IBM Systems and Technology Group

Perspectives on Globalization & World Wide Collaborative Innovation for the Nation's Defense

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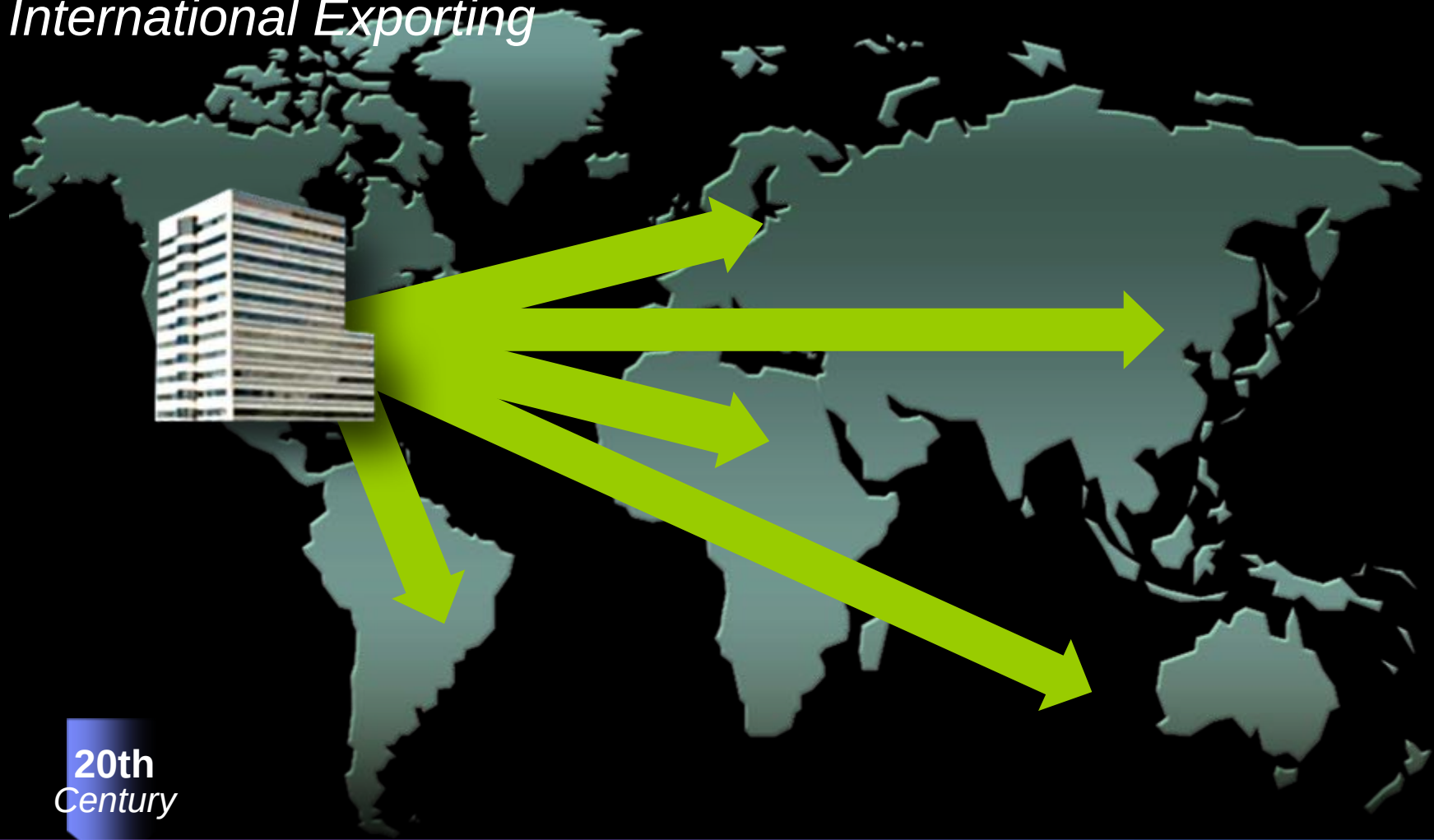
Globalization: the Journey…

International Exporting



20th
Century

Timeline

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The Evolving Business Model

Multinational Country Silos

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The Emerging Business Model

The Globally Integrated Enterprise

21st *Century*

Timeline

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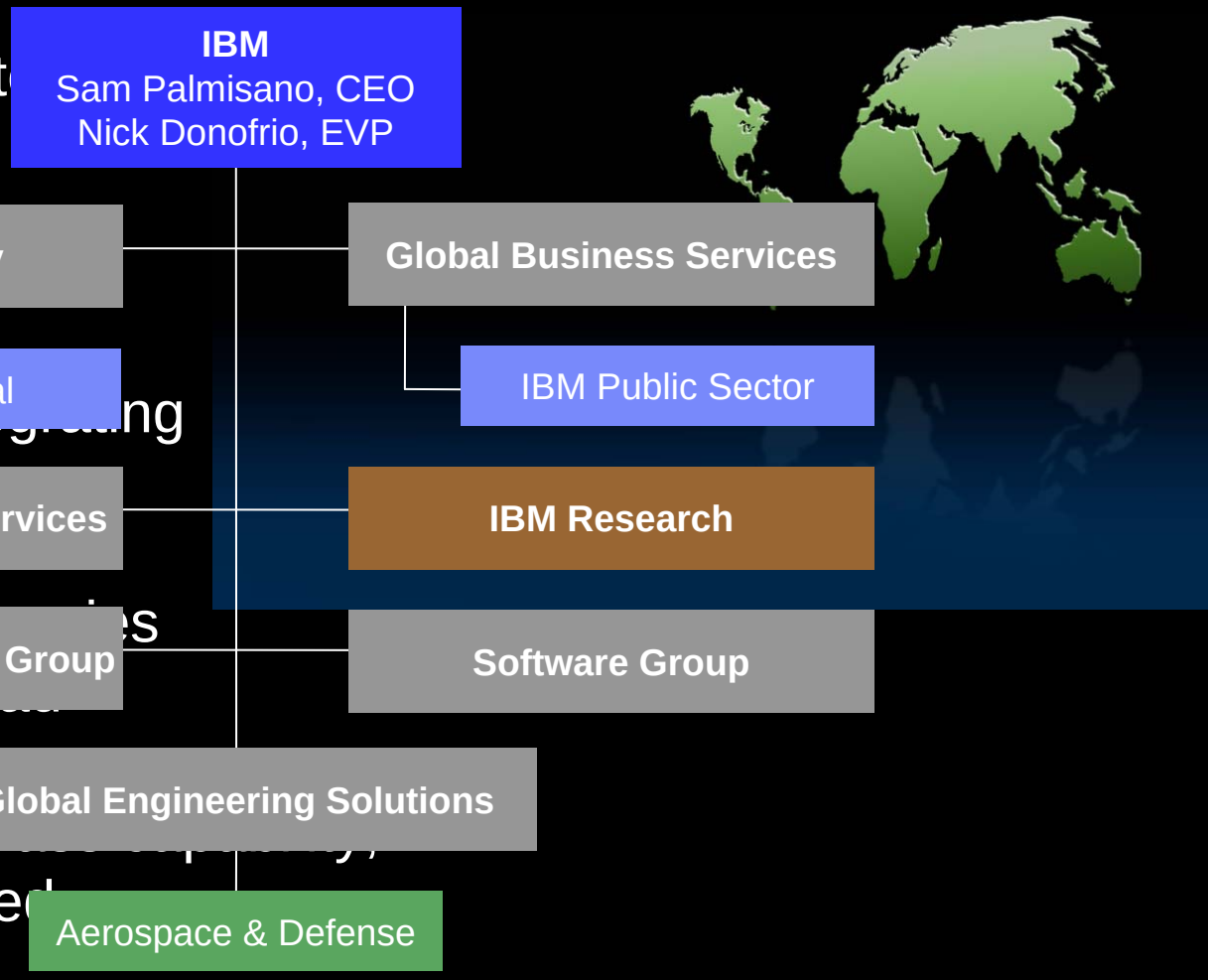
The Globally Integrated IBM

Making the Whole of IBM More Efficient

- Extending reach int
  markets
- Rea
- Optimiz ng
  key
- Elin s
  and
- Leveraging world
  wherever it is locate



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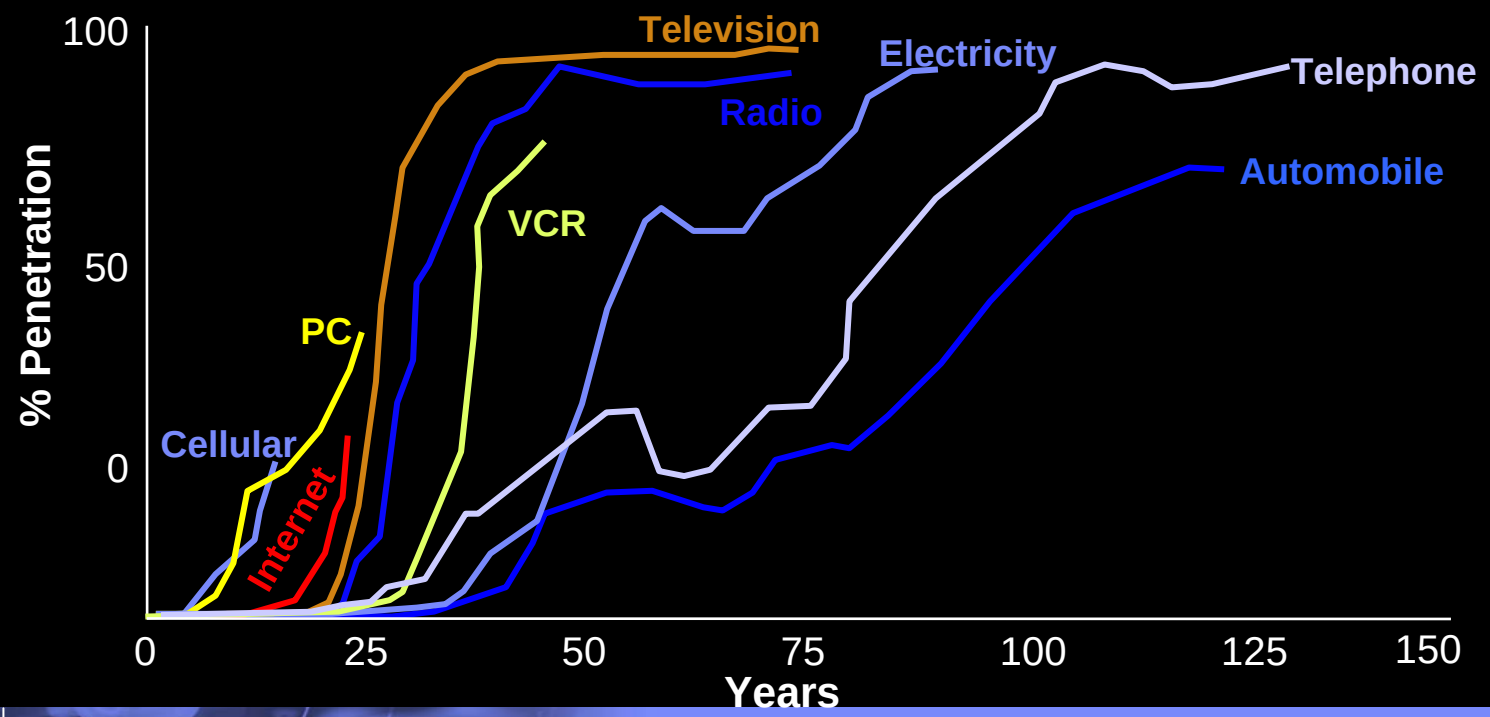
Pace of Commercial Technology Innovation is Accelerating

Defense Pressures

- **Newer technologies taking hold at double or triple previous rates**
- **Moore's Law vs. skills**
- **Globalization of Advanced Technology and Industry**
- **Declining Defense Dollars**



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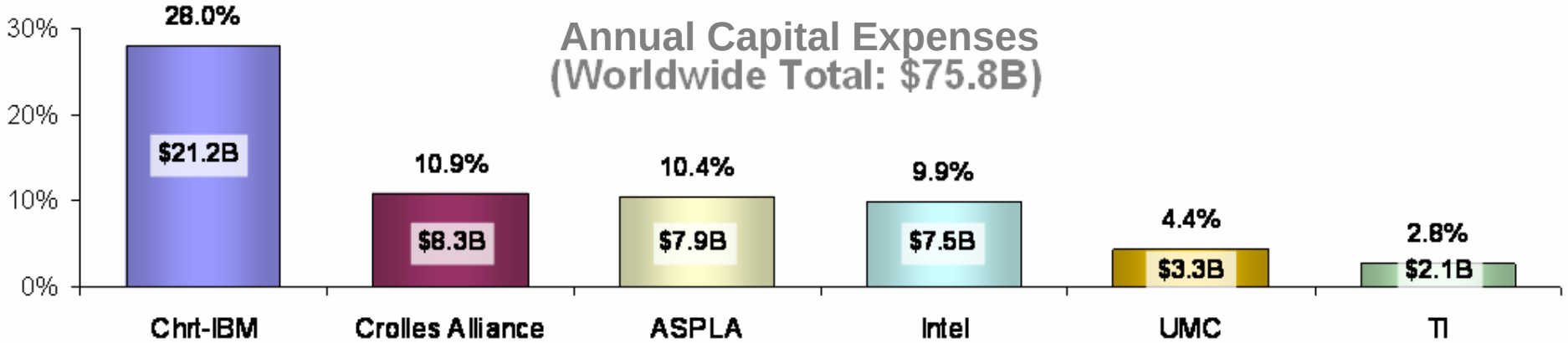
Soaring Cost of Development and Next Gen Manufacturing

Emergence of Strategic Development Alliances



IBM
Chartered semiconductor manufacturing
SAMSUNG
Infineon technologies
AMD
SONY Sony Semiconductor
TOSHIBA
freescale semiconductor
Moving
tsmc
FUJITSU
Matsushita Electric National Panasonic
RENESAS
NEC
intel
UMC
Texas Instruments

Has announced plans to end in-house development. At 45nm and beyond will utilize TSMC Foundry.

Source: Gartner DQ (January 2005), Chartered

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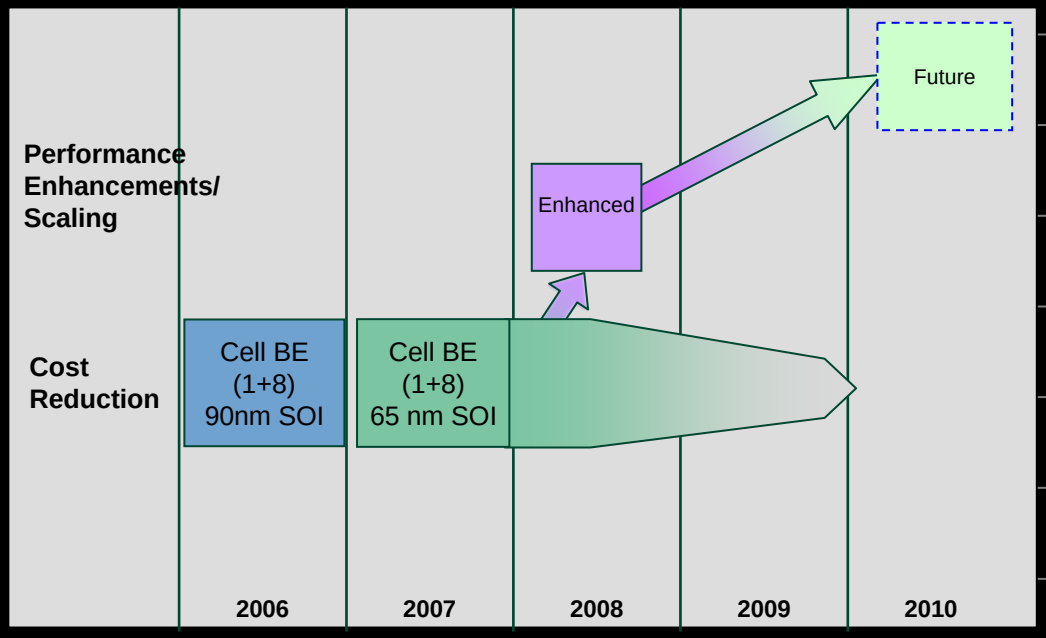
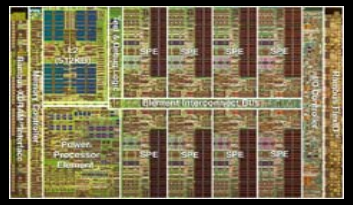
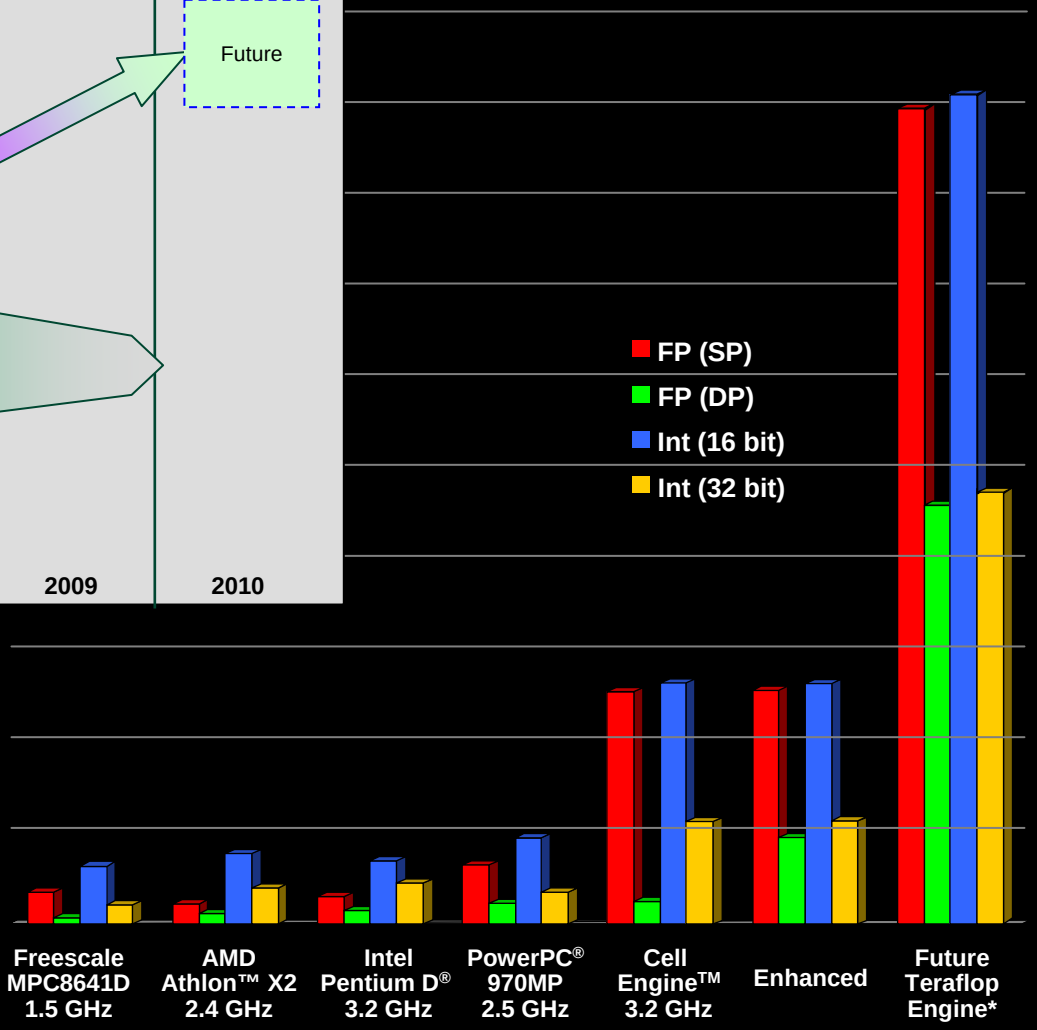
Example: *Gaming Technology Pushing the Processor Envelope (PS3, Xbox, Wii)*





Cell Engine™ 3.2 GHz

"Supercomputer on a chip"



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…for High Performance Computing Breakthroughs

- Cell & Power PC for Complex 4-D Visualization Exploitation
  - Cell Processor developed for Sony Play Station 3
  - Custom Power PC developed for Microsoft Xbox 360 and Nintendo Wii
  - ***This will revolutionize Geospatial Analysis and Battlefield Awareness***
- IBM Supercomputing dedicated to new Intelligence Missions
  - Blue Gene/L: Fastest Supercomputer in the World (six months old)
  - Most dense computing capability known to man (at Lawrence Livermore)
  - Blinding electronic speeds at low power levels for supercomputing
  - ***Los Alamos Road Runner Petaflop Supercomputer***
- Cell powered signal processing and advanced radar systems
  - Quantum leap of 15 – 30X in power for multi-function radars
  - Massive multi-cores along with efficient auto-code software enable portability
  - ***This will shrink weight while dramatically increasing functionality***
- UIMA Text Analysis & Imagery / JPEG / MPEG Analysis Developments
- High Speed All Source & Internet Content Analysis Techniques

PlayStation 3

X Box 360

Nintendo Wii

Blue Gene / Road Runner

Cell/Soma Blades

Custom Cell based Boards

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Example: *MASTOR Speech-to-Speech Translation Technology*

- Completes English – Arabic & Arabic – English speech recognition and translation
- Provides visual aids so to assist users in accurate communication
- Adapts to each speaker despite differences in tones and accents
- Implemented for a language pair, optimized for "focused conversational domains"
- Accepts free form input in both languages, as opposed to "fixed phrase translation"
- **Leverages IBM's 35 years of commercial marketplace experience with practical issues in speech recognition**

Hand-held

Ruggedized Laptop

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Examples: *bringing Commercial Innovation to solving U.S. Government needs for advanced microelectronics solutions*

Leveraging best of commercial <u>technology and processes</u> to drive DOD imperatives defined in QDR and Defense Science Board task force studies on defense technologies

- **Trusted Foundry serves as a current example of this model**
  - Continued learning for both industry and U.S Government partners
- **Additional opportunities**
  - Radiation hardened (rad hard) microelectronics
  - Anti-tamper solutions, Trusted Software
  - Ultra high performance Systems, components and architectures
  - Ultra low power components, systems

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The Power of Commercial Leveraged for Defense

- Historically the Defense Industry drove significant technology creation and many of today's high-tech companies are the direct beneficiaries
- The dynamic has changed…
- In today's global economy, a strong, viable, USA Commercial Technology Industry is key to the future health of the US Government Defense
  - Three examples have been provided which demonstrate how commercial technology may be leveraged
- We have learned this is not easy to do, but we believe adoption is essential

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Back-Up

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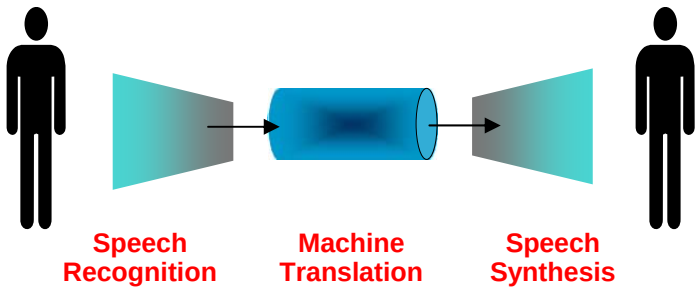
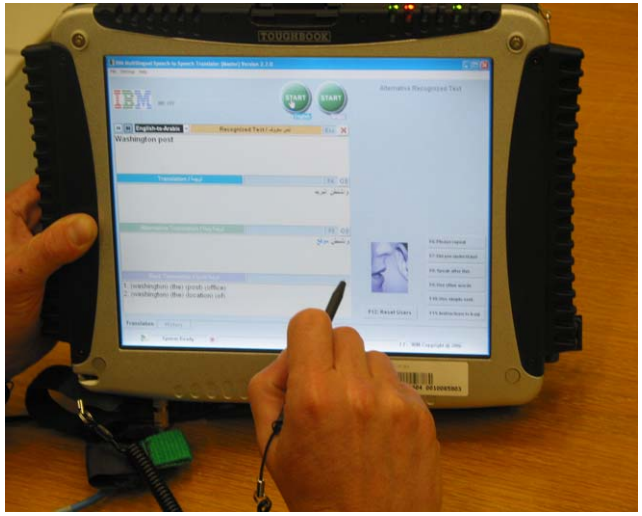
IBM Real-time Speech Translation Technologies



Today, IBM speech innovations are allowing media companies to monitor Chinese and Arabic news broadcasts over the Web in English, travelers to use PDAs to translate menus in Japanese, and doctors to communicate with patients in Spanish.

- IBM MASTOR - Multilingual Automatic Speech-to-Speech TranslatOR
- MIT Technology Review - ***One of "10 Emerging Technologies That Will Change Your World"***
- Time Magazine - ***" One of 5 New Things that Will Blow your Mind"***



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