Increased US/UK Collaboration in R & D?

ARM:London

ARMHY:New

ARM®

Background – Semiconductor Market

- ARM is a secular growth story with a 25+ year time horizon

- Industry is 50 years old and looks set to continue for another 50 years

- Several waves of semiconductor technology
  - Now in the middle of CMOS
  - CMOS has enabled MSI>LSI>VLSI>SOC

- Technical progress brings a basis for industry evolution
  - Miniaturisation
  - Reductions in costs
  - Increases in complexity

- Vertical integration gives way to horizontal specialisation
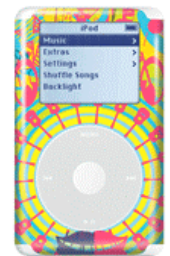 - Creates a sub-sector: Semiconductor IP

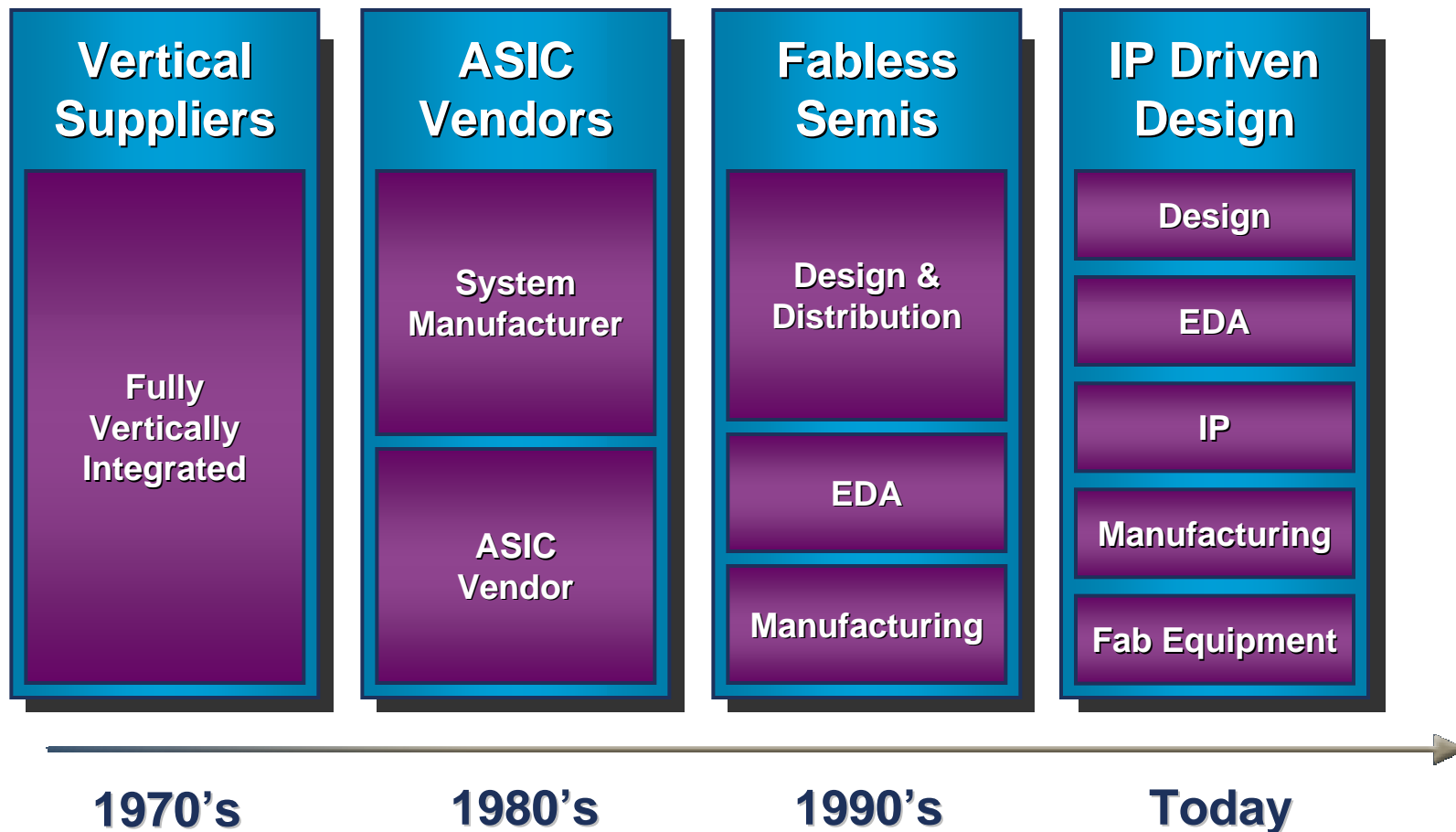**ARM**®

Background – Computing Market

- Computing has evolved in parallel with the Semiconductor market over a similar but slightly longer period
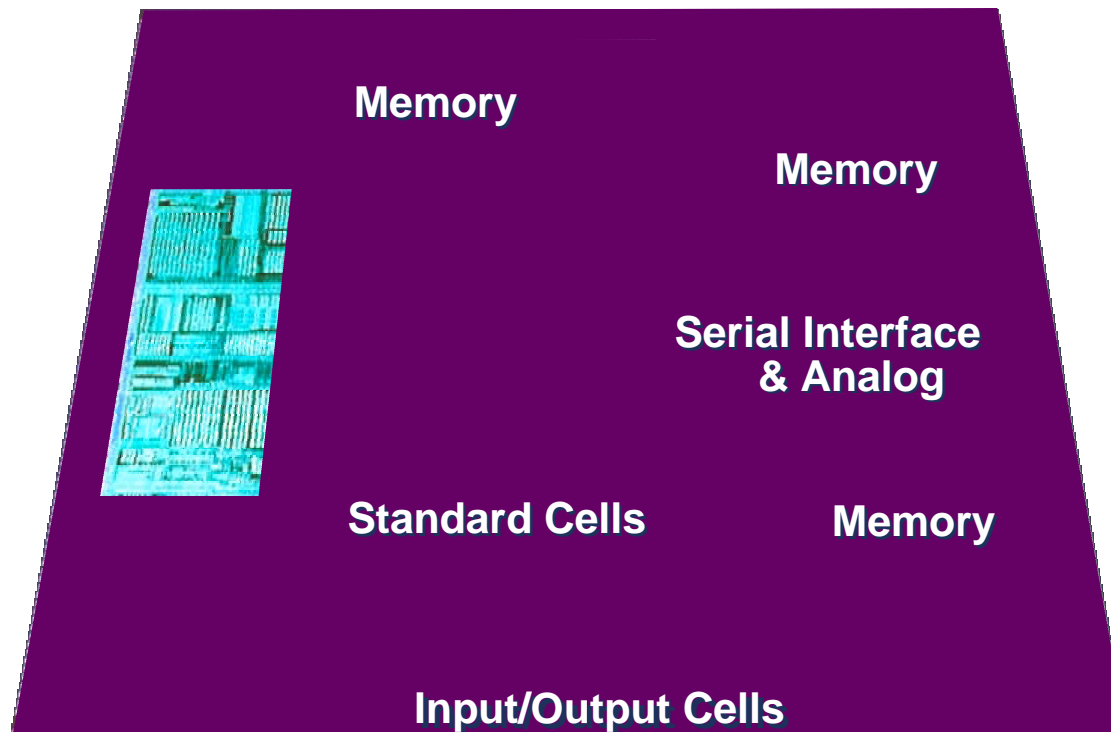

- Semiconductor technology is now allowing computing to become embedded into everyday products
  - Enhancing existing products
  - Enabling the creation of new ones

Semiconductor Disaggregation

Vertical Suppliers	ASIC Vendors	Fabless Semis	IP Driven Design
Fully Vertically Integrated	System Manufacturer	Design & Distribution	Design
	ASIC Vendor	EDA	EDA
		Manufacturing	IP
			Manufacturing
			Fab Equipment
1970's	1980's	1990's	Today

Physical IP Product Focus

Memory

Memory

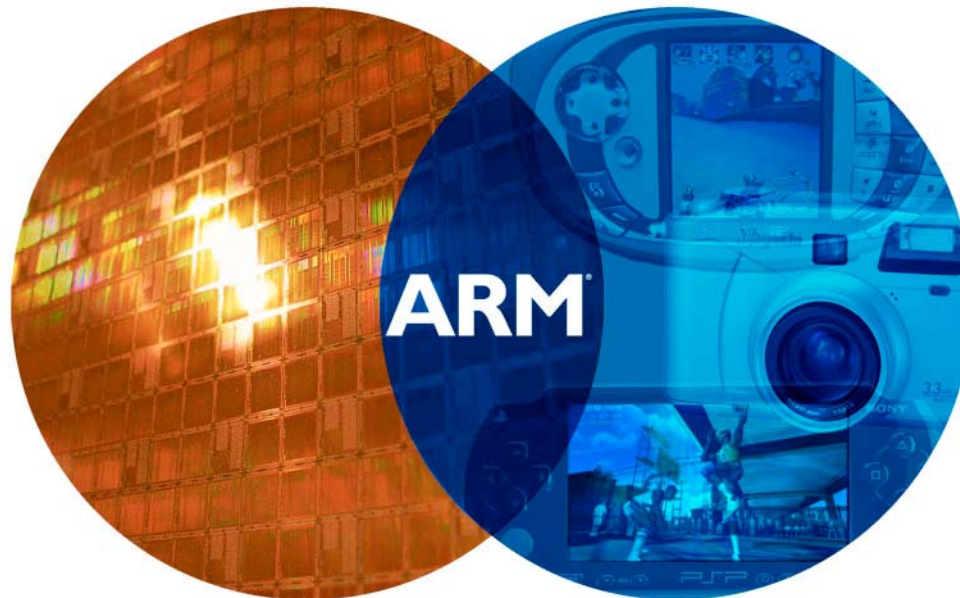Serial Interface & Analog

Standard Cells

Memory

Input/Output Cells

- Product strategy to maximize royalty
  - Pervasive need
  - Standard
  - Diverse market

Leading Global Foundry Locations

National
Jazz
IBM
Infineon
Tower
Hynix
Dongbu
SMIC
TSMC
UMC
Kawasaki
NEC
Sharp
Sony
Chartered
First Silicon
Silterra

ARM Position

ARM is at the epicentre of this exciting combination

- Enabling SOC
- Reusable System IP
- Physical IP
- System design tools
- Low-power

- Software
- 8-bit>>32-bit migration
- Wireless
- "Lightly" embedded
- "Deeply" embedded

Where do we do R & D Today?

- Cambridge, Sheffield, Maidenhead, Blackburn - UK

- Austin, San Diago, Silicon Valley - USA

- Bangalore - India

- Sophia Antipolis – France

- Where's the Long Term Growth?
  - China – IP Issues - Risks
  - India

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Strategy

- Broad technology portfolio
- Convergence of Computing and Semiconductor IP trends

APPS & OS PARTNERS

TOOLS PARTNERS

SILICON PARTNERS

ARM®
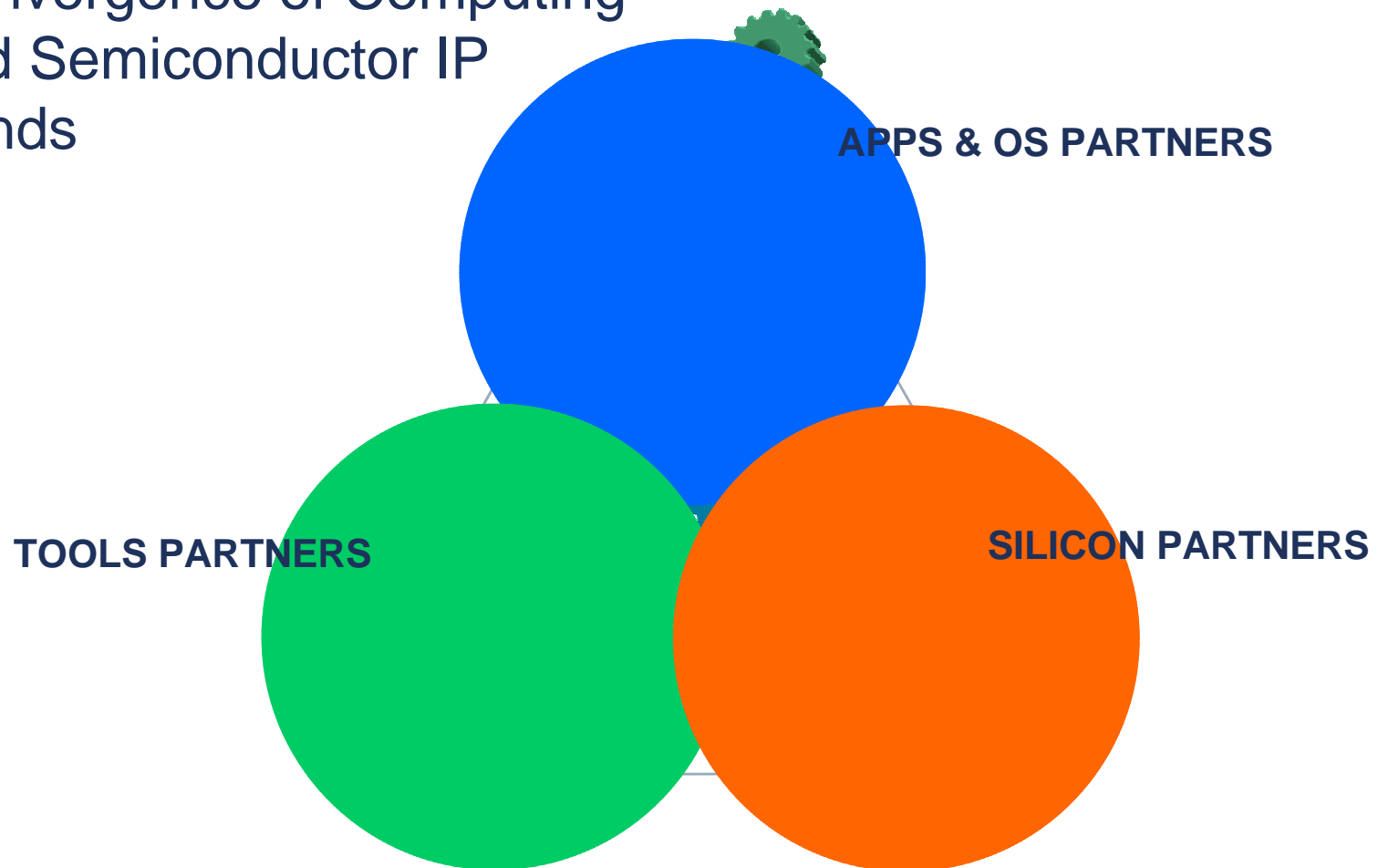
Customer Requirements

- Standards upon which to build
- Ecosystem
  - ARM Connected Community
  - Market creation
- Innovation
- Quality IP
  - Out of the box experience
- Roadmap
- Value

Thousands of Physical IP Users

Meeting Customer Requirements

- **Standards**
  - ARM, AMBA, ASL, RVD, OpenMax

- **Partnership**
  - Vibrant third party Connected Community
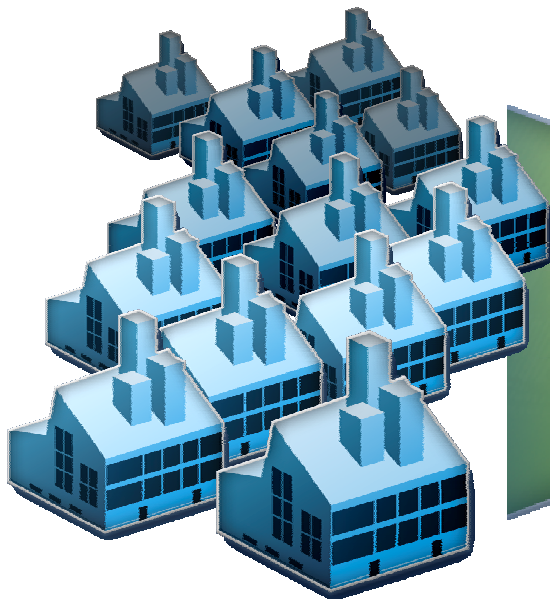 - Leverage partners' differentiation

- **Low-power system design**
  - Power efficient cores
  - OptimoDE
  - IEM
  - Artisan Physical IP

Connecting Manufacturers with Designers

**World's Leading
IC Manufacturers**

**ARM User
Community**

Artisan®
ARM® Physical IP

**2,000+ Companies,
Estimated 10,000
Design Teams**

Dataquest's 2004 IP Company Rankings

	Rank	2003 ($M)	Growth
ARM	1	175.2	
Rambus	2	118.1	
Synopsys	3	81.2	
Artisan	**4**	**74.6**	**71%**
TTPCom	5	73.5	
MIPS	6	47.0	
Virage	7	40.0	-16%
Ceva	8	36.8	
Imagination	9	23.6	
Mentor	10	22.2	
Monolithic	11	20.4	-18%
ARC	12	17.8	
NewLogic	13	17.0	
Mosaid	14	15.9	-13%
Tensilica	15	15.1	
Faraday	16	15.0	
QualCore	17	13.7	
Sci-Worx	18	13.2	
Cadence	19	12.4	
Virtual Silicon	20	11.6	15%

Battery Operated, On the Move

Applications

- Smart Phone
- Feature Phone
- Voice Phone
- Cordless Phone
- Bluetooth (Headset etc.)
- PDAs
- Portable Media Players

* ARM Estimate

TAM 2004	TAM 2010	Avg. SoCs per Product (2010)*
32M	255M	3.0
224M	340M	1.5
384M	255M	1.0
256M	561M	1.0
47M	284M	1.0
10M	16M	2.0
40M	168M	1.0

ARM meeting the trend

- Efficient design of processors
  - Maximum performance/min power
  - Minimum area
- System-level design tools
- Application driven technology
  - Media
  - Signal processing
  - Security
  - Battery life

Segment trends

- Convergence drives performance
- Battery life remains critical
- 3G becomes a reality
- HSDPA on the horizon
- Mobile TV gaining momentum
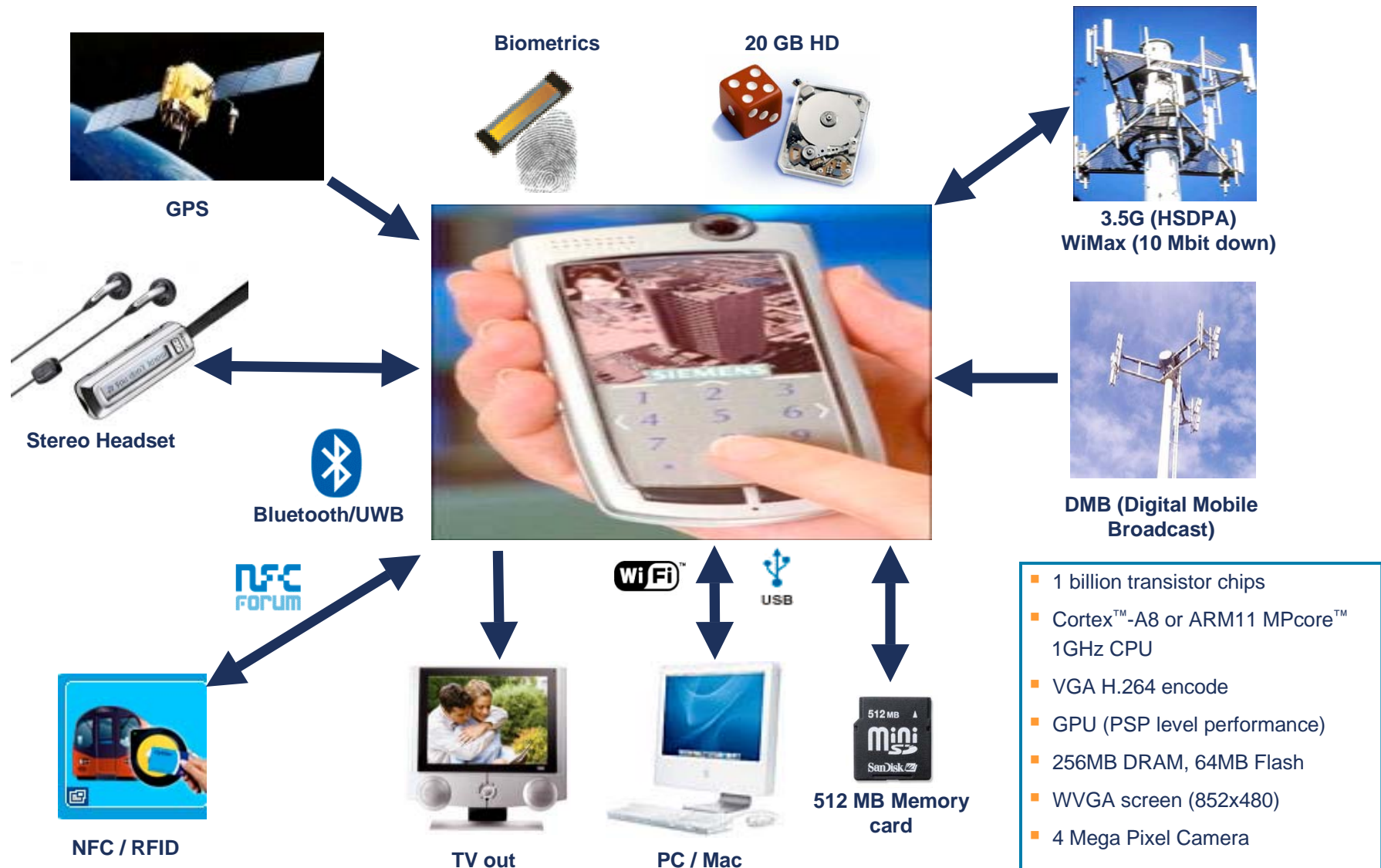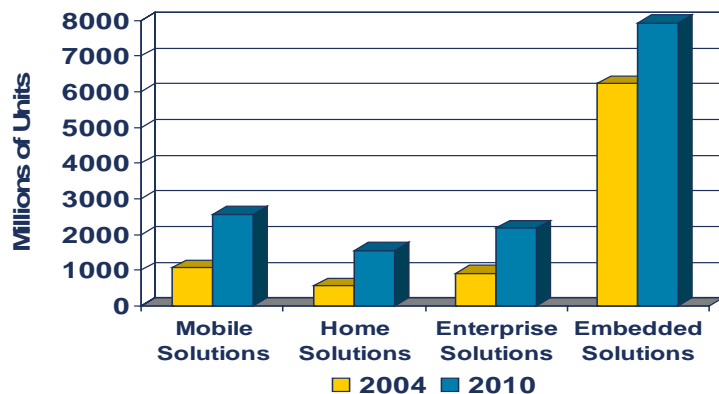- Hacking of phones emerging

Note: Sources Semico, Strategy Analytics,
ARC Group, IDC, IMS, Gartner, and ARM Estimates

Concept Smart phone of 2008

Biometrics

20 GB HD

GPS

Stereo Headset

Bluetooth/UWB

3.5G (HSDPA) WiMax (10 Mbit down)

DMB (Digital Mobile Broadcast)

NFC / RFID

TV out

WiFi ™ **USB**

PC / Mac

512 MB Memory card

- 1 billion transistor chips
- Cortex™-A8 or ARM11 MPcore™ 1GHz CPU
- VGA H.264 encode
- GPU (PSP level performance)
- 256MB DRAM, 64MB Flash
- WVGA screen (852x480)
- 4 Mega Pixel Camera

2010 Shape

Total Available Market (SoCs) — Millions of Units

Mobile Solutions, Home Solutions, Enterprise Solutions, Embedded Solutions — 2004 / 2010

% Market Share

Mobile Solutions, Home Solutions, Enterprise Solutions, Embedded Solutions — 2005 / 2010

HOME SOLUTIONS   ENTERPRISE SOLUTIONS   MOBILE SOLUTIONS   EMBEDDED SOLUTIONS

EMERGING APPLICATIONS

Mobile 48%

Non-Mobile 52%
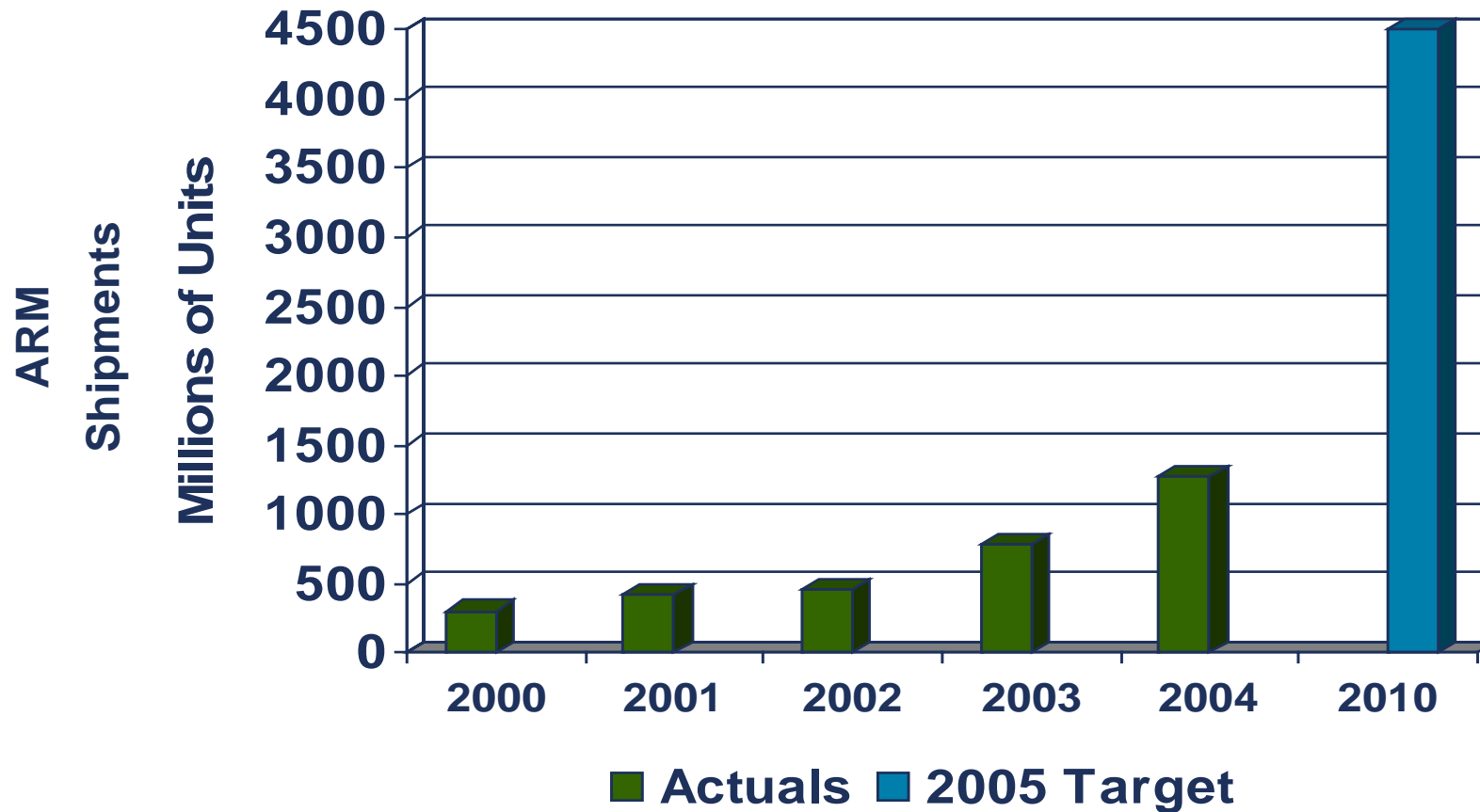
ARM®
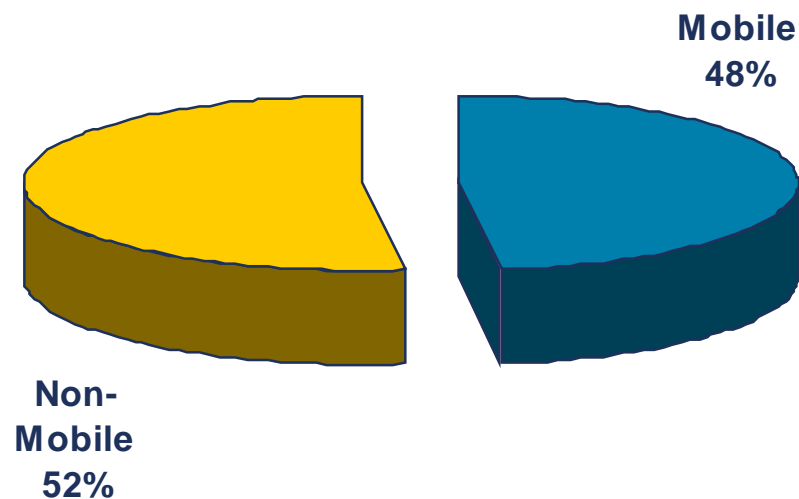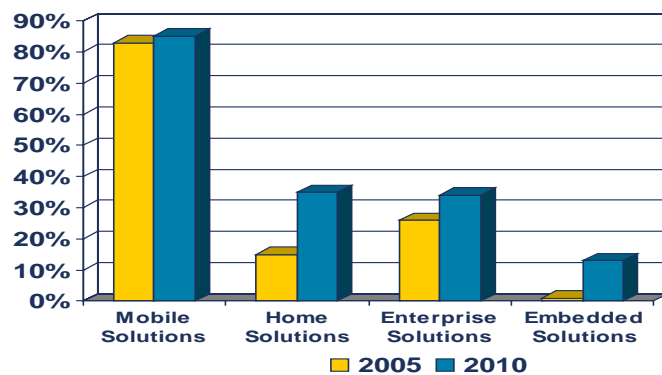
4.5 Billion Unit Opportunity

Issues - Questions

- Industry, Academia, Governments have different time lines, objectives, measures

- The West especially needs to turn its Science & Engineering Base into money globally

- How can we better achieve this?

  - Through Partnership in Multiple Dimensions