped and supported when undergoing this change. It is therefore necessary to have an energy management system with ample feedback possibilities to provide an insight



Bjorn Van de Vondel, Peter Verboven and Patricia Van Reeth

in the private usage and production of electrical energy.

The final presentation was an exposition on the Flemish Smart Grid Platform (VSGP) by Peter Verboven. He introduced this platform as an initiative to consolidate and bundle all the efforts invested in the smart grid story. He provided the audience an insight in how this vehicle will support the definition and initiation of (industrial) research projects in the field of smart grids with a clear industrial affinity.

After the presentations, the participants were invited to join the speakers for a closing reception. By the sound of different interesting discussions during the networking drink, one can only come to the conclusion that the last words are far from being said on this interesting topic.



GN ReSound Develops Wireless Protocol Stack for Next-Generation Hearing Instruments, using Target's Optimizing C Compiler Technology

Target Compiler Technologies, the leader in application-specific processor (ASIP) design tools, announced that the wireless protocol stack of Range, GN ReSound's new hearing instrument platform, was entirely developed using Target's optimizing C compiler technology.



GN ReSound's Range platform was separately announced by the hearing instrument leader at the AudiologyNow! Conference, and marks a leap forward in hearing innovation, with vastly improved connectivity with the surrounding world. The new platform incorporates GN ReSound's next-generation ultra-low power digital signal processor called Coyote 4.

GN ReSound has been using Target's IP Designer tool-suite to model a number of generations of its Coyote DSP architecture family. For each DSP, the IP Designer tool-suite automatically generated a software development kit (SDK), including an optimizing C compiler, instruction-set simulator and on-chip debugger. GN ReSound's latest DSP, the Coyote 4, has been significantly extended with new audio functions and wireless communication capabilities. A key element is a wireless protocol stack that was developed entirely in C code and compiled onto the Coyote 4 DSP.

Brian Dam Pedersen, Chief System

Architect of GN ReSound commented: *"Innovation and time to market are crucial for GN Resound. Using Target's IP Designer tool-suite with its excellent C compiler technology, we have been able to develop our wireless protocol stack, map it onto our new DSP, and verify its operation, in record time. Moreover, Target's C compiler is highly efficient both in cycle performance and code size, even on our specialized DSP architecture. This efficiency is key for our ultra-low power platform."*

Gert Goossens, Target's CEO, said: *"We are delighted with the opportunity to contribute to GN ReSound's accelerated development of a new groundbreaking hearing instrument platform. Hearing instruments evolve into sophisticated devices combining more advanced audio, wireless communication and embedded software, all with ultra-low power operation. This has led to a wider adoption of ASIPs and of our ASIP design tools by the hearing industry."*

IP Designer is a retargetable tool-suite for the design and programming of ASIPs. The designer can easily describe ASIP architectures with performance and energy characteristics that are superior to general-purpose processors or close to hardwired data-paths. Using the nML processor description language and the retargetable SDK (including highly optimizing C compiler, cycle- or instruction-accurate simulator, and graphical debugger/profiler), one can explore and fine-tune the processor architecture and then generate a low-power register-transfer level (RTL) hardware implementation of the ASIP, accompanied by a comprehensive verification suite.

Under the brand name IP Programmer, Target also offers comprehensive SDKs intended for third-party users of ASIPs that were designed with IP Designer. Simulation models for virtual prototypes are also made available as part of this package.

Blue Guide EMC lab is now part of the Dekimo group



We are glad to inform you that the Blue Guide EMC lab (www.bgemc.com) in Erpe-Mere, founded in 1996 by Pioneer Electronics, is now also part of the Dekimo group.

The BGEMC lab is accredited and fully equipped to perform full compliant measurements, so you obtain a con-

formity certificate and you may label your product as CE. However, also pre-compliant measurements and tests can be executed on your products in development. We also support you with professional advice, possibly in our "debug corner" where you can test optimizations yourself.

This is a logical step in the strategic growth of the Dekimo group and the production plant More@Mere (www.moreatmere.com). Indeed, EMC certification is often the final step of the development activities of Dekimo Products (www.dekimo.com) in Ghent and Layers (www.layers.com) in Leuven.

Multi-Agent Simulation for Robocup soccer



Within the Robocup.be project Tim Vermeulen developed in his master thesis at KaHo Sint-Lieven Information Technology Department a simulation tool that enables creating and testing different soccer strategies for the Belgian team. Besides building an appropriate hardware design for the robot, the software which must control it is probably even more important. The delayed information from the cameras needs to be processed to predict the actual position and speed of all the robots and the ball. Next, the team needs to determine a global strategy, which will result in a single strategy for every player. To achieve this strategy, the player will calculate the required actions: moving, turning and, if appropriate, kicking the ball.

Tim's thesis proposes a multi-agent simulation environment. By applying a multi-agent approach, a pretty complex global strategy can be modeled with a simple behavior for every single robot/agent. The advantage of the simulation is avoiding time-consuming testing with real robots and especially covering the lack of hardware at this stage of the project.

In a first step a simulation environment was created using the physical engine Phys2D for modeling the physical properties of the robots, the ball and the field as accurately as possible. In a second step this physical environment was extended with a multi-agent system in order to acquire a simulator for developing and testing intelligent multi-agent soccer strategies.

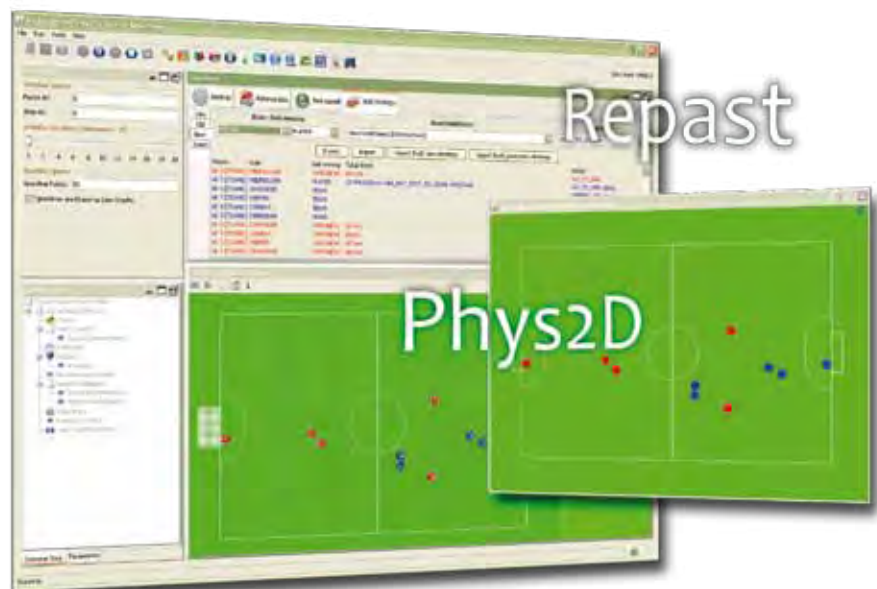
The resulting simulator enables investigating new strategies. Unlike the popular reactive strategies with a server controlled behavior, the IT department of KaHo will focus on agents with coordination and local intelligence. A team of robots will be represented by a team of cooperating agents. The players in

the team get a dynamically assigned role and will perform their behavior in function of that role.

The strategy of the players will, however, always be work-in-progress. Master students of KaHo Sint-Lieven are now working on a project that will introduce learning strategies to anticipate the behavior of the opponent. The agents will use reinforcement learning for determining which action to take in every situation.



During the next academic year, the simulator will be ported to 3D in a follow-up master thesis. This will enable a three dimensional behavior of the players and the ball. ■



About Robocup.be

Robocup.be is part of an international project to encourage AI and robotic research. Guided by DSP Valley, some colleges (Erasmus University College, Lessius University College, Campus De Nayer and KaHo Sint-Lieven, Technology Campus) cooperate in a Belgian team of small, driving soccer robots to take part in international competitions in the future. For more information see www.robocup.be.

About CODES KaHo Sint-Lieven

The CODES group at KaHo Sint-Lieven concentrates on Combinatorial Optimization and Decision Support. Together with MSec, it constitutes the Information Technology group at the Engineering Department.

The main areas of research include modeling, development of intelligent heuristics and multi-agent systems. CODES at KaHo Sint-Lieven contributes to applications for automated scheduling, timetabling and routing in health care, production and logistics. For more information see <http://ingenieur.kahosl.be/vakgroep/it/>.

Why use Eclipse for embedded software development?

On Tuesday, March 30, 2010, DSP valley organized a technical seminar at the Evoluon in Eindhoven, the Netherlands. The subject of the seminar was "Why use Eclipse for embedded software development?" No less than 85 people registered for this seminar in which experts gave their view on the theme or shared their expertise based on daily use with Eclipse.

The first speaker of the seminar was Jos Hegge from Virage Logic who was software development manager at NXP Semiconductors until the end of 2009 and a member of the Technology Competency Framework. In 2006 NXP Semiconductors had more than 1600 software engineers spread over several locations worldwide. Some of the software challenges were the growing share of software in the total R&D costs, the growing software complexity in silicon industry and the high quality drive from customers. A standard tool environment is an enabler for addressing the software challenges. The software design environment would therefore be standardized and based on Eclipse. The NXP Eclipse Policy set the direction to go and a central support with an Eclipse knowledge center and an NXP Eclipse Program board took care for the deployment. More and more groups adopted the Way-of-Working but it took (takes) some time to make the transition.

The second presentation was given by Hendrik Eeckhaut, founder and CTO of Sigasi. He shared his lessons learned when using Eclipse to write Java code to develop the plug-in his company develops to help hardware engineers writing VHDL code. His first encounter with Eclipse as an IDE gave him a 'waaw'-feeling when he compared the functionality available in the IDE compared to the simple text editor he used to use as a hardware designer. Eclipse changed the way he writes code. By using Eclipse with several plug-ins he was able to have a working version of their software product from day one. They now use Eclipse as a cock-



pit for coding, version control, project management and continuous integration.

The last presentation before the break was given by Johan Cockx, senior project engineer at Flanders' Mechatronics Technology Centre (FMTC), who developed an Eclipse plug-in to easily integrate Simulink models in legacy C/C++ code. When developing a machine controller algorithm the transfer from the control engineer who developed the algorithm to the software engineer, who implements the algorithm in software on a certain hardware platform, often suffers from communication noise. Moreover this manual re-coding effort can be error prone and the consistency between model and code is often not the case anymore especially after updates. To tackle these problems FMTC developed an Eclipse plug-in to facilitate code generation from Simulink with legacy C/C++. The presenter explained the features of the plug-in. On the learning curve he pointed out Java, the integration depth into the Eclipse IDE, Simulink code generation and the understanding of the development process to be supported

During coffee break - or in parallel with the presentations - representatives of seven organizations were eager to show and to discuss on the advantages of their technology and the value of their development.

After the coffee break Peter Soetens who is a hopeful daily Eclipse user and founder of TheSourceWorks gave a presentation



with live demo about how to use Eclipse CDT for reverse debugging and data inspection with GDB 7. A remarkable statement he made to introduce Eclipse CDT was that a dozen of developers fix a 1000+ bugs each year. With GNU debugger version 7.1 reverse debugging records a session from an arbitrary start but the recording slows down the execution very much. The data visualization comes with a Python interpreter and containers like strings, vectors and maps can be shown in a comprehensible way. He also demonstrated the capability of GDB 7 to stop only one thread of a process.

In the second presentation after the break Koen Deforche, founder and CTO of Emweb, demonstrated the development of a web interface for a head-less device with Wt as the C++ web toolkit. He showed the benefits Eclipse offer to support C++ development. Eclipse integrates well with the GNU tool chain and by using custom compile and link flags a developer has a number of options to control the binary size of the application. He advised to use UPX (The Ultimate Packer for eXecutables) to even further compress the final binary. Although Eclipse offers a lot of added value for the developer, it remains crucial to understand the underlying tools (compiler, linker, bin utils) to diagnose problems and produce optimal binaries. ■

Seminar: Embedded Linux For SMEwww.fontys.nl/embeddedsystems/embeddedlinux

Fontys Hogeschool ICT

June 25, 2010



On June 25, Fontys Hogeschool ICT will organize a third seminar on the use of Embedded Linux in SME applications. There will be talks on creating business opportunities with Linux, how to setup

a professional environment for development, and several demos on ARM9 environments will be presented.

There is also an exhibition part with interesting industrial demos from several companies and we will finish off with a network drink.

Keynote speaker is Michael Opdenacker from free electrons (www.freeelectrons.com)

Entrance is free but subscription is appreciated. For more information: www.fontys.nl/embeddedsystems/embeddedlinux or mail r.ermers@fontys.nl (Ruud Ermers)

AUTOSAR seminar

Karel de Grote University College

September 14, 2010

Software content in vehicles has grown steadily over the years. The amount of code present in even low-end vehicles is going towards 100 million lines of code. An increasing amount of this automotive embedded software and the related automotive networking is being developed

according to the AUTOSAR-standards. But what is AUTOSAR actually? And how does it help to control cost and automotive-grade quality? How can AUTOSAR be of any use to the SMEs or to suppliers? These and other AUTOSAR-related topics will be discovered during a one-day seminar, organized by TERA-Labs (Karel de Grote University College), Flanders' DRIVE and DSP Valley.

Venue:

Karel de Grote University College
Campus Don Bosco Hoboken
Salesianenlaan 30
2660 Hoboken
Belgium

www.teralabs.org**9th International Conference and Workshop on Ambient Intelligence and Embedded Systems (AMIES2010)**<http://docweb.khk.be/khk/amies2010>

KHK, Geel, Belgium

September 30- October 1, 2010



The KHK will organize the 9th International Conference and Workshop on Ambient Intelligence and Embedded Systems (AMIES2010) on 30 September and 1 October 2010.

The KHK will organize the 9th International Conference and Workshop on Ambient Intelligence and Embedded Systems (AMIES2010) on 30 September and 1 October 2010.

During this international event, designers and applicants of Embedded Systems and high end electronics become acquainted with the latest technologies and interchange ideas with colleagues. The workshop is intended to bring together technology and education.

The workshop is open to the public

the entire day. Prominent suppliers of embedded systems and design automation present innovative developments and technologies for a faultless and smooth design flow.

The 9th International Conference offers the latest tooling technology and contacts necessary for performance improvement of embedded systems to developers.

eLinux training

In October 2010 TASS is planning to organize its famous embedded Linux course together with MontaVista. This is a four-day hands-on programming course on writing device drivers for embedded systems using



MontaVista Linux. This instructor-led course provides the skills needed to successfully develop, test and integrate kernel modules and device drivers as appropriate to embedded Linux products. If you are interested in taking this course please let us know by sending an

email to hrm@tass.be. An exact date will be set later also depending on your preference for a specific week in October.

**Acivs 2010, Advanced Concepts for Intelligent Vision Systems**<http://acivs.org/acivs2010/>

Macquarie University Sydney,
Australia
December 13-16, 2010

Acivs is a conference focusing on techniques for building adaptive, intelligent, safe and secure imaging systems. Acivs

2010 consists of four days of lecture sessions, poster sessions and a special session on distributed camera systems

Contact Information

Septentrio announces AiRx2™, the first TSO-certifiable aviation receiver with field-upgradability to L5 and Galileo • p.1

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An Easier Way to Write Multi-Threaded C Code • p.2

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Jabil develops IP camera • p.4

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imec Virtual Camera (iVC), the ultimate angle on reality • p.5

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Embedded Software Development Driven by Tests • p.6

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Wireless Nodes are talking Gossip (3) • p.7

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Collaboration with semiconductor company Huali gives imec China a jump start • p.8

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FreeFlight Systems and Septentrio form strategic partnership • p.8

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MyMax Mobile NFC Sticker - tbp electronics gets stuck into the “sticky” business of Near Field Communication • p.9

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GN ReSound Develops Wireless Protocol Stack for Next-Generation Hearing Instruments, using Target’s Optimizing C Compiler Technology • p. 12

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Blue Guide EMC lab is now part of the Dekimo group • p. 12

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Multi-Agent Simulation for Robocup soccer • p.13

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Embedded Corner • p. 13

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