

Agenda for 5th EDA Advisory Panel Mtg, 4/10,2009

- **Introductions, Progress Review --- Herb**
 - New Team Members
 - Review of Mission and Previous Meetings
- **Ideas to Increase Industry Efficiency --- All**
 - Emerging design challenges for “More-than Moore” .
Which new EDA tools have to be ready in 2-3 years?
- **The SOI Opportunity --- Horacio Mendez**
 - SOI Technology Benefits
 - SOI EcoSystem Update
- **Wrap-up, Action Items, Preview --- All**

Current EDA/Design Advisory Panel Members (1)

COMPANY	Representative	EDA	IC Vendor	Foundry	Design Services
eda 2 asic	Herb Reiter, Chair	X	X	X	X
ATRENTA	Piyush Sanchetti	X			
CADENCE	Pankaj Mayor	X			
GRADIENT	Ed Cheng	X			
IBM	Leon Stok, Chris Tretz	X			
MENTOR	Don Kurelich	X			
SEQUENCE	Will Ruby	X			
SIGRITY	Leslie Landers (new)	X			
SYNOPSYS	Yatin Trivedi	X			

Current EDA/Design Advisory Panel Members (2)

COMPANY	Representative	IC Vendor	Foundry	Design Services
SAMPLIFY	Richard Tobias (new)	X		
Chartered	Walter Ng		X	
TSMC	D.Pattullo, Tom Quan		X	
UMC/Faraday	K.C. Wu, Albert Chen		X	X
SYMMID	Alex Parshad			X
WIPRO	Ron Burns			X

EDA/Design Panel Mission – as agreed on June 10, 2008

**Identify and communicate
opportunities to deliver increased
predictability of design and
designer productivity
as well as**

semiconductor product differentiation.*

Address market needs in the next 2 to 3 years !!!

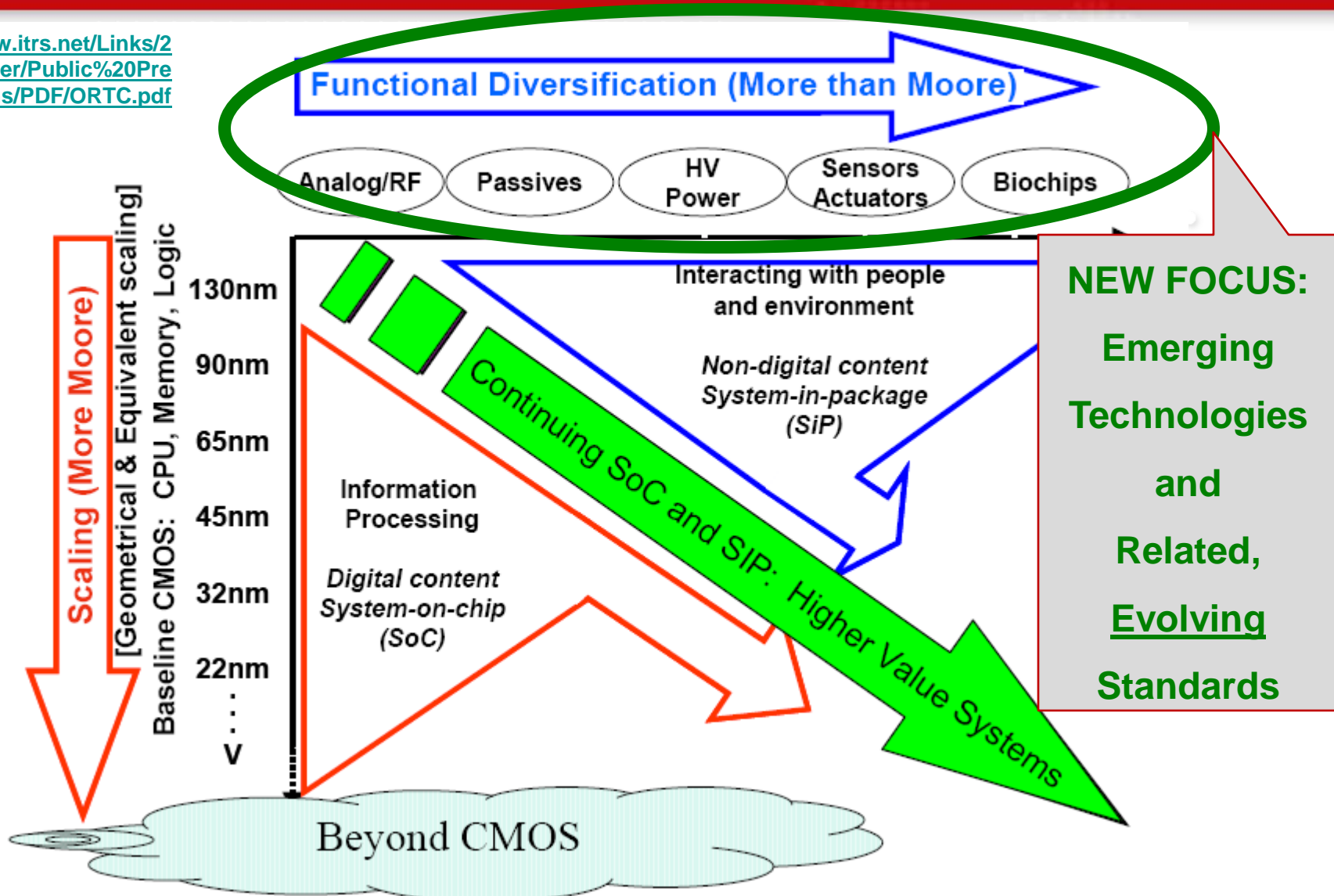
***Semicond. Vendors don't expect EDA to differentiate ICs!**

Meetings and Key Topics Since Inception

- **June 2008: Introductions, Mission,...**
- **Sept 2008: PathFinding & 3D**
 - Qualcomm, STMicroelectronics, Javelin
- **Nov 2008: VC Perspective of EDA & 3D**
 - Alloy Ventures
- **Febr 2009: Widely Used EDA Standards**
 - Accellera, IEEE & SPIRIT, Si2

ITRS Roadmap (1)

<http://www.itrs.net/Links/2008Summer/Public%20Presentations/PDF/ORTC.pdf>



HR Comments to ITRS Roadmap (1)

- **The “More Moore” Axis is**
 - Served by establish players and (de-facto) standards
 - Covered with development efforts between large EDA Vendors, IDMs and large Foundries
 - ➔ No opportunities for our Panel to add meaningful value
- **The “More than Moore” Axis**
 - Many new opportunities for Semiconductor Vendors
 - Opportunities for higher productivity design technologies
 - EDA Panel will **cooperate with the existing standards organizations** to assure evolutionary developments
- In the April & July Panel meetings we will choose which areas to address and in future meetings we’ll invite area experts to outline their design technology requirements to our Panel

ITRS Roadmap (2)

<http://www.itrs.net/Links/2008Summer/Public%20Presentations/PDF/ORTC.pdf>

2007 ITRS “Moore’s Law and More” Alternative Definition Graphic

Baseline
CMOS

Memory

RF

HV
Power

Passives

Sensors,
Actuators

Bio-chips,
Fluidics

“More Moore”

“More than Moore”

Computing &
Data Storage

Sense, interact,
Empower

Heterogeneous Integration

System on Chip (SOC) and System In Package (SiP)



Source: ITRS, European Nanoelectronics Initiative Advisory Council (ENIAC) 4

Work in Progress – Do Not Publish

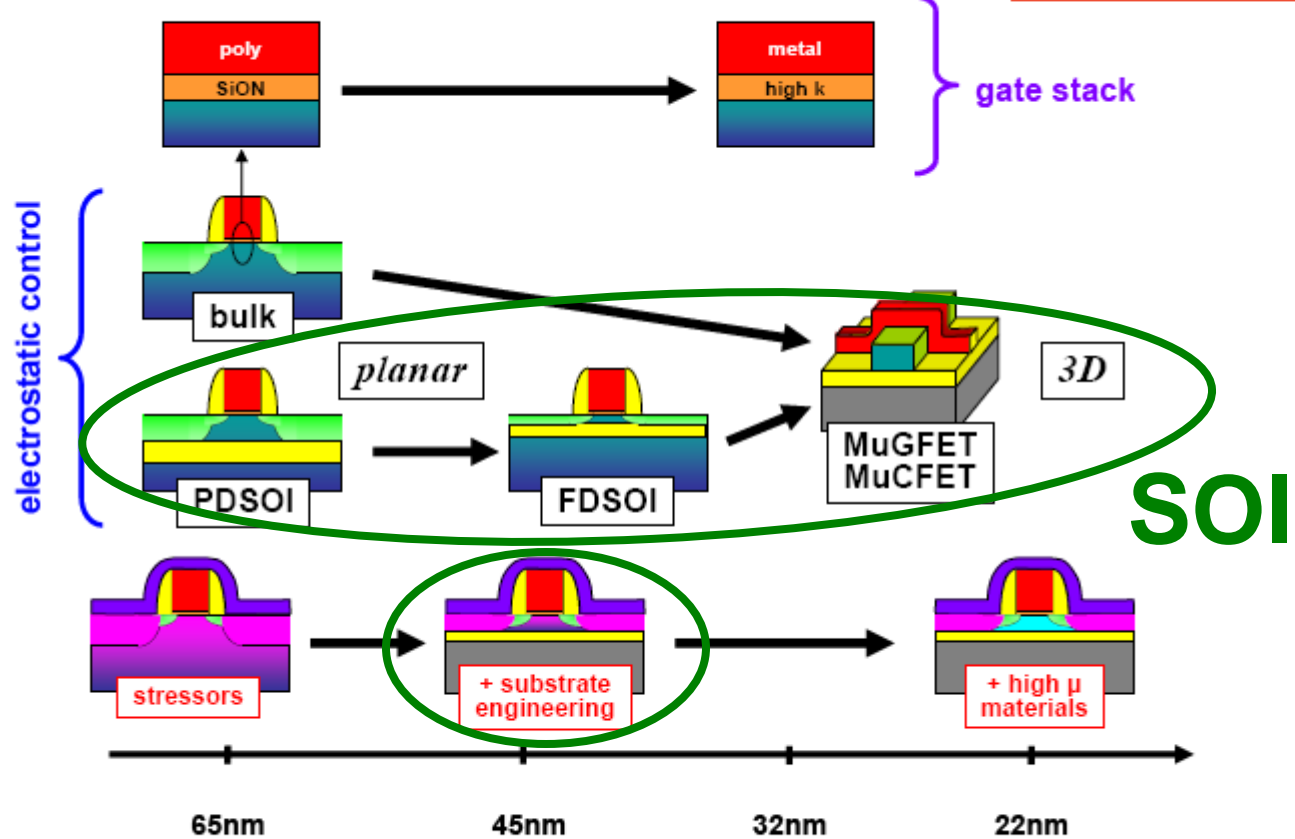
ITRS 2008 Update Preparation – July, San Francisco, USA

ITRS Roadmap (3)

<http://www.itrs.net/Links/2008Summer/Public%20Presentations/PDF/ORTC.pdf>

2007 - PIDS/FEP - Simplified Transistor Roadmap

[Examples of "Equivalent Scaling" from ITRS PIDS/FEP TWGs] – Update in 2009



[ITRS DRAM/MPU Timing: 2007[7.5]



Source: ITRS, European Nanoelectronics Initiative Advisory Council (ENIAC)

Future Meetings and Key Topics

- **5th Mtg: April 10: SOI** Technology expert presents

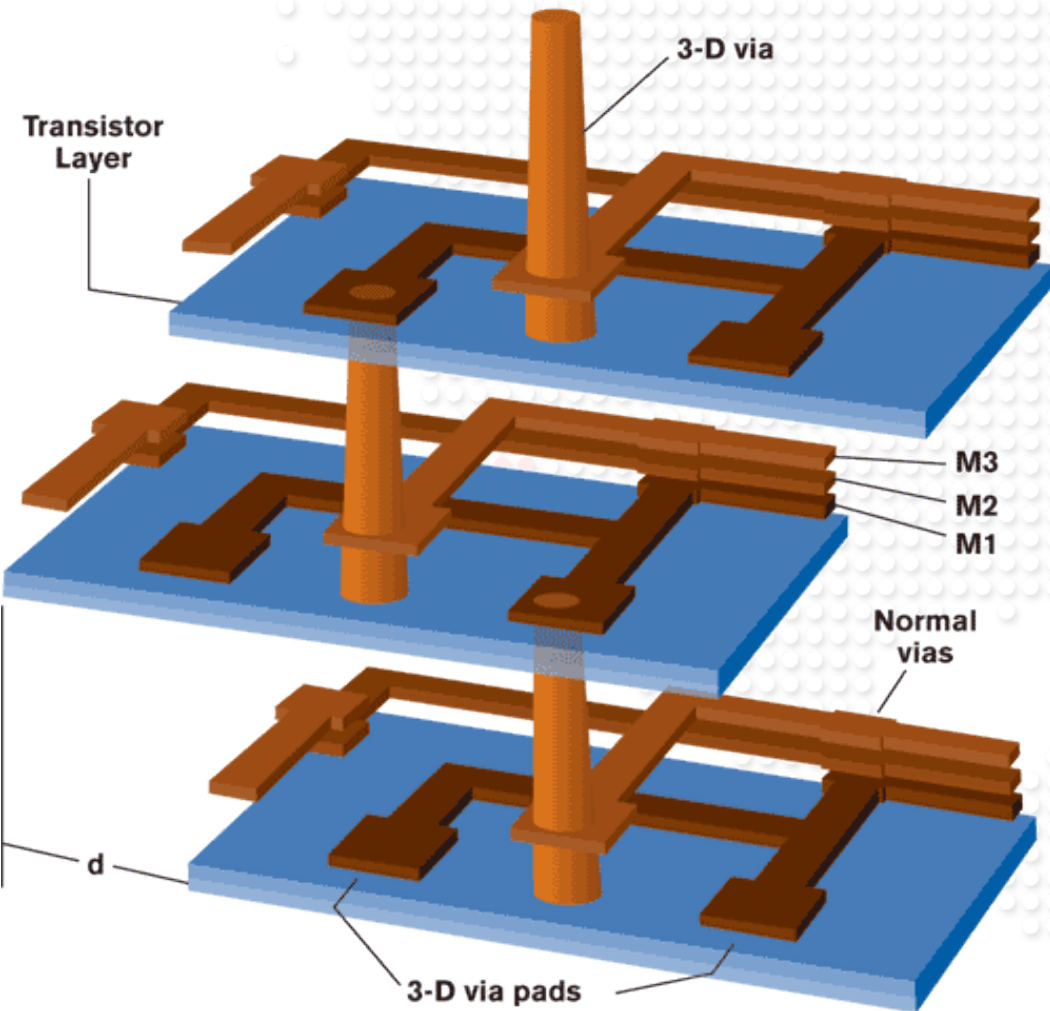
- **6th Mtg (at DAC in SFO?): “More than Moore” ***
and Amkor expert presents EDA needs for 3D/TSV/SiP
- **7th Mtg: MEMS or CIS** or.... expert presents EDA needs
- **8th Mtg:** another expert presents their EDA needs

Opportunities for New Design Technologies

- A) Die stacking / 3D / TSV and related technologies**
- B) Design tools for MEMS structures and integration of MEMS with SoCs**
- C) Sensor design, signal amplification and integration with SoCs**
- D) Die - Package - Board - Back-panel - System design environments**
- E) Analog / RF / Mixed-signal IC and board design challenges**
- F) Foundry and Fabless/Fablite customer interface (from and to Foundry)**
- G) YOUR specific design challenge you want EDA tools to address better**

Opportunity: TSV (Through Hole Vias)

3-D Wafer-Level Stacking Using TSV



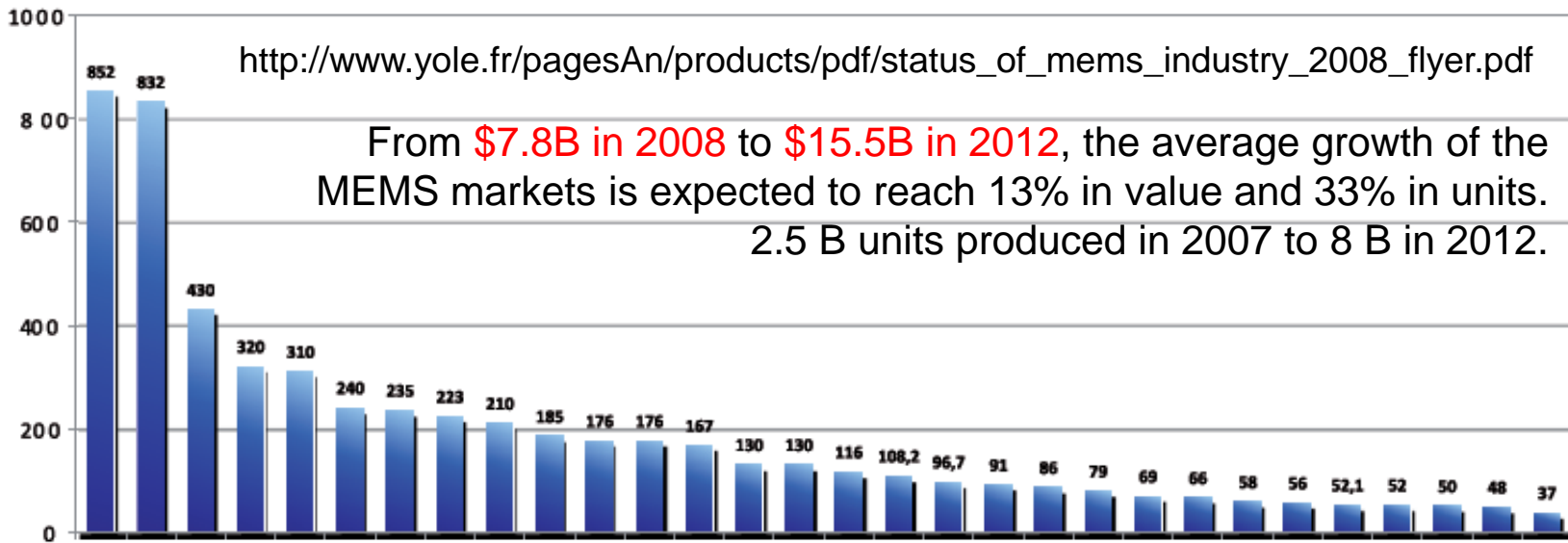
A 3-D wafer-level stacking scheme using a through-silicon via approach. (Source: University of Alberta)

<http://www.semiconductor.net/index.asp?layout=articlePrint&articleID=CA6602500>

Opportunity: MEMS

TOP 30 Worldwide MEMS Manufacturers 2007 Revenues (Yole Estimations)

Mill \$



http://www.yole.fr/pagesAn/products/pdf/status_of_mems_industry_2008_flyer.pdf

From **\$7.8B in 2008** to **\$15.5B in 2012**, the average growth of the MEMS markets is expected to reach 13% in value and 33% in units. 2.5 B units produced in 2007 to 8 B in 2012.

Opportunity: Sensors “Our Computers Eyes and Ears”

- **Acoustic, sound, vibration**
- **Automotive, transportation**
- **Chemical**
- **Electric current, electric potential, magnetic, radio**
- **Environment, weather**
- **Flow**
- **Ionising radiation, subatomic particles**
- **Navigation instruments**
- **Position, angle, displacement, distance, speed, acceleration**
- **Optical, light, imaging**
- **Pressure, force, density, level**
- **Thermal, heat, temperature**
- **Proximity, presence** http://en.wikipedia.org/wiki/List_of_sensors

Opportunity: More Analog & Mixed-Signal Tools

2007 and 2008 Worldwide Analog Market Share by Supplier

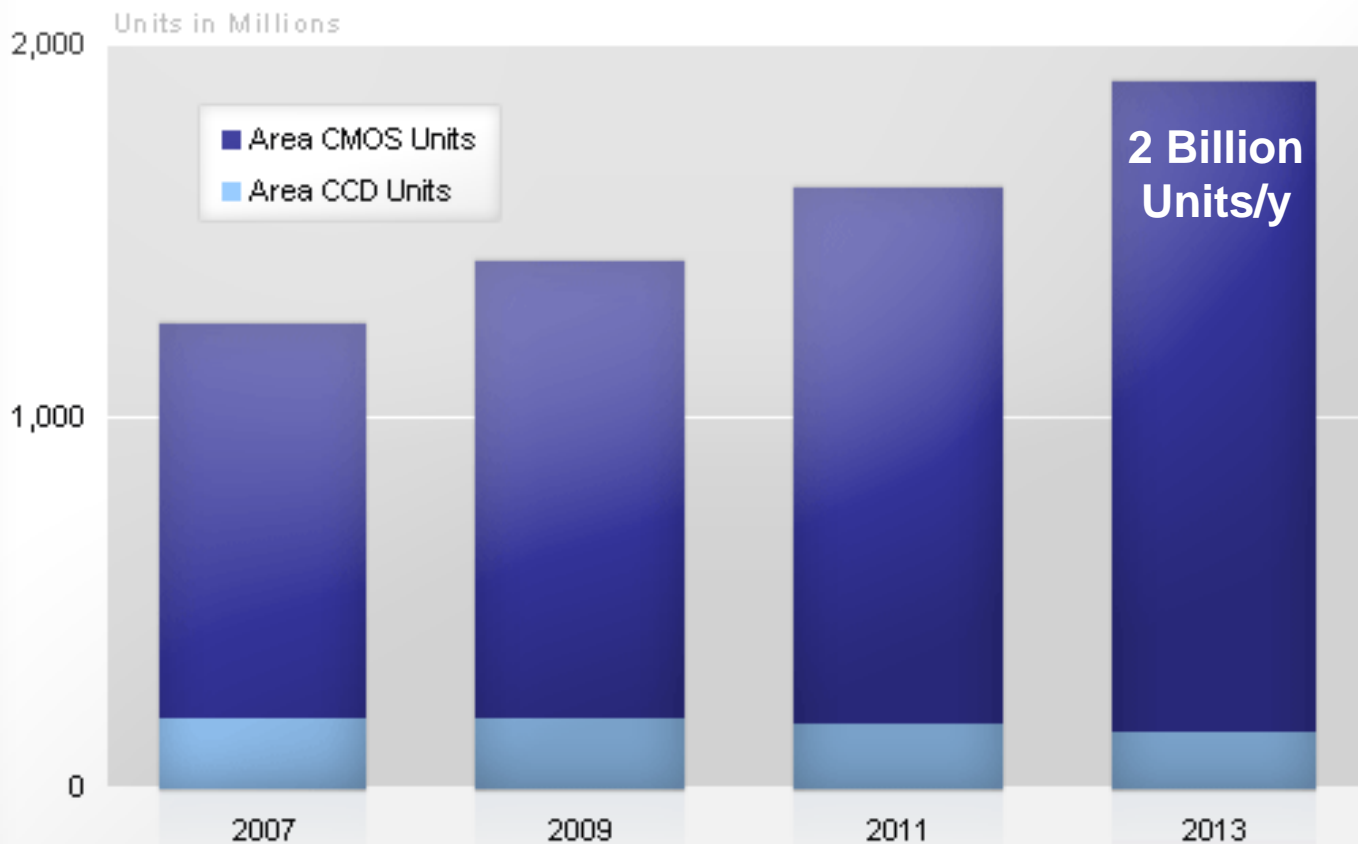
Company	2008 Rank	2008 \$M	2008 Share	2007 Rank	2007 \$M	2007 Share	Y/Y %
Texas Instruments	1	5,009	14.1%	1	5,247	14.4%	-5%
STMicroelectronics	2	3,902	10.9%	2	3,844	10.5%	1%
Infineon Technologies	3	2,786	7.8%	3	3,327	9.1%	-16%
Analog Devices	4	2,268	6.4%	5	2,195	6.0%	3%
NXP Semiconductors	5	2,148	6.0%	4	2,675	7.3%	-20%
National Semiconductor	6	1,567	4.4%	6	1,703	4.7%	-8%
Maxim Integrated Products	7	1,491	4.2%	7	1,530	4.2%	-3%
Linear Technology	8	1,155	3.2%	9	1,085	3.0%	6%
Freescale Semiconductor	9	1,090	3.1%	8	1,245	3.4%	-12%
RF Micro Devices	10	935	2.6%	11	993	2.7%	-6%
Other		13,287	37.3%		12,609	34.6%	5%
Total		35,636			36,453		-2%

Source: **data**beans Estimates, Company Reports

Opportunity: Image Sensors

3D Opportunities ?

Worldwide Area Image Sensor Shipments



Source: In-Stat, 3/09

**Major
manufacturers:**

Aptina,
MagnaChip,
OmniVision,
Sharp, Sony
and Panasonic.
(Instat, April 2009)

HR Suggestions & Plans

- **Coordinate work of IP-, EDA-, Test Panels**
- **Cooperation with other Industry Organizations**
 - Accellera, ASCII, IEEE, SEMI, Si2, SOI Consortium,...
 - Seminars, Educational Panels, Collateral, Press,...
- **Cooperation w EDA-, IP-, Semicond. Vendors**
 - Multi-vendor seminars in key cities & at trade shows
 - Business-focused GSA events worldwide
- **Expand EDA section of the GSA website**
 - Start EDA blog, emerging standards questionnaire, tool vendors matrix, contributions from partners,...



Thank You !!!