



European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz



P R E S S R E V I E W

LAUNCHING DOTFIVE PROJECT

*Kick-off Meeting
13-14 February 2008
Paris*



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SUMMARY

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I - IN BRIEF



Key actions

13 February > The TEAM INTERVIEW with **EETimes Magazine** Kick-off meeting

29 February > PRESS RELEASE **English & French** -

13 March > Post on CORDIS WIRE

Key results

> 1 exclusive PROJECT COORDINATOR INTERVIEW with **The Engineer Magazine**

> 29 design ARTICLES **Print & Online** > 8 Print articles

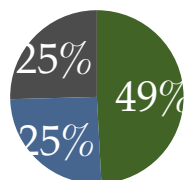
> 60 + Dotfive BUZZ **Articles & Press release**

> 14 COUNTRIES **Emitters**

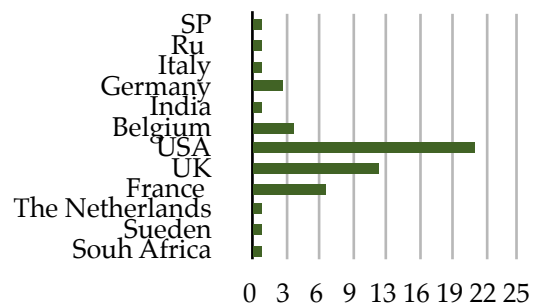
> + 50 000 + EUROS **Equivalent Publicity (estimation)**

>

- Design articles
- Buzz from articles
- Buzz from Cordis




■ Numbers of articles by countries










II- OVERVIEW (1)

II-11- PRESS ARTICLES - Online

MEDIA	TITLE / AUTHOR / DATE
	EU's DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz Semiconductor Today -29 February 2008 Author: Mark Telford -UK
	Join the dots! New Electronics -29 February 2008 Author: Graham Pitcher UK
	European Consortium To Develop 0.5 TeraHertz Silicon Transistor EDA GEEK - 29 February 2008 Author: Ken Cheng USA
	Halv terahertz mål för EU-transistor Elektronik Tidningen 29 February 2008 Author : Adam Edström : Sueden
	Speed limit for transistors EuroAsia Semiconductor 29 February 2008 Author :Klaus Gerle UK
	Dotfive wil 0,5 THz bipolaire transistoren ontwikkelen Bits&Chips 03 maart 08 Author :Paul van Gerven The Netherlands
	DOTFIVE in EU Integrating Project Networks Computer Scotland 1st March 2008 Author : Paul Van Gerven : Scotland
	Des transistors silicium 0,5THz à l'étude en Europe Electronique international 05 mars 2008 Author: Françoise Grovalet , Editor in Chief - France
	14,75 millions d'euros pour développer des transistors SiGe 500 GHz en Europe VIPress 06Mars @ VIPress.net Author: Elisabeth Feder -France
	European Consortium to Push Speed Limit of Silicon Based Transistor to 0.5 THz Wireless Design & Development- Author: Nancy Maas - USA









II - Overview (2)

II-11- PRESS ARTICLES - Online (suite)

MEDIA	TITLE / AUTHOR/ DATE
	Project EU targets 0.5-THz SiGe bipolar transistor EETimes Eu - March 17, 2008 Author: Anne-François PELÉ - France
	IDEM EETimes.fr - March 17, 2008
	IDEM EETimes.UK - March 18 2008
	EU project targets 0.5-THz SiGe bipolar transistor RF Design Line - March 18, 2008 Tech On line USA By Courtesy of Anne-François PELÉ
The Engineer Online	Faster by design The Engineer - Published: 26 March 2008 10:05 AM Author: Ahn Nguyen - UK
	European consortium to create advanced silicon-based bipolar transistor Inside Engineer - April 6, 2008 Author: Staff UK. More information >The Engineer By Courtesy of Ahn Nguyen
	European Consortium Increases Speed Limit Of Silicon-Based Transistor Microwaves & RF April 2008 Author : Dawn Hightower - USA
USINENNOUVELLE.com	Les transistors à base de silicium visent les 500Ghz Usine Nouvelle.com - 20 Mars 2008 - France Author: Staff - France
	Quote into DataWeek Digest News - 02 april - Author: Staff - South Africa




II- OVERVIEW (3)

II- 12 SHOW ARTICLES / PRINT PRESS

MEDIA	TITLE / AUTHOR / DATE
	<p>EU project targets 0.5-THz SiGe bipolar transistor EETimes Europe</p> <p>> Dotfive Team's interview</p> <p>Bimonthly issue 03/17 /2008 Author: Anne-François PELÉ - Fr (article in English)</p>
	<p>European Consortium to Push Speed Limit of Silicon Based Transistor up to 0.5 THz SIGE News N067</p> <p>Print Newsletter -12 March 2008 Author : Roy Szweda - UK</p>
	<p>EU's DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz Semiconductor Today Compounds & Advanced Silicon</p> <p>March 2008 -UK Monthly TABLOID Author: Mark Telford -UK</p>
	<p>European Consortium Increases Speed Limit Of Silicon-Based Transistor Microwaves & RF</p> <p>Monthly April 2008 Author :Dawn Hightower - USA</p>
	<p>Faster by design The Engineer</p> <p>> Gilles Thomas interview</p> <p>Monthly Issued 26 March - Author: Ahn Nguyen UK</p>
	<p>Les transistors à base de silicium visent les 500Ghz USINE NOUVELLE N0 3094</p> <p>Print magazine Hebdo - Issued : 20 Mars 2008 Author: Staff - France</p>
	<p>Fréquence record pour Dotfive L'Economie Grenoble Isère - Print Newsletter - issued 1 avril.</p> <p>Author: AEPI staff - France</p>
	<p>Près de 15 M€ pour le projet européen DOTFIVE Electronique</p> <p>Print monthly magazine- NO Avril 2008 Author: Pascal Wilhem - France</p>

II- Overview (4)










II- 21 BU DOTFIVE - on companies's sites

TITLE / SOURCES	WEB SITE
<p>Projet européen DOTFIVE: avec l'IMEC (Louvain) Des transistors silicium 0,5THz à l'étude en Europe Source: Electronique International - 7/3/08 http://www.innovatech.be/actualites</p>	
<p>European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz Source :Press Release http://www.ihp-microelectronics.com/252.0.html --25-03 -08</p>	 <small>Innovations for high performance microelectronics</small>
<p>GWT Konsortialpartner in EU-Projekt AKTUELLES -06.05.2008 Source : SIGE Newsletter gwtonline.de/aktuelles/2008-05/ gwt-konsortialpartner-in-eu-projekt/</p>	

II-Overview(5)

I

II-21 BUZZ DOTFIVE from Show Articles

TITLES / SOURCES / ADDRESS	PORTALS-BLOGS-WIRES
EU's DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz Source Semiconductor Today- 29 February	
http://www.aufta.com/o/a/548/1096672/index.htmlArticle	 AUFTA.com Australia Free Trade Area
www.dmoz.org/science/chemistry/elements/germanium	 open directory project
European. The High info/ ()	
http://www.rfcafe.com	 RF Cafe A Disruptive Web Presence
http://eupolitics.einnews.com/news/eu-semiconductors	 E.N. Politics Today A NEWS SOURCE FOR PROFESSIONALS
Http://www.einnews.com/centraleurope/ newsfeed-central-europe-automotive	
http://semiconductor.myfeedportal.com/item.php?sessionid=fd0a9a33adb0976c8542a89a88e419af&itemid=498375	 EINNEWS.com A SERVICE FOR GLOBAL PROFESSIONALS
European Consortium To Develop 0.5 TeraHertz Silicon Transistor. source EDAGeek- 29 february	
Blog http://www.4gnetwork.com	4G NETWORK
Blog www.sompedia.com/artist/B+Key - 28k - 14 avr 200	SOMPEDIA - Spain
Join The Dots ! Source New Electronics - 29 february	
Blog http://www.thznetwork.org/wordpress/index.php?s=dotfive	 THz Science & Technology Network
Dotfive wil 0,5 THz bipolaire transistoren ontwikkelen Source Bits & Chips -01 march	
http://eo.st/cgi-bin/ovt/splinks/i_ct/4/c_locale/fr/d_date/2008-03-03	 eo.st The best of RSS news
EU project targets 0.5-THz SiGe bipolar transistor Source EETimes.eu -17 march	
03/18/2008 (see clipping)	 slobreaker
Faster by design Source The Engineer on line- 26 march	
03/26/2008 (see clipping)	 slobreaker

II-Overview (6)

II-22 BUZZ DOTFIVE from Cordis

European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz -CORDIS Wire -Posted : 11 mars	
Nanotech-now- USA http://www.nanotech-now.com/news.cgi?story_id=28448 - 11 mars	
Nanowerk - USA http://www.nanowerk.com/news/newsid=4900.php - 11 mars	
NanoQuebec - Canada http://www.nanoquebec.ca/nanoquebec -- 11 mars	
The IET -The Institution of Engineering and Technology-UK http://www2.theiet.org/oncomms/sector/transport/News.cfm?SectionID=CB770CAF-5698-4A71-9F132515414815A4 - 11 mars	
NanoNewsnet - Russia - www.nanonewsnet.ru/planet/en?page=6	
http://www.nanosys.ru/feed.php (lien perdu)	НАНОТЕХНОЛОГИИ.РУ - Лента новостей
AcceleratingWorld.com - Germany http://www.acceleratingworld.com/news/?category=nanotechnology - 11mars	AcceleratingWorld.com
Le Scienze WebNews - Italy http://www.lsw.n.it/en/press_releases - 11 mars	Le Scienze WebNews
nano nutrients :/209.85.135.104/search?q=cache:ByQaocbn9sJ:nano-inside.com/view - 12 mars	
SOOKnet.com http://www.sooknet.com/technology/news.cfm?ID=50974 - 12 mars	
TOP Hot Trends tophottrends.info/default.asp?show=terahertz - 12 mars	TOP Hot Trends
Silobreaker www.silobreaker.com/View360.aspx?Item=7 - 12 mars	
Schema-root.org encyclopedia of current events= 12 mars	
Mar 19, 2008 03:04 AM CET By augustine /www.strategicboard.com/index.php?page=2&s=thruvision.Eur http opean Consortium to Push	Strategic Board: top 100 blogs
Congoo. -24 march http://www.congoo.com/news/2008March24/European-Consortium-push-speed-limit	Congoo.com



European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz

III - CLIPPINGS

III- CLIPPINGS (1)

PRESS ARTICLES - Print & Online



EU's DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz

The kick-off meeting of the three-year project DOTFIVE ('Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology') has been held by a 15-partner, five country European consortium led by STMicroelectronics.

The €14.75m project includes funding of €9.7m from the European Commission, making it the largest 'More than Moore' nanoelectronics project under the European Union's Framework Programme 7.

By developing silicon-based HBTs with a maximum operating frequency of 0.5THz (500GHz), the DOTFIVE consortium aims to establish a leadership position for Europe's semiconductor industry in the area of SiGe HBTs for millimeter-wave applications (where companies like STMicroelectronics and Infineon Technologies are already strong contributors), as well as for future terahertz communications, radar, imaging and sensing applications.

"With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS [the International Technology Roadmap for Semiconductors], strengthening its position in an area where the whole ecosystem is already strong," says project coordinator Gilles Thomas, STMicroelectronics R&D cooperative programs manager.

Emerging high-volume millimeter-wave applications encompass, for example, 77GHz automotive radar applications and 60GHz wireless local-area network (WLAN) communication systems. According to market research firm Strategy Analysts, the market for long-range anti-collision warning systems in cars could grow by more than 65% annually until 2011. In addition to these already evolving markets, DOTFIVE aims to be a key technology enabler for silicon-based millimeter-wave circuits penetrating the so-called terahertz gap, enabling enhanced imaging systems with applications in the security, medical and scientific area.

Currently, state-of-the-art SiGe HBTs achieve a maximum operating frequency of about 300GHz at room temperature. DOTFIVE has set its goal at 500GHz at room temperature, a performance conventionally thought possible only by using III-V compound semiconductor technologies, it is said. A higher operating speed can either open up new application areas at very high frequencies, or be traded for lower power dissipation, or help to reduce the impact of process, voltage and temperature variations at lower frequencies for better circuit reliability. Compared to III-V based devices, SiGe HBTs enable high-density and low-cost integration for high-frequency low-power applications, making them suitable for consumer applications.

To achieve their goals, DOTFIVE partners will team on R&D of silicon-based transistor architectures, device modeling, and circuit design. The project's 15 partners (from industry and academia) include:



20 News: Microelectronics

First 77GHz CMOS power amplifier

At the International Solid-State Circuits Conference (ISSCC) 2008 in San Francisco, CA, USA in February, Fujitsu Laboratories Ltd of Tokyo, Japan presented what it claimed is the world's first CMOS-based power amplifier (PA) that operates at 77GHz (also see page 80 of the feature article on CMOS in this issue).

The millimeter-wave PA uses standard 90nm CMOS process technology, with standard CMOS modeling technology and design techniques developed to minimize high-frequency signal loss. The technology enables the realization of CMOS RF front-end circuitry that includes a PA, allowing integration with base-band circuitry on a single chip.

Such millimeter-wave circuitry is suited to measuring the distance between two points with high resolution and accuracy (e.g. for automotive radar systems) and is being used for high-capacity data transmission in wireless systems.

For CMOS technology, which allows high levels of integration and functionality, ongoing miniaturization has enabled silicon-based millimeter-wave circuits with operating speeds comparable to circuitry based on compound semiconductors, claims Fujitsu.

Fujitsu has demonstrated the first PA operating at 77GHz to achieve 8.5dB gain and 6.3dBm saturated output power.

Also, a separate PA operating at 60GHz has been developed that achieved gain of 8.3dB and saturated output power of 10.6dBm.

Fujitsu Labs now plans to use standard CMOS technologies to further develop amplifier circuits with higher output power, as well as integrated RF front-end circuits.

<http://jp.fujitsu.com/labs/en>

EU's DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz

The kick-off meeting of the three-year project DOTFIVE ('Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology') has been held by a 15-partner, five-country European consortium led by STMicroelectronics.

The €14.75m project includes funding of €9.7m from the European Commission, making it the largest 'More than Moore' nanoelectronics project under the European Union's Framework Programme 7.

By developing silicon-based HBTs with a maximum operating frequency of 0.5THz, the DOTFIVE consortium aims to establish a leadership position for Europe's semiconductor industry in the area of SiGe HBTs for millimeter-wave applications (where firms like STMicroelectronics and Infineon Technologies are already strong contributors), as well as for future terahertz communications, radar, imaging and sensing applications.

"With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS [the International Technology Roadmap for Semiconductors], strengthening its position in an area where the whole ecosystem is already strong," says project coordinator Gilles Thomas, STMicroelectronics R&D cooperative programs manager.

Emerging high-volume millimeter-wave applications encompass, for example, 77GHz automotive radar applications and 60GHz wireless local-area network (WLAN) communication systems. According to market research firm Strategy Analysts, the market for long-range anti-collision warning systems in cars could grow by more than 65% annually until 2011. In addition to these already evolving markets, DOTFIVE aims to be a key technology enabler for silicon-based millimeter-wave circuits penetrating the terahertz gap, enabling enhanced imaging systems with applications in the security, medical and scientific area.

Currently, SiGe HBTs achieve a maximum operating frequency of about 300GHz at room temperature. DOTFIVE has set its goal at 500GHz, conventionally thought possible only by using III-V technologies, it is said. A higher operating speed can either open up new application areas at very high frequencies, be traded for lower power dissipation, or help to reduce the impact of process, voltage and temperature variations at lower frequencies for better circuit reliability. Compared to III-V devices, SiGe HBTs enable high-density and low-cost integration for high-frequency low-power applications, making them suitable for consumer applications.

To achieve their goals, DOTFIVE partners will team on R&D of silicon-based transistor architectures, device modeling, and circuit design. The project's 15 partners (from industry and academia) include:

- Infineon Technologies (Germany) and STMicroelectronics (France), which can produce 250GHz HBTs on silicon and are willing to push up to 500GHz by working on structural and technological improvements;
- IMEC (Belgium) and IHP (Germany), research institutes working on innovative HBT concepts, new process modules and transistor structures on silicon wafers;
- XMOD Technologies (France) and GWT-TUD (Germany), which are capable of providing the necessary parameter extraction and RF device modeling expertise; and
- seven academic partners — the Johannes Kepler University of Linz (Austria), ENSEIRB, Paris-Sud University (France), Technical University of Dresden, Bundeswehr University in Munich, the University of Siegen (Germany), and the University of Naples (Italy) — with knowledge of nano-transistors, simulation, modeling and characterization of devices, and design of RF functional blocks. ALMA (France) is in charge of administration and finances.

www.dotfive.eu

New Electronics

The Design Cycle Fortnightly

Join the dots!

29/02/2008

A powerful European consortium is setting out with the objective of developing 0.5THz silicon/germanium heterojunction bipolar transistors.

The DOTFIVE project, which is being led by STMicroelectronics, hopes to develop the devices needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications.

The three year DOTFIVE project is worth €14.75million, with €9.7m coming from the EC. This makes it the largest 'More than Moore' nanoelectronics project running within the EU's Framework Programme 7.

DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe heterojunction bipolar transistors (HBTs) for millimeter wave applications. "With this ambitious project," said Gilles Thomas, DOTFIVE project coordinator and STMicroelectronics R&D Cooperative Programs Manager, "Europe is getting ahead of the rf roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong." Emerging high volume millimeter wave applications include 77GHz automotive radar applications and 60GHz wireless lan systems. In addition to these evolving markets, DOTFIVE technology sets out to be a key enabler for imaging systems with applications in the security, medical and scientific sectors.

Current SiGe HBTs have a maximum operating frequency of 300GHz at room temperature. DOTFIVE is looking to boost this to 500GHz, previously thought to require III-V compound semiconductors.

The project involves 15 partners from industry and academia in five countries. Infineon and STMicroelectronics are joined by research institutes IMEC and IHP. Meanwhile, XMOD



Technologies and GWT-TUD will provide parameter extraction and rf device modeling expertise. Academic partners include the Johannes Kepler University of Linz, ENSEIRB, Paris-Sud University, Technical University of Dresden, Bundeswehr University, University of Siegen and the University of Naples.

Author

Graham Pitcher

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Halv terahertz mål för EU-transistor

Av Adam Edström (adam@etn.se)

(29/2) Under ledning av ST Microelectronics ska projektet Dotfive på tre år försöka ta fram en kisel-germaniumbaserad transistor som ska klara 500 GHz, eller 0,5 THz. Projektet har fått 9,7 miljoner euro från EU-kommissionen, vilket gör det till det största elektronikprojektet inom sjunde ramprogrammet.

Ambitionen med Dotfive är att Europa ska ta ledningen inom området SiGe-HBT, Silicon-Germanium Heterojunction Bipolar Transistors, en typ av transistorer som väntas få stor betydelse inom morgondagens kommunikation på millimetervågor och i terahertzområdet. Även radar, bildbehandling och sensorer är tänkbara tillämpningsområden.

Projektledaren Gilles Thomas, till vardags forskningsledare på ST Microelectronics, konstaterar i ett pressmeddelande att högfrekvens är ett europeiskt styrkeområde, med tillämpningar som 77 GHz bilradar och 60 GHz wlan på väg ut på marknaden.

Målet 500 GHz är enligt Thomas högt men rimligt satt. Dagens SiGe-HBT:er klarar som mest 300 GHz vid rumstemperatur. För 500 GHz har forskarna hittills trott att det krävs så kallade III-V-material, som är betydligt dyrare och mer strömkrävande än SiGe.

Projektet omfattar 15 partner i fem länder. Från industrin deltar Infineon och ST Microelectronics, samt två mindre företag - franska Xmod och tyska GWT-TUD. Två forskningsinstitut är med, belgiska Imec och tyska IHP. Därtill deltar sju universitet,

från Österrike, Frankrike, Tyskland och Italien. Ingen svensk aktör är med.

Projektbudgeten ligger på 14,75 miljoner euro, motsvarande 138 miljoner kronor, under tre år. Därav står EU-kommissionen för 9,7 miljoner euro och parterna själva för resten. Dotfive blir därmed det största projektet inom nanoelektronik under devisen "More than Moore" inom EUs sjunde ramprogram.

Speed limit for transistors

Updated on: Friday 29 February 2008

Written By: Klaus Gerle

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European Consortium to push the speed limit of silicon based transistor up to 0.5 Tera Hertz (THz).

DOTFIVE is a 3 year project targeting a 0.5 THz SiGe Heterojunction Bipolar Transistor for the future development of communication, imaging and radar applications. A powerful European consortium held the kick off meeting of the EU funded project labelled DOTFIVE and titled "Towards 0.5 Terahertz SiGe Heterojunction Bipolar Technology". Led by STMicroelectronics, the consortium is setting out to develop advanced silicon based bipolar transistors with a maximum operating frequency of 0.5 THz (0.5 THz or 500 GHz) needed for future millimetre wave and terahertz communication, radar, imaging and sensing applications. The three year project is worth 314.75 million with 3 9.7 million European Commission funding, making it the largest 'More than Moore' nanoelectronics project under EU Framework Programme 7. DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe Heterojunction Bipolar Transistors (HBTs) for millimetre wave applications, where companies like STMicroelectronics and Infineon Technologies are already strong contributors.

"With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong", said Gilles Thomas, DOTFIVE project co-ordinator and STMicroelectronics R&D Co-operative Programs Manager.

Emerging high volume millimetre wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz Wireless Local Area Network (WLAN) communication systems. According to Strategy Analysts, the market for long range anti collision warning systems in cars could increase by more than 65% per year until 2011. In addition to these already evolving markets, DOTFIVE technology sets out to be a key enabler for silicon based millimetre wave circuits penetrating the so called THz gap, enabling enhanced imaging systems with applications in the security, medical and scientific area. Today's state of the art SiGe HBTs achieve roughly a maximum operating frequency of 300 GHz at room temperature. The DOTFIVE project has set its

goal at 500 GHz at room temperature, a performance usually thought only possible with III-V compound semiconductor technologies. A higher operating speed can open up new application areas at very high frequencies, or can be traded in for lower power dissipation, or can help to reduce the impact of process, voltage and temperature variations at lower frequencies for better circuit reliability. SiGe HBTs are key devices for high frequency low power applications. Compared to III-V compound semiconductor devices, they enable high density and low cost integration making them suitable for consumer applications.

In order to achieve their goals, the DOTFIVE partners will team up for research and development work on silicon based transistor architectures, device modelling, and circuit design. The project involves 15 partners from industry and academia in 5 countries: Infineon Technologies (Germany) and STMicroelectronics (France), two industrial companies capable of producing 250 GHz HBTs on silicon and willing to push up to 500 GHz by working on structural and technological improvements; IMEC (Belgium) and IHP (Germany), two research institutes working on innovative HBT concepts, new process modules and transistor structures on silicon wafers; XMOD Technologies (France) and GWT-TUD (Germany), two small and medium enterprises (SMEs) capable of providing needed parameter extraction and RF device modelling expertise; and seven academic partners: The Johannes Kepler University of Linz (Austria), the ENSEIRB (Ecole Nationale Supérieure d'Electronique, Informatique et Radiocommunications de Bordeaux), the Paris-Sud University (France), the Technical University of Dresden (TUD), the Bundeswehr University in Munich, the University of Siegen (Germany), the University of Naples (Italy) ; with a strong understanding of nanotransistors, simulation, modelling and characterisation of devices as well as design of RF electronic functional blocks. ALMA (France) is in charge of all administrative and financial aspects of the project.

European Consortium to Develop 0.5 TeraHertz Silicon Transistor

Posted by EDA Geek News Staff in [Research](#) on Friday, February 29, 2008
[Synopsys Proteus Pipeline Technology Reduces Design-to-Mask Cycle Time](#) »

« [Softmaxx Unveils Linkmaxx Embedded Product for Wireless Modem Control](#)

A powerful European consortium held the kick-off meeting of the EU-funded project labeled DOTFIVE and titled "Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)." Led by STMicroelectronics, the consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (0.5 TeraHertz or 500 GigaHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications. The three-year project is worth Euros 14.75 million with Euros 9.7 million European Commission funding, making it the largest (More than Moore) nanoelectronics project under EU Framework Programme 7.

[Millimeter Wave Terahertz](#)

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[www.globalspec.com](#)

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DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe HBTs (Silicon-Germanium Heterojunction Bipolar Transistors) for millimeter wave applications, where semiconductor manufacturers like STMicroelectronics and Infineon Technologies are already involved. "With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong", said Gilles Thomas, DOTFIVE project coordinator and STMicroelectronics R&D Cooperative Programs Manager. Emerging high-volume millimeter wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz WLAN (Wireless Local Area Network) communication systems. According to U.S. market research company Strategy Analysts, the market for long-range anti-collision warning systems in cars could increase by more than 65 percent per year until 2011. In addition to these already evolving markets, DOTFIVE technology sets out to be a key enabler for silicon-

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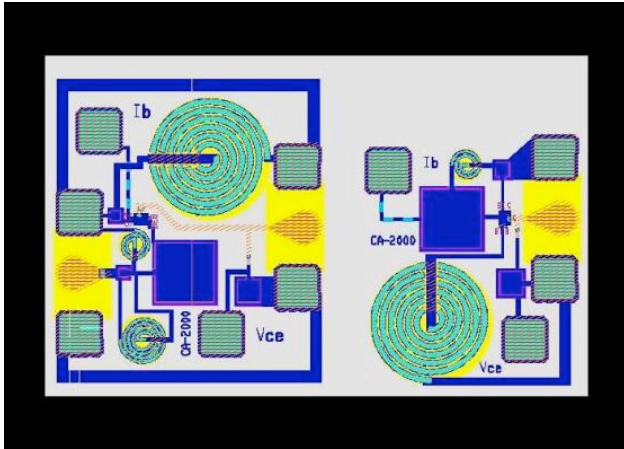
- Infineon Technologies (Germany) and STMicroelectronics (France) are capable of manufacturing 250 GHz HBTs on silicon and willing to push up to 500 GHz by working on structural and technological improvements
- IMEC (Belgium) and IHP (Germany), two research institutes working on innovative HBT concepts, new process modules and transistor structures on silicon wafers
- XMOD Technologies (France) and GWT-TUD (Germany), two small and medium enterprises (SMEs) capable of providing needed parameter extraction and RF device modeling expertise
- Seven academic partners – the Johannes Kepler University of Linz (Austria), the ENSEIRB (Ecole Nationale Supérieure d'Electronique, Informatique et Radiocommunications de Bordeaux), the Paris-Sud University (France), the Technical University of Dresden (Germany), the Bundeswehr University in Munich (Germany), the University of Siegen (Germany), the University of Naples (Italy) - with a strong understanding of nano-transistors, simulation, modeling and characterization of devices as well as design of RF electronic functional blocks. ALMA (France) is in charge of all administrative and financial aspects of the project.

DOTFIVE is supported by the European Commission under contract N0 216110 from the Information and Communication Technologies Program within the European Union's FP7.

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Saturday 1st March 2008

DOTFIVE in EU Integrating Projects Networks



SiGe signalling: Courtesy:

www.signal.uu.se/Research/MWtechnology.htm

DOTFIVE is only one of five in the EU's Integrating Project Networks which includes NANOPACK Nano Packaging Technology for Interconnects and Heat Dissipation (€11.8m) GOSSAMER or Gigascale Oriented Solid State fIASH Memory for EuRope (€25.8m) MAGIC – IP MASKless lithoGraphy for IC manufacturing (€20m) NANOSIL – NoE Silicon-based nanostructures and nanodevices for long term nanoelectronics applications and DOTFIVE – IP 0.5 THz Silicon/Germanium Heterojunction bipolar technology(SiGe HBT) (€15.5m)

STMicroelectronics, and the consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (or 500 GigaHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications.

The three-year project is reported now as worth €14.75m with €9.7m European Commission funding, making it the largest (More than Moore) nanoelectronics project under EU Framework Programme 7 and is aimed at taking a leadership position for the European semiconductor industry in the area of SiGe HBTs where semiconductor manufacturers like STMicroelectronics and Infineon Technologies are already involved.

"With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong", said Gilles Thomas, DOTFIVE project coordinator and STMicroelectronics R&D cooperative programs manager.

Emerging high-volume millimeter wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz WLAN (Wireless Local Area Network) communication systems. Market research company Strategy Analysts, the market for long-



range anti-collision warning systems in cars could increase by more than 65% per year until 2011. In addition to these already evolving markets, DOTFIVE technology sets out to be a key enabler for silicon-based millimeter wave circuits penetrating the so-called THz gap, enabling enhanced imaging systems with applications in the security, medical and scientific area.

Today's state-of-the-art SiGe HBTs achieve roughly a maximum operating frequency of 300 GHz at room temperature. The DOTFIVE project has set its goal at 500 GHz at room temperature, a performance usually thought only possible with III-V compound semiconductor technologies.

In order to achieve their goals, the DOTFIVE partners will team up for research and development work on silicon-based transistor architectures, device modeling, and circuit design. The project involves 15 partners from industry and academia in Germany, France, Belgium, Italy and Austria.

- * Infineon Technologies (Germany) and STMicroelectronics (France) are capable of manufacturing 250 GHz HBTs on silicon and willing to push up to 500 GHz by working on structural and technological improvements

- * IMEC (Belgium) and IHP (Germany), two research institutes working on innovative HBT concepts, new process modules and transistor structures on silicon wafers

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- * Seven academic partners – the Johannes Kepler University of Linz (Austria), the ENSEIRB (Ecole Nationale Supérieure d'Electronique, Informatique et Radiocommunications de Bordeaux), the Paris-Sud University (France), the Technical University of Dresden (Germany), the Bundeswehr University in Munich (Germany), the University of Siegen (Germany), the University of Naples (Italy) - with a strong understanding of nano-transistors, simulation, modeling and characterization of devices as well as design of RF electronic functional blocks. ALMA (France) is in charge of all administrative and financial aspects of the project.

Sources: <http://tinyurl.com/27huc3>
<http://edageek.com/2008/02/29/dotfive-sige-hbt/>

Bits&Chips

Tidbits

Dotfive wil 0,5 THz bipolaire transistoren ontwikkelen

03 maart 2008

Onder aanvoering van STMicroelectronics gaan vijftien academische en industriële partners samenwerken aan silicium-germanium *heterojunction* bipolaire transistoren (SiGe HBT's). Het doel van het Dotfive-project is om ze op 0,5 THz te laten draaien, zo'n 200 GHz meer dan nu lukt bij kamertemperatuur. Het project krijgt 9,7 miljoen euro subsidie van het Europese Zevende Kaderprogramma, op een totaalbudget van 14,75 miljoen euro. Het loopt tot 2011.

SiGe HBT's zijn interessant voor communicatietoepassingen zoals 60 GHz WLAN. Ook staan ze in de belangstelling voor nieuwe imaging-, radar- en sensorsystemen die gebruikmaken van elektromagnetische straling in het millimetergebied. Het Dotfive-persbericht noemt automotive-radar als voorbeeld van een toepassing in opkomst. Ook chips op basis van III-V-halfgeleiders kunnen deze hoge-frequentie-, laag-vermogen taken op zich nemen, maar SiGe HBT-transistoren halen een hogere dichtheid en laten zich goedkoper integreren.

Behalve ST doen onder meer ook mee Infineon, Imec en het Duitse IHP (Innovations for Highperformance Electronics). De meeste academische deelnemers komen uit Duitsland en Frankrijk.

Paul van Gerven

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Des transistors silicium 0,5THz à l'étude en Europe

Un projet européen appelé DOTFIVE vient d'être lancé pour développer des transistors bipolaires à hétérojonction SiGe

Françoise Grosvalet , Electronique International, le 06/03/2008 à 13h24



écrire à l'auteur de l'article



imprimer l'article



envoyer par mail

Un projet européen appelé DOTFIVE vient d'être lancé pour développer des transistors bipolaires à hétérojonction SiGe fonctionnant à une fréquence maximale de 0,5THz (500GHz) à température ambiante, alors que l'état de l'art se situe aujourd'hui à 300GHz. D'une durée de trois ans, ce projet, constitué des meilleurs experts européens du domaine et coordonné par STMicroelectronics, est doté d'une enveloppe budgétaire de 14,75 millions d'euros. Il est cofinancé par la Commission européenne à hauteur de 9,7 millions. Parmi les applications visées figurent les radars automobiles (77GHz) ou les réseaux locaux sans fil (60GHz).

DOTFIVE regroupe quinze partenaires issus des milieux industriels, scientifiques et éducatifs de cinq pays. Infineon Technologies (Allemagne) et STMicroelectronics (France), deux industriels leaders dans les transistors SiGe 250GHz, travailleront sur l'amélioration technologique de la structure du composant. Imec (Belgique) et IHP (Allemagne), deux instituts de recherche qui travaillent sur des concepts innovants de transistors bipolaires à hétérojonction, étudieront les nouveaux processus et structures de transistors. XMOD Technologies (France) et GWT-TUD (Allemagne), deux PME capables de fournir l'extraction des paramètres électriques et l'expertise en modélisation RF participent. Le projet est également composé de sept partenaires académiques.

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14,75 millions d'euros pour développer des transistors SiGe 500 GHz en Europe

Semiconducteurs>Europe>Recherche et développement>Grands Programmes
05/03/2008 22:36:51 :

Ambitieux, le projet européen Dotfive qui vient de tenir sa réunion de lancement à Paris, l'est assurément : coordonné par STMicroelectronics avec la participation d'Infineon Technologies et d'une dizaine d'autres partenaires scientifiques et industriels, il est intitulé « technologies des **transistors bipolaires à hétérojonction SiGe 0,5 THz** » et a pour objectif de développer, d'ici 3 ans, les transistors 500 GHz nécessaires pour les futures applications dans les micro-ondes, les télécoms, l'imagerie numérique, les radars de sécurité et autres capteurs.

Il est doté d'une enveloppe budgétaire de 14,75 millions d'euros, cofinancé par Bruxelles à hauteur de 9,7 millions, ce qui le positionne comme l'un des projets les plus ambitieux de la thématique « More than Moore » du septième programme cadre européen dédié à la R&D.

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European Consortium to Push Speed Limit of Silicon Based Transistor to 0.5 THz

Led by STMicroelectronics, the European Consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (0.5 TeraHertz or 500 GigaHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications.

The three-year project, designated DOTFIVE and titled "Towards 0.5 Terahertz Silicon/Germanium Heterojunction Bipolar Technology" is worth Euros 14.75 million with Euros 9.7 million European Commission funding, making it the largest — more than Moore — nanoelectronics project under EU Framework Programme 7.

DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe HBTs (Silicon-Germanium Heterojunction Bipolar Transistors) for millimeter wave applications, where semiconductor manufacturers like STMicroelectronics and Infineon Technologies are already involved. "With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong," said Gilles Thomas, DOTFIVE project coordinator and ST Microelectronics R&D Cooperative Programs Manager. Emerging high-volume millimeter wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz WLAN (Wireless Local Area Network) communication systems. According to U.S. market research company Strategy Analysts, the market for long-range anti-collision warning systems in cars could increase by more than 65 percent per year until 2011.

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EU project targets 0.5-THz SiGe bipolar transistor

[Anne-Francoise Pele](#)

(03/17/2008 6:07 AM EDT)

URL: <http://eetimes.eu/semi/206903964>

A European consortium from industry and academia has been formed to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 Terahertz targeting millimeter wave and terahertz communication, radar, imaging and sensing applications.

PARIS — A European consortium from industry and academia has been formed to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 Terahertz targeting millimeter wave and terahertz communication, radar, imaging and sensing applications.

Dubbed Dotfive, the 36-month project has a total budget of €14.75 million (\$21.8 million) with a contribution of €9.7 million (\$14.3 million) from the European Commission, making it the largest 'More than Moore' nanoelectronics project under the EC's Seventh Framework Program.

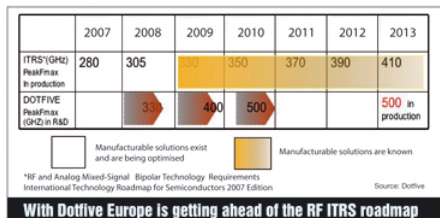
The project's aim is to establish a firm position in Europe for silicon-germanium heterojunction bipolar transistors (SiGe HBTs) for millimeter wave applications "We are trying to bring microwave applications into silicon in contrast to other types of semiconductor that have been used, that are more expensive and do not allow large device integration," said Michael Schröter, chair for electron devices and integrated circuits at the Technical University of Dresden (Germany).

Gilles Thomas, ST's research and development co-operative projects manager, who has been nominated Dotfive project coordinator said, "In the first year, we will try to get 300-GHz frequency which means it translates into a delay time of typically 3.5 picoseconds. In the second year, we intend to achieve 400 GHz and 3 picoseconds and, in the third year, we target 500 GHz and 2.5 picoseconds."

Ultimately, project partners would start encroaching into the terahertz region, which ranges from frequencies of about 300 GHz to 10 THz. This would open a lot of applications that are now taken by other technologies like imaging systems with applications in the security, medical and scientific areas.

Initially, the project aims to devise a proof of concept and demonstrate the potential of the silicon-based technology. "We are preparing the next technology node, and this technology takes us beyond 2012. We could then go to a project closer to the industrialization phase like Catrene," said Thomas. Catrene is the follow-up program to Medea and Medea+.

Led by STMicroelectronics NV, the Dotfive project brings together academic partners, the Johannes Kepler University of Linz (Austria), the Bordeaux National School of Electronics, IT and Radiocommunications, the Paris-Sud University (France), the Technical University of Dresden, the Bundeswehr University in Munich, the University of Siegen (Germany) and the University of Naples (Italy); research institutes IMEC (Leuven, Belgium) and IHP (Germany); and industrial partners XMOD Technologies (Talence, France), GWT-TUD GmbH (Dresden, Germany) and Infineon Technologies (Munich, Germany).



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EU project targets 0.5-THz SiGe bipolar transistor

By Anne-Françoise Péle

PARIS – A European consortium from industry and academia has been formed to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 Terahertz targeting millimeter wave and terahertz communication, radar, imaging and sensing applications.

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ANALOG DEVICES

mars 17, 2008

EU project targets 0.5-THz SiGe bipolar transistor

By Anne-Francoise Pele

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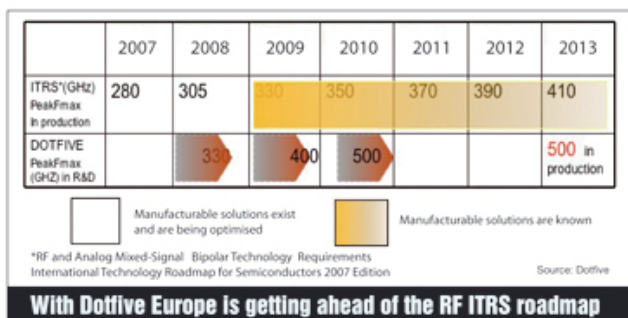
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SiGe NewsReview



SiGe News Review

Issue 67

European Consortium to push the speed limit of silicon based transistor up to 0.5 THz

A powerful European consortium has held its first meeting of the EU-funded project labeled DOTFIVE and entitled "Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)". Led by STMicroelectronics, the consortium aims to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (500 GHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications. The three-year project is worth €14.75 million with €9.7 million European Commission funding, making it the largest « More than Moore » nanoelectronics project under EU Framework Programme 7.

DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe HBTs for millimeter wave applications, where semiconductor manufacturers such as STMicroelectronics and Infineon Technologies are involved.

"With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong", said Gilles Thomas, DOTFIVE project coordinator and STMicroelectronics R&D Cooperative Programs Manager.

Emerging high-volume millimeter wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz WLAN communication systems. According to market research company Strategy Analytics, the market for long-range anti-collision warning systems in cars could increase by more than 65% per year until 2011. In addition to these already evolving markets, DOTFIVE technology sets out to be a key enabler for silicon-based millimeter wave circuits penetrating the so-called THz gap, enabling enhanced imaging systems with applications in the security, medical and scientific area.

Today's state-of-the-art SiGe HBTs achieve roughly a maximum operating frequency of 300 GHz at room temperature. The DOTFIVE project has set its goal at 500 GHz at room temperature, a performance usually thought only possible with III-V compound semiconductor technologies. A higher operating speed can open up new application areas at very high frequencies, or can be traded in for lower power dissipation, or can help to reduce the impact of process, voltage and temperature variations at lower frequencies for better circuit reliability. SiGe HBTs are key devices for high-frequency low-power applications. Compared to III-V compound semiconductor devices, they enable high density and low-cost integration making them suitable for consumer applications.



In order to achieve their goals, the DOTFIVE partners will team up for research and development work on silicon-based transistor architectures, device modeling, and circuit design. The project involves 15 partners from industry and academia in five countries:

- ◆ Infineon Technologies (Germany) and STMicroelectronics (France) are capable of manufacturing 250 GHz HBTs on silicon and willing to push up to 500 GHz by working on structural and technological improvements;
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Contact : Gilles Thomas, STMicroelectronics
(gilles.thomas@st.com)

The Engineer Online

Faster by design

Published: 26 March 2008 10:05 AM

Source: The Engineer

A European consortium has set its sights on developing a transistor that would enable the design of cheaper and faster products for applications ranging from communication to imaging.

The £11m DOTFIVE project, co-ordinated by France-based STMicroelectronics' Gilles Thomas, aims to create an integrated circuit with advanced silicon-based bipolar transistors that operate at a frequency of 500GHz, or 0.5TeraHertz. Other industry partners in the 15-strong consortium include Germany's Infineon Technologies and Belgium's IMEC. Academic partners include the University of Naples and the Johannes Kepler University of Linz, Austria.



'The objective is to develop silicon/germanium heterojunction bipolar transistors (SiGe HBTs) at 500GHz, which could allow the design of products with circuits that could reach up to 160GHz,' said Thomas. This compares with devices such as today's GSM phones, which operate at a standard frequency of 2GHz in Europe. Moreover, SiGe HBTs are widely used in all applications

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[European consortium to create advanced silicon-based bipolar transistors](#)

Apr 8, 2008 in [Design](#), [Electronics](#)

A European consortium is aiming to create an integrated circuit with advanced silicon-based bipolar transistors that operate at a frequency of 500GHz, or 0.5Tera Hertz, as part of an £11 million project.

Gilles Thomas, of STMicroelectronics, co-ordinator of the DOTFIVE project, explained: "The objective is to develop silicon/germanium heterojunction bipolar transistors (SiGe HBTs) at 500GHz, which could allow the design of products with circuits that could reach up to 160GHz. This compares with devices such as today's GSM phones, which operate at a standard frequency of 2GHz in Europe.

A key part of the new transistor will be the silicon germanium compound, built on a substrate of pure silicon, which allows the band gap of the semiconductor material to be widened. This is designed to enable higher mobility of the electrons and consequently higher transistor frequencies. The researchers also plan to explore new ways of building the transistors.

According to Thomas, the transistors will allow for applications that are currently only available using very costly techniques — either electronics comprising expensive compound materials like gallium arsenide or indium phosphide, or by using discrete electronics.

Thomas continued: "You could have applications such as proximity radars, which currently work at 77GHz and are being developed on very high-end cars, and radars with a range of distances to increase safety, especially in poor visibility.

"You could also, for example, cheaply build airport security equipment to detect weapons on people without them having to remove any clothing."

The 36-month project is scheduled to end in 2010.

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THE ENGINEER



NEWS

Faster by design

£11m Euro project aims to develop advanced silicon-based transistor

A EUROPEAN consortium has set its sights on developing a transistor that would enable the design of cheaper and faster products for applications ranging from communication to imaging.

The £11m DOTFIVE project, co-ordinated by France-based STMicroelectronics' Gilles Thomas, aims to create an integrated circuit with advanced silicon-based bipolar transistors that operate at a frequency of 500GHz, or 0.5Tera-Hertz. Other industry partners in the 15-strong consortium include Germany's Infineon Technologies and Belgium's IMEC. Academic partners include the University of Naples and the Johannes Kepler University of Linz, Austria.

'The objective is to develop silicon/germanium heterojunction bipolar transistors (SiGe HBTs) at 500GHz, which could allow the design of products with circuits that could reach up to 160GHz,' said Thomas. This compares with devices such as today's GSM phones, which operate at a standard frequency of 2GHz in Europe. Moreover, SiGe HBTs are widely used in all applications above 1GHz, including all GPS systems.

'Depending upon the complexity of the application and the capability of the circuit designer in terms of layout and integration, what you reach at the single device level compared with what you reach at the complete integrated circuit level is usually a factor of three to four,' said Thomas. This means that a GSM phone transmitting at 2GHz would typically use circuit technologies with a frequency of 10GHz — a factor of four.

A key part of the new transistor will be the silicon germanium compound, built on a substrate of pure silicon, which allows the band gap of the semiconductor material to be widened. This is designed to enable higher mobility of the electrons and consequently higher transistor frequencies. The researchers also plan to achieve this goal by exploring new ways of building the transistors.

'We need to define new transistor architecture, new ways of realising extremely thin transistor bases — in the 10nm range,' said Thomas. At present, the engineers are aiming for an improvement of at least a factor of three in the base thickness compared with what is currently being done.

'Also, we need to reduce extremely old parasitics that you have inside the transistor by having a structure that allows self-alignment and to avoid all parasitic resistance to make the transistor work at the highest possible frequency.'

Existing SiGe HBTs achieve a maximum

operating frequency of about 300GHz at room temperature, and it is possible for the engineers to reach 500GHz, but only at extremely low temperatures — for example, that of liquid helium or very close to absolute zero.

'This is not difficult to reach, but of course you cannot have cheap electronics working at those temperatures — you cannot have cryogenic systems creating a temperature of a few degrees permanently around the chip,' said Thomas. The researchers are therefore aiming to design cost-effective circuits by creating 500GHz transistors that will work at room temperature.

According to Thomas, the transistors will allow for applications that are currently only available using very costly techniques — either electronics comprising expensive compound materials like gallium arsenide or indium phosphide, or by using discrete electronics (devices with thousands of transistors on the same chip).

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'You could also, for example, cheaply build airport security equipment to detect weapons on people without them having to remove any clothing,' he said.

The researchers are hoping to move to even higher frequencies in the future, saying that the number of possible applications increase as they progress in the development of the optimum transistor.

The 36-month project is scheduled to end in 2010, when the researchers hope to demonstrate the individual key circuit functions — such as noise amplifier or transmission capabilities — to prove that the technology can reach a certain level of frequency on simple circuit blocks.

Anh Nguyen



The transistor will, say its developers, make the design of products such as GSM phones cheaper



[Components]

European Consortium Increases Speed Limit Of Silicon-Based Transistor

Dawn Hightower | April 2008

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PARIS, FRANCE—A European consortium, led by STMicroelectronics, held the kick-off meeting of the EU-funded project DOTFIVE and titled "Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)."

The consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz or 500 GHz needed for future millimeter-wave and TeraHertz communication, radar, imaging, and sensing applications. The three-year project is worth Euros 14.75 million with Euros 9.7 million European Commission funding, making it the largest "More than Moore" nanoelectronics project under EU Framework Programme 7. DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in SiGe HBTs for millimeter-wave applications, where semiconductor manufacturers like STMicroelectronics and Infineon Technologies are involved.

Emerging high-volume millimeter-wave applications encompass, for example, 77-GHz automotive radar applications and 60-GHz Wireless Local Area Network (WLAN) communication systems. According to US market research company Strategy Analysts, the market for long-range anti-collision warning systems in cars could increase by more than 65-percent per year until 2011. In addition to these evolving markets, DOTFIVE technology sets out to be a key enabler for silicon-based millimeter-wave circuits penetrating the so-called TeraHertz gap, enabling enhanced imaging systems with applications in the security, medical, and scientific area.

1 sur 2

Today's state-of-the-art SiGe HBTs achieve roughly a maximum operating frequency of 300 GHz at room temperature. The DOTFIVE project has set its goal at 500 GHz at room temperature, a performance usually thought only possible with III-V compound semiconductor technologies.

The DOTFIVE partners will team up for research and development on silicon-based transistor architectures, device modeling, and circuit design. The project involves 15 partners in five countries: Infineon Technologies (Germany) and STMicroelectronics (France); IMEC (Belgium) and IHP (Germany); XMOD Technologies (France) and GWT-TUD (Germany); and seven academic partners—the Johannes Kepler University of Linz (Austria), the ENSEIRB (Ecole Nationale Supérieure d'Electronique, Informatique et Radiocommunications de Bordeaux), the Paris-Sud University (France), the Technical University of Dresden (Germany), the Bundeswehr University in Munich (Germany), the University of Siegen (Germany), the University of Naples (Italy); and ALMA (France).



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ELECTRONIQUE

Les transistors à base de silicium visent les 500 GHz

Porter la fréquence de fonctionnement des transistors bipolaires à hétérojonction silicium-germanium de 300 GHz actuellement à 500 GHz d'ici à trois ans : tel est l'objectif du programme européen Dotfive, coordonné par STMicroelectronics et doté d'un budget de 14,75 millions d'euros, financé à hauteur de 9,7 millions par la Communauté européenne. Jusqu'ici, seuls les composés III-V permettent d'atteindre de telles vitesses de fonctionnement, mais sans offrir la densité d'intégration et le niveau de coût du silicium.



Focus

Fréquence record pour Dotfive

0,5 terahertz : telle est la fréquence de fonctionnement exceptionnelle qu'atteindront les transistors mis au point dans le cadre du projet européen Dotfive coordonné par STMicroelectronics, qui vise à développer de nouveaux transistors bipolaires à hétérojonction silicium-germanium. Ces composants seront utilisés pour de futures applications dans les ondes millimétriques ainsi que dans les télécommunications (réseaux sans fil à 60 GHz), l'imagerie numérique en médecine, les radars de sécurité pour l'automobile et les capteurs. Ils permettent une plus forte densité d'intégration des circuits, à des prix très réduits, compatibles avec des applications grand public. D'une durée de trois ans et doté d'un budget de 14,75 M€ (dont 9,7 M€ apportés par la Commission européenne), ce projet rassemble quinze acteurs de cinq pays européens. STMicroelectronics est, aux côtés son partenaire allemand Infineon, le leader mondial de cette technologie des transistors SiGe. Contact : Gilles Thomas, tél. : 04 76 92 51 11 (Crolles), e-mail : gilles.thomas@st.com



ELECTRONIQUE

ELECTRONIQUE N° 190 – Avril 2008

Le mensuel des ingénieurs de conception

Semiconducteurs

Près de 15M€ pour le projet européen **Dotfive**

Le projet européen Dotfive, coordonné par ST-Microelectronics vient de tenir sa réunion de lancement à Paris. Il vise le développement de transistors SiGe fonctionnant à 0,5THz.

Le projet Dotfive n'a qu'une ambition: développer des transistors bipolaires à hétérojonction (HBT) silicium-germanium, pouvant fonctionner jusqu'à une fréquence de 500GHz à température ambiante, alors que la limite actuelle est de 300GHz. Cette velléité de taille a pour but de propulser l'indus-

trie européenne du semiconducteur à une position de leadership dans le secteur des HBT SiGe pour les futures applications des micro-ondes, en télécommunications terahertz, imagerie numérique, capteurs, radars de sécurité automobile (77GHz) et autres réseaux locaux sans-fil (WLAN 60GHz).

Cette initiative prévue pour durer trois années, pilotée par STMicroelectronics avec la participation d'Infineon et d'une douzaine d'autres partenaires industriels, académiques et scientifiques, bénéficie d'un budget de 14,75M€, dont un financement alloué par la Commission européenne à hauteur de 9,7M€.

Cette enveloppe fait de Dotfive l'un des projets les plus ambitieux de la thématique « more than Moore », du septième programme cadre européen dédié aux technologies de l'information et des communications.

Pour Infineon Technologies et ST, c'est une opportunité de faire avancer leur maîtrise technologique, puisqu'aujourd'hui ils produisent des circuits qui plafonnent à 250GHz, en améliorant la structure du composant. Parmi les acteurs du projet, citons L'Imec (Belgique) et l'IHP (Allemagne), deux instituts travaillant sur des concepts innovants de transistors bipolaires à hétérojonction, les nouveaux

process et structures de transistors; ou encore XMOD Technologies (France) et GWT-TUD (Allemagne), deux PME expertes en matière de modélisation de circuits RF et d'extraction de paramètres électriques. Sept entités académiques européennes apporteront leur savoir-faire, notamment en matière de connaissances des nanotransistors, de simulation et de conception de blocs fonctionnels en RF.

Dotfive se donne comme objectif de passer le cap de 300GHz à l'issue de la première année, pour passer de délais de propagation de 3,5ps à 2,5ps dans les deux suivantes.

PASCAL WILHELM



DATAWEEK

Electronics & Communications Technology

Issue Date: 2 April 2008

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Electronics News Digest

2 April 2008

A powerful, EU-funded consortium, led by *STMicroelectronics*, is setting out to develop advanced silicon-based bipolar transistors capable of operating at frequencies up to 0,5 THz (500 GHz). The three-year DotFive project, worth 14,75 million Euros, seeks to develop the technology which will underlie next-generation millimetre wave and terahertz communication, radar, imaging and sensing applications. The project involves 15 partners from industry and academia in five European countries.

Ever willing and eager to adopt new technologies, the Japanese are running a pilot project using hydrogen fuel cells to provide electricity to 2200 homes. Each home has a suitcase-sized fuel cell which also generates enough heat as a by-product to heat the home's water. The Japanese government has earmarked 32,4 billion yen per year for fuel cell development and plans for 10 million homes to be powered by fuel cells by 2020.

Technology

Researchers at the *University of Michigan* have developed what they believe is the world's most intense laser beam. The record-setting beam, which can emit 30 femtosecond bursts every 10 seconds, contains 300 Terawatts of power, which equates to 300 times the capacity of the entire energy grid of the USA. The beam's power is concentrated to a 1,3 micron speck, which is roughly 100th the diameter of a human hair. To put this magnitude of energy in perspective, it is roughly equivalent to holding a giant magnifying glass in space and focusing all the sunlight shining toward Earth onto one grain of sand.

Frost & Sullivan has taken interest in a new class of material discovered by a team of scientists at the *National University of Singapore* (NUS), which has exceptionally high hydrogen content and can release hydrogen at temperatures near the operation temperature of proton exchange membrane (PEM) fuel cells. The researchers have already patented their findings and expect the technology to find potential applications in portable fuel cell devices and vehicles.

A team of researchers, led by Jeremy Levy of the *University of Pittsburgh*, has developed a method of drawing, erasing and redrawing electrically conductive paths on a special material. Using an atomic force microscope, the tracks are as thin as 3 nanometres, narrower than what can be achieved with electron beam

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03/18/2008 - RF Designline

EU project targets 0.5-THz SiGe bipolar transistor

Dubbed Dotfive, the 36-month project has a total budget of 14.75 million (\$21.8 million) with a contribution of 9.7 million (\$14.3 million) from the **European Commission**, making it the largest 'More than Moore' nanoelectronics project under the EC's Seventh Framework Program.

The project's aim is to establish a firm position in **Europe** for silicon-germanium heterojunction bipolar transistors (SiGe HBTs) for millimeter wave applications 'We are trying to bring **microwave** applications...

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Quotes

...technology. **"We are preparing the next technology node, and this technology takes us beyond 2012. We could then go to a project closer to the industrialization phase like Catrene"** said Thomas...

...coordinator said, **"In the first year, we will try to get 300-GHz frequency which means it translates into a delay time of typically 3.5 picoseconds. In the second year, we intend to achieve 400 GHz and 3 picoseconds and, in the third year, we target 500 GHz and 2.5 picoseconds."** Ultimately, project...

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Faster by design

A European consortium has set its sights on developing a transistor that would enable the design of cheaper and faster products for applications ranging from communication to imaging. The 11m DOTFIVE project, co-ordinated by France-based **STMicroelectronics** Gilles Thomas, aims to create an integrated circuit with advanced silicon-based bipolar transistors that operate at a frequency of 500GHz, or 0.5TeraHertz. Other industry partners in the 15-strong consortium include **Germany's Infineon** Technologies and **Belgium's**...

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Quotes

"You could also, for example, cheaply build airport security equipment to detect weapons on people without them having to remove any clothing" he said

"You could have applications such as proximity radars, which currently work at 77GHz and are being developed on very high-end cars, and radars with a range of distances to increase safety, especially in poor visibility" said Thomas

"This is not difficult to reach, but of course you cannot have cheap electronics working at those temperatures - you cannot have cryogenic systems creating a temperature of a few degrees permanently around the chip" said Thomas...

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EU s DOTFIVE project to boost SiGe HBTs from 300GHz to 0.5THz

Posting Time: 2008-03-01 09:18:40.0

[Digest]

The kick-off meeting of the three-year project DOTFIVE (Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology) has been held by a 15-partner, five country European consortium led by STMicroelectronics.

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Projet européen DOTFIVE: avec l'IMEC (Louvain)

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Des transistors silicium 0,5THz à l'étude en Europe

Un projet européen appelé DOTFIVE vient d'être lancé pour développer des transistors bipolaires à hétérojonction SiGe fonctionnant à une fréquence maximale de 0,5THz (500GHz) à température ambiante, alors que l'état de l'art se situe aujourd'hui à 300GHz. D'une durée de trois ans, ce projet, constitué des meilleurs experts européens du domaine et coordonné par STMicroelectronics, est doté d'une enveloppe budgétaire de 14,75 millions d'euros. Il est cofinancé par la Commission européenne à hauteur de 9,7 millions. Parmi les applications visées figurent les radars automobiles (77GHz) ou les réseaux locaux sans fil (60GHz).

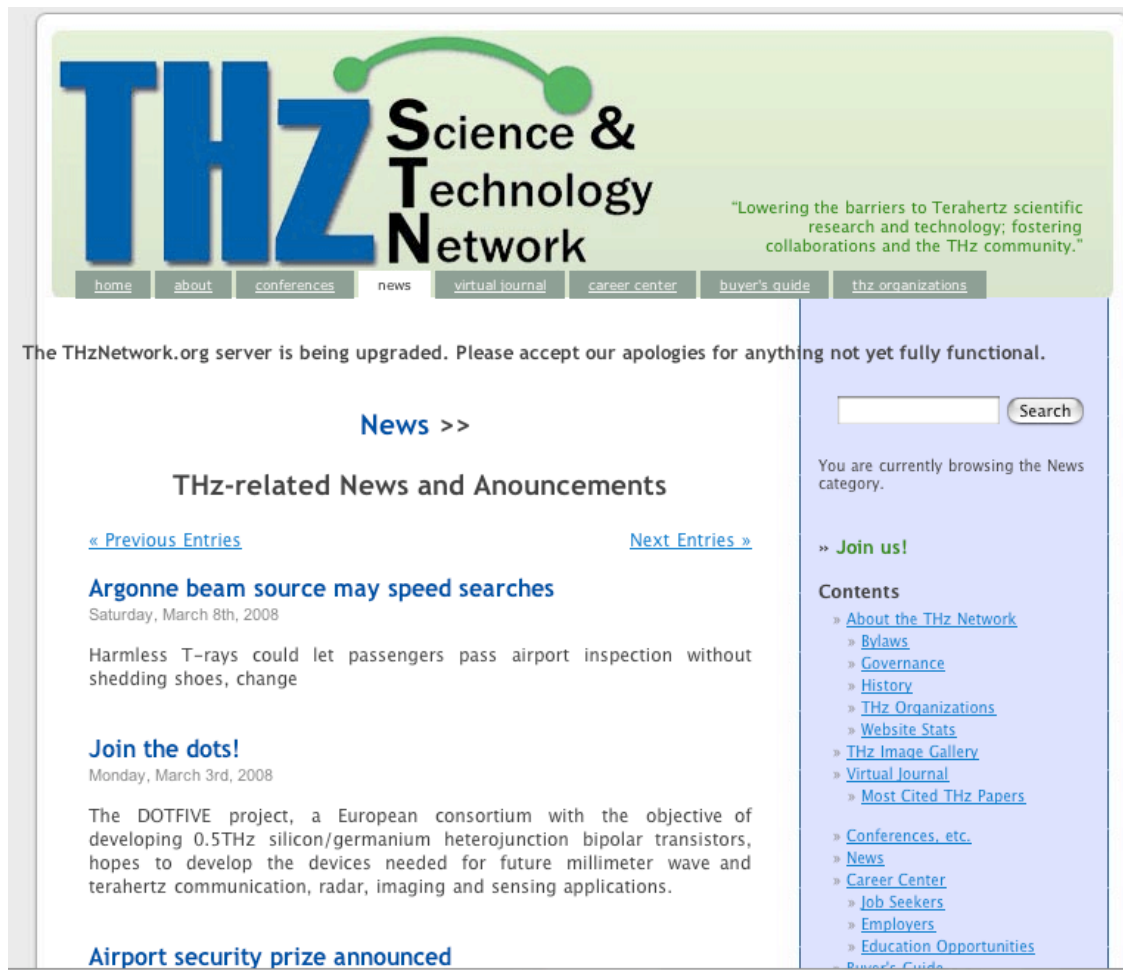
DOTFIVE regroupe quinze partenaires issus des milieux industriels, scientifiques et éducatifs de cinq pays. Infineon Technologies (Allemagne) et STMicroelectronics (France), deux industriels leaders dans les transistors SiGe 250GHz, travailleront sur l'amélioration technologique de la structure du composant. [Imec \(Belgique\)](#) et IHP (Allemagne), deux instituts de recherche qui travaillent sur des concepts innovants de transistors bipolaires à hétérojonction, étudieront les nouveaux processus et structures de transistors. XMOD Technologies (France) et GWT-TUD (Allemagne), deux PME capables de fournir l'extraction des paramètres électriques et l'expertise en modélisation RF participent. Le projet est également composé de sept partenaires académiques.

Auteur: Françoise Grosvalet

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Join the dots!
Monday, March 3rd, 2008

The DOTFIVE project, a European consortium with the objective of developing 0.5THz silicon/germanium heterojunction bipolar transistors, hopes to develop the devices needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications.

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GWT Konsortialpartner in EU-Projekt

Die GWT-TUD GmbH ist mit ihrem Forschungsbereich Electron Devices and Integrated Circuits, unter wiss. Leitung von Prof. Michael Schröter, seit 01.02.2008 Konsortialpartner im EU-Projekt DOTFIVE "Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)". Ziel des Projektes ist die Entwicklung von neuen siliziumbasierten Bipolar-Transistoren mit einer maximalen Arbeitsfrequenz von 0.5 Terahertz

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European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz

PARIS, February 27, 2008 - A powerful European consortium held the kick-off meeting of the EU-funded project labeled DOTFIVE and titled « Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology ». Led by STMicroelectronics, the consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (0.5 TeraHertz or 500 GigaHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications. The three-year project is worth € 14.75 million with € 9.7 million European Commission funding, making it the largest « More than Moore » nanoelectronics project under EU Framework Programme 7.

DOTFIVE is aiming to establish a leadership position for the European semiconductor industry in the area of SiGe HBTs (Silicon-Germanium Heterojunction Bipolar Transistors) for millimeter wave applications, where companies like STMicroelectronics and Infineon Technologies are already strong contributors. "With this ambitious project, Europe is getting ahead of the RF roadmap defined in ITRS, strengthening its position in an area where the whole ecosystem is already strong", said Gilles Thomas, DOTFIVE project coordinator and STMicroelectronics R&D Cooperative Programs Manager. Emerging high-volume millimeter wave applications encompass, for example, 77 GHz automotive radar applications and 60 GHz WLAN (Wireless

06-05-08
7th Workshop High-Performance SiGe:C BiCMOS (September 17, 2008) and Tutorial IHP Design Kits (September 18-19, 2008)
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15-04-08
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25-03-08
7th Meeting of GMM Competence Group "Process control, Inspection and Analytics"
IHP has organized on 06.03.2008 the ... [\[more\]](#)

16-11-07
IEEE International Electron Devices Meeting (IEDM 2007)
Washington, DC
December 10-12, 2007 [\[more\]](#)

04-09-07
6th Workshop High-Performance SiGe BiCMOS (September 10, 2007) and Tutorial IHP Design Kits (September 11-12, 2007)
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Posted: March 11, 2008

European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz

(*Nanowerk News*) A powerful European consortium held the kick-off meeting of the EU-funded project labeled DOTFIVE and titled "Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)". Led by STMicroelectronics, the consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz (0.5 TeraHertz or 500 GHz) needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications. The three-year project is worth Euros 14.75 million with Euros 9.7 million European Commission funding, making it the largest « More than Moore » nanoelectronics project under EU Framework Programme 7.

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Today's state-of-the-art SiGe HBTs achieve roughly a maximum operating frequency of 300 GHz at room temperature. The DOTFIVE project has set its goal at 500 GHz at room temperature, a performance usually thought only possible with III-V compound semiconductor technologies. A higher operating speed can open up new application areas at very high frequencies, or can be traded in for lower power dissipation, or can help to reduce the impact of process, voltage and temperature variations at lower frequencies for better circuit reliability. SiGe HBTs are key devices for high-frequency low-power applications. Compared to III-V compound semiconductor devices, they enable high density and low-cost integration making them suitable for consumer applications.

In order to achieve their goals, the DOTFIVE partners will team up for research and development work on silicon-based transistor architectures, device modeling, and circuit design. The project involves 15

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European Consortium To Push The Speed Limit Of Silicon Based Transistor Up To 0.5 TeraHertz

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A powerful European consortium held the kick-off meeting of the EU-funded project labeled DOTFIVE and titled 'Towards 0.5 TeraHertz Silicon/Germanium Heterojunction Bipolar technology (SiGe HBT)'.

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European Consortium to push the speed limit of silicon based transistor up to 0.5

Nanotechnology News | March 24, 2008

DOTFIVE is a 3-year project targeting a 0.5 THz SiGe Heterojunction Bipolar Transistor for the future development of communication, imaging and radar applications. A powerful European consortium held the kick-off meeting of the EU-funded project labeled DOTFIVE and titled "Towards 0.5 TeraHertz Si..."

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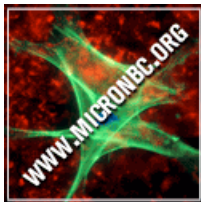
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Abstract:

DOTFIVE is a 3-year project targeting a 0.5 THz SiGe Heterojunction Bipolar Transistor for the future development of communication, imaging and radar applications.

European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz

France | Posted on March 11th, 2008

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(1599)
12 mars 2008

Copolymers Block Out New Approaches to Microelectronics at NIST

The next breakthroughs in the electronics size barrier are likely to come from microchips and data storage devices created out of novel materials such as organic molecules and polymers. NIST researchers have improved manipulation of so-called block copolymers—polymers made of a mixture of two or more different molecule building blocks that...

BASF prépare une nouvelle teinture pour portes et fenêtres en bois 11 mars 2008

Un communiqué de presse de BASF annonce le lancement du COL.9 que la compagnie décrit comme un «nanoliant qui va révolutionner les peintures pour façades». BASF insiste particulièrement sur la résistance aux taches et à l'écaillage des revêtements contenant le COL.9. Le produit est maintenant disponible au grand public mais, en fait, il ...

European Consortium to push the speed limit of silicon based transistor up to 0.5 TeraHertz 11 mars 2008

The consortium is setting out to develop advanced silicon-based bipolar transistors with a maximum operating frequency of 0.5 THz needed for future millimeter wave and terahertz communication, radar, imaging and sensing applications.

Flow Leads Infection Prevention Trend by Using Silver with Antimicrobial Properties in Medical Devices 11 mars 2008

(...) A study confirmed the potential usefulness of plastic catheters coated with proprietary silver nanoparticles, because of their demonstrated antimicrobial properties, and concluded that the treated catheters may be useful in reducing infectious complications in patients with indwelling catheters.

IV - ANNEX

List of Medias with Equivalent Publicity Analysis

DOTFIVE - Press release 29 february 2008 - EQUIVALENT PUBLICITY ANALYSIS

PRESS Design articles							
Issue date	Source	Type or press	Text lenght	Quotes	Country	internet : Traffic rank print : Circulation	Equivalence PUB*
02/29/08	Semiconductor-today.com	Internet	Junior Page	GTST +all partners	U.K	2000 unique visitor a day	800,00 €
March Issue	SEMICONDUCTOR TODAY COMPOUNDS & ADVANCED SILICON	monthly magazine tabloid	Junior page	GT+all partners	U.K	mail 6200ex	1 660,00 €
02/29/08	NEW Electronics	Internet	Junior Page	logo+ GT + partners R&D	U.K	TR: 1,099,279 <i>Print magazine: 18 740</i>	800,00 €
02/29/08	EDA Geek	Internet	Junior Page	GT+all partners	USA	147,683	800,00 €
02/29/08	EDA Blog	Internet	Junior Page	GT+all partners	USA	358,133	800,00 €
02/29/08	Embedded star	Internet	Junior Page	GT+all partners	USA	148,263	800,00 €
02/29/08	Elektronik Tidningen	Internet	half page	GT+ all R&D partners	Sueden	4,337,784 1,886,630	800,00 €
02/29/08	EuroAsia Semiconductor	Internet	1/3page	main partners	UK	40 000 unique visitors a month	800,00 €
3/01/08	Compute Scotland	internet	full page	illustration + GT + all partners	UK	1,154,195	800,00 €
3/03/08	Bits&Chips	Internet	1/3page	main partners	The Netherlands	7,669,808	800,00 €
3/05/08	Electronique international	Internet	1/4 page	main partners	France	Internet :402,741 Print magazine: 12 740ex	800,00 €
3/05/08	SIGE News N067 page 2	Print newsletter	full page	illustration GT all partners	UK	no Data	1 660,00 €
3/06/08	VIPress	Internet	1/3 page	main partners	France	4,779,838 mail 2300 suscribers 40 000 pages views /month	800,00 €

03/13/08	Wireless DESIGN & Development	Internet	1/4 page	main partners	USA	1,401,829 37000 pages views/month	800,00 €
03/17/08	EETimes Europe page 8	Bimonthly magazine	1/3 page	GThomas Michael Shroeter all R&D partners	Europe.belg	35 000 suscribers	5 700,00 €
03/17/08	EetimesEurope Online	internet	Junior Page	GThomas Michael Shroeter all R&D partners	Europe/ Belgique)	Traffic rank : 169,997 300 000 pages views/month	1 600,00 €
03/17/08	Eetimes.uk	internet	Junior Page	Idem + illustration	UK	: 11000 suscribers	1 000,00 €
03/17/08	Eetimes.fr	internet	Junior Page	Idem + illustration	France	6500 suscribers	1 000,00 €
03/17/08	RF DesignLine	internet	Junior Page	GThomas + Michael Shroeter all R&D partners	india	Traffic rank : 555,112	800,00 €
20/03/08	USINE NOUVELLE.com	Internet	1/8 Junior page	ST	France	Traffic rank : 40,900 4.000.000 pages views/month 900.000 uniquevistors/month	800,00 €
20/03/08	USINE NOUVELLE N0 3094	Print Hebdo Magazine	1/8 Junior page	ST	France	69 400 ex 390000 circulation	1 046,00 €
03/26/08	The Engineer Online	internet	Full page	GT + 4 partners	UK	16,995,921 60 000unique vistors/month	1 600,00 €
03/26/08	The Engineer	Print Monthly magazine	Full page	Illustration + GT /ST 4 partners	UK	32 000 circulation	5 200,00 €
4/01/08	AEPI	Print Newsletter	1/4 Junior page	ST/ GT	local Grenoble		500,00 €
4/06/08	Inside Engineer	Internet	1/3 page	ST/ GT +lien	UK	no data	800,00 €
4/14/08	Mwrf.com	internet	1/2 page	all partners	USA	Traffic rank : 403,141 34 358 unique vistors/month	800,00 €
April 08	Microwaves & RF magazine	Print Monthly magazine	1/ 2 page	all partners	USA	circulation 45000	1 960,00 €
April 08	ELECTRONIQUE	Print Monthly magazine	1/2 junior page	main partners	France	circulation 8600	1 060,00 €
2/04/08	DATAWEEK	Print magazine Tech Pressl	1/8 page	ST	South Africa	Traffic Rank : 538,401	300,00 €

Web wires - Portals Blogs - Web sites							
02/29/08	Einnews http://eupolitics.einnews.com/news/eu-semiconductors	portal			USA	7,644,729	500,00 €
02/29/08	Einnews www.einnews.com/centraleurope/newsfeed-central-europe-	portal			USA	7,644,729	500,00 €
3/01/08	United States Free Trade Area http://www.aufta.com	Portal			USA	20,756,833	500,00 €
3/01/08	http://semiconductor.myreedportal.com/item.php?sessionid=fd0a9a33adb0976c8542a89a88e41	portal			USA		500,00 €
3/01/08	www.dmoz.org/science/chemistry/elements/germanium	(Open directory project)portal			Germany	1,142	500,00 €
3/01/08	eo.st	Web wires			Fr	28,675	500,00 €
3/06/08	www.rfcafe.com	website			USA	173,502 95,879 visits/month	800,00 €
3/06/08	European. The High Info	blog			Be		300,00 €
3/06/08	THZ Science and Technology Network	portal			UK	2,411,768 17 000 pages views/month	800,00 €
3/06/08	Innovatech.be	Web site			Be	1,721,270	500,00 €
3/06/08	4gnetwork.com	blog				no data	300,00 €
3/11/08	CORDIS Wire	portal					
3/11/08	nanotech-now	portal			USA	Traffic rank : 132,213 330 000 pages views/month	800,00 €
3/11/08	nanowerk.com	portal			USA	Traffic rank : 73,802 250 000 pages views/month	800,00 €
3/11/08	NANOQUEBEC WWW.nanoquebec.ca	InstitutionWeb Site			Ca	3,280,157	500,00 €

3/11/08	IET The Institution of Engineering and Technology http://www2.theiet.org	portal			UK	61,895	800,00 €
3/11/08	NanoNewsnet www.nanoewsnet.ru	portal			Ru	280,379	500,00 €
3/11/08	AcceleratingWorld.com	Web wires				11,458,522	500,00 €
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3/12/08	TOP Hot trends tophottrends.info/default.asp?s how=terahertz	web wires					500,00 €
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3/27/08	SILOBREAKER	Web wires			USA	44,128	500,00 €
03/14/08	Sompedia -Spain	Blog			Sp		300,00 €
03/19/08	Strategicboard	Blog					300,00 €
04/15/08	IHP-Innovations for High performances ihp-ffo.de/252.0.html	Partner site			De	1,670,207	500,00 €
6/05/08	GWT.net.de	Partner site			De	697,584	500,00 €
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