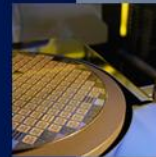
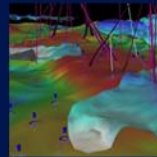
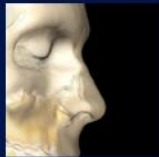


Computer Systems, Inc.
MERCURY

Challenges Drive Innovation™



Sensor Data Exploitation

David Toms, Director Business Development

703 963 1591

dtoms@mc.com

- **Mercury Introduction**
- **Battlefield challenges**
- **Airborne Reconnaissance Image Exploitation System (ARIES)**
- **Multi-Mission Computing**
- **Cell Processing: A (very) disruptive technology**
- **Questions / Discussion**

The leading provider of high-performance, scalable, optimized multicomputing solutions for challenging environmental and compute-intensive requirements

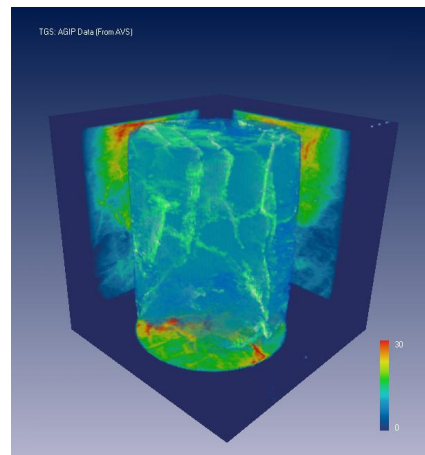


Semi-conductor fab

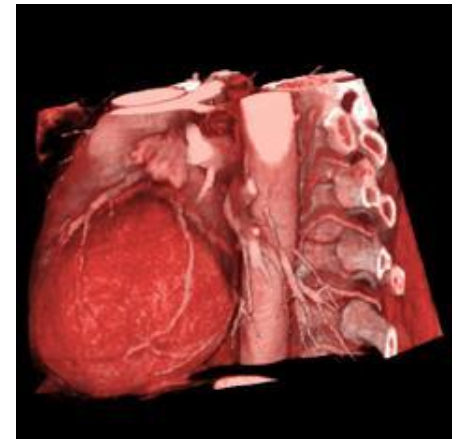


Defense

**3D
Seismography**



**Digital
X-ray**



Sensor Processing

- Radar
- Signals intelligence
- Image intelligence



Across all environments

- Deployed in the air, on the surface, under the water
- Commercial and rugged, air-cooled and conduction-cooled

Full life cycle support

- From R&D through deployment
- Technology insertion in scalable configurations



Defense Electronics

Design Wins



U-2



Global Hawk



MC2A MP RTIP



E-3 AWACS



SIVAM



SOSTAR



Wedgetail



JSTARS



Erieye



Rivet Joint



Airborne Laser



F/A-22 Raptor



EP-3E



P-3C(APS-137)



Japan MPA



Astor



JSF



F-18 (POD)



Predator



HALO II



F-16



Sampson



SQQ-32



F-100



Aegis



Prophet



Commander



ASPARCS



SQQ-89



TPS-59(V)3



PAR-2000



GRAVES



Tornado(POD)



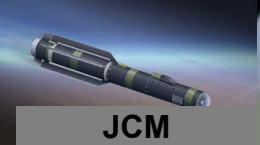
Gripen



EMPAR



SH60



JCM



SQS-56



Common Imagery Processor



Nostradamus

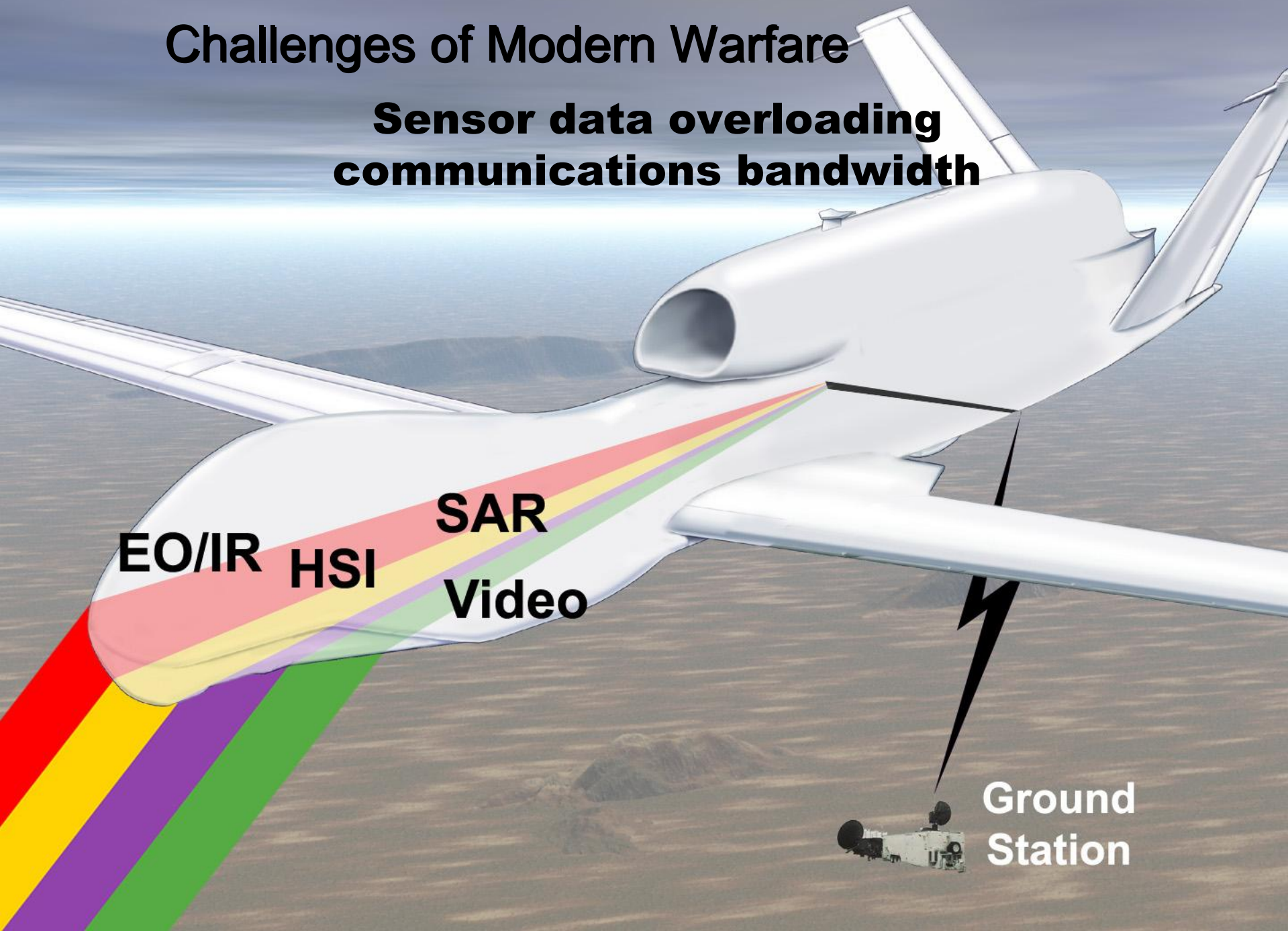


NSSN

C4ISR in support of tactical operations is changing quickly – the need now is for rapid (a few minutes) extraction of actionable information from multiple airborne sensors.

Challenges of Modern Warfare

**Sensor data overloading
communications bandwidth**



EO/IR

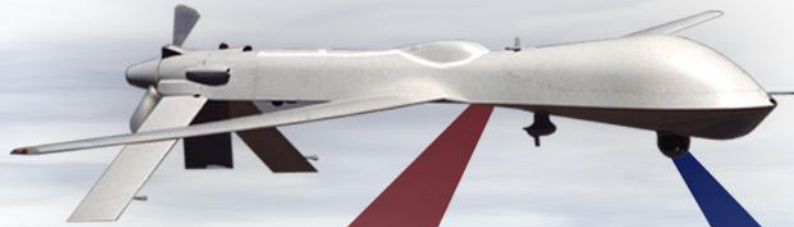
HSI

SAR

Video

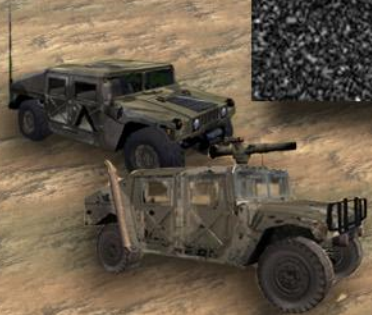
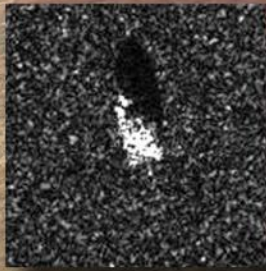
**Ground
Station**

Challenges of Modern Warfare



Real Time Access:

Providing real time sensor based intelligence to the shooter on the ground



Challenges of Modern Warfare

Sensor data overwhelming Analysts



Senior PEO-I EW&S:
“Over 90% of all data falls on the floor”

Powering the migration of exploitation from ground to air

Airborne

Reconnaissance

Image

Exploitation

System



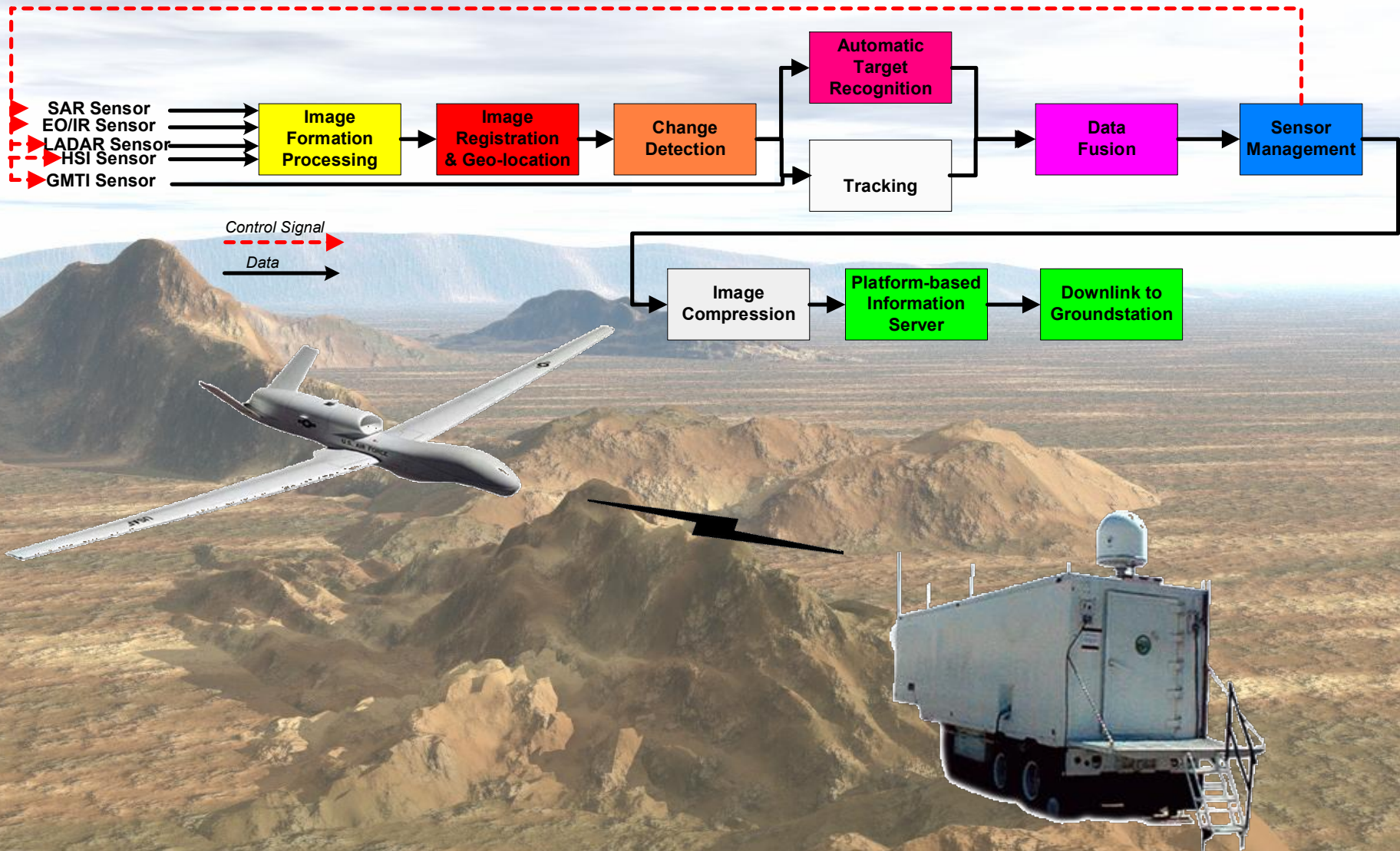
As Exploitation migrates from Ground Station to Platform, an IE system will require:

- **High throughput**
 - 200 GFlops, typ
- **Large storage capacity**
 - 1.5 TBytes, typ
- **Optimized SWAP**
- **Multiple outputs**
- **Flexible sensor inputs**
- **Framework for multiple algorithm sourcing**



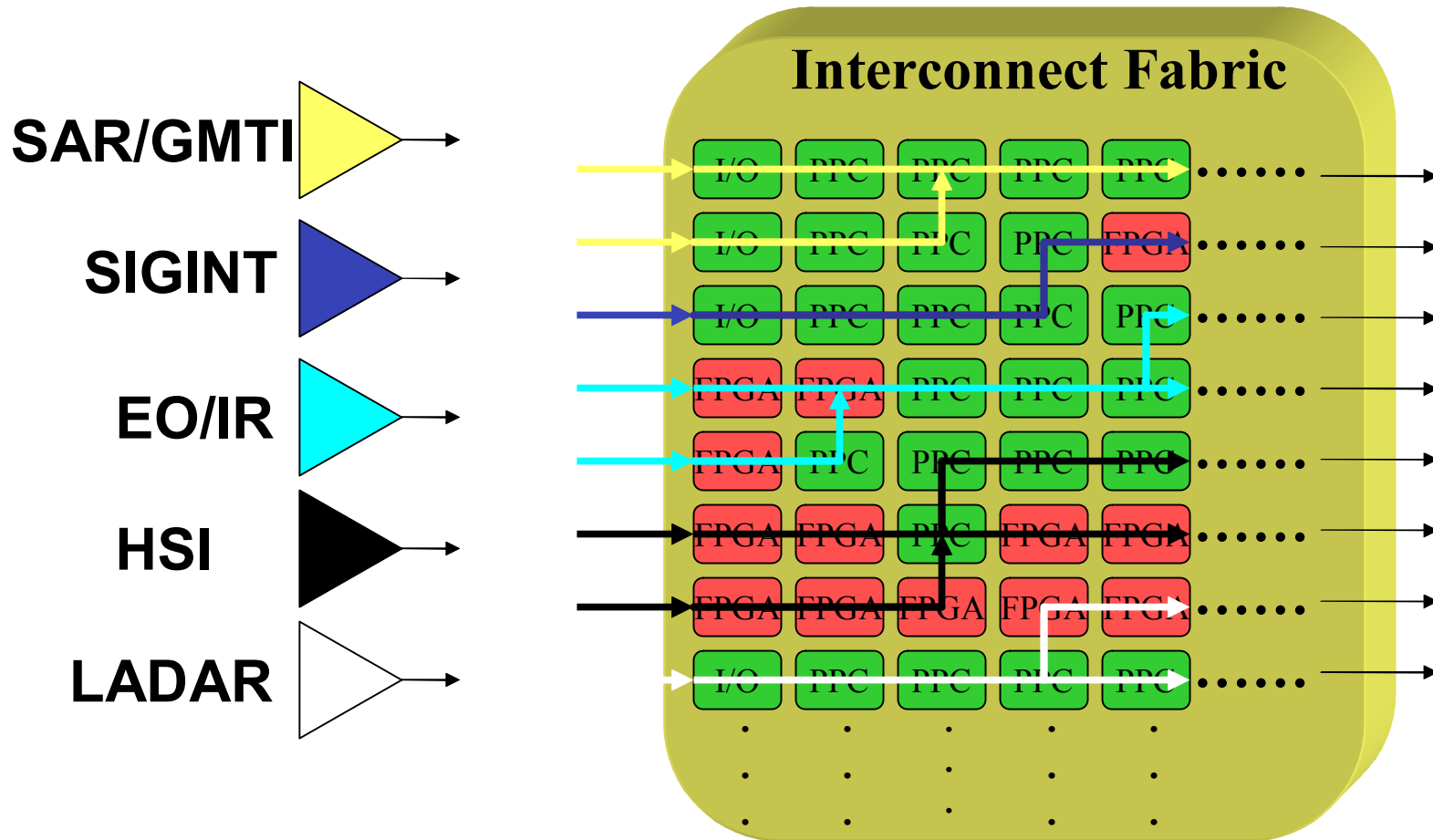
ARIES

Notional Processing Chain



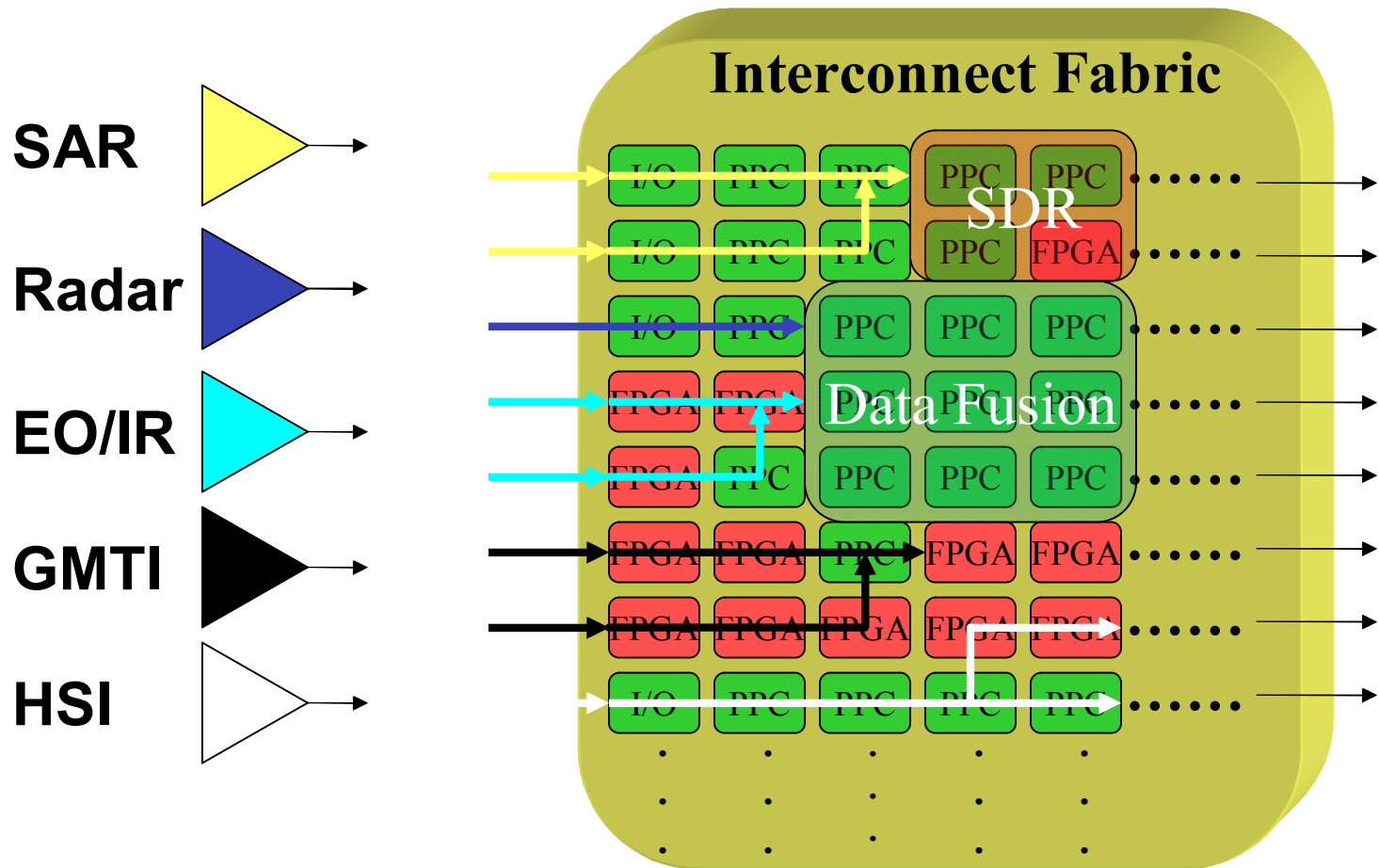
- **ARIES push - Clipping service – target chips passed down as “bell ringers”**
- **Warfighters’ pull from ARIES**
 - “Look at this location” with EO/IR or SAR
 - “Show me everything from that location over last 24 hours”
 - “Cross cue additional sensor” such as HSI for MASINT
- **View backwards to track point of origin**
- **Transfer data to incoming UAV or other aircraft for mission handoff**
- **“Low Bandwidth” ops should be the goal**
 - Getting the Man out of the Loop

Programmable - Scalable - Reconfigurable



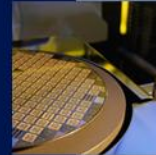
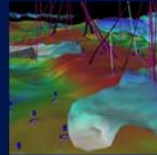
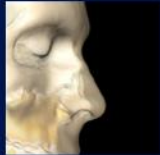
Change Missions on the Fly

- Adapt sensors and processors to new missions

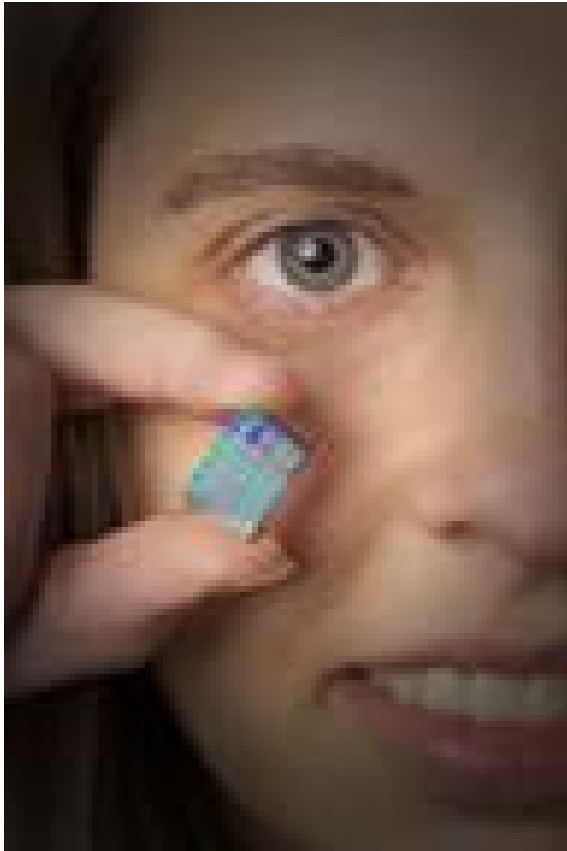


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**Cell: A (very) disruptive
technology**



In June 2005, Mercury announced a strategic alliance agreement with IBM offering Mercury special access to IBM expertise including the broadly publicized Cell technology.

Multicomputer-on-a-chip

How Is This Relationship Working?



Mercury CEO Jay Bertelli and IBM's Engineering and Technology Services GM Dr. Satish Gupta shake hands following signing of historic alliance between the two companies.

- **IBM Engineering and Technology Services approached Mercury in the second half of 2004**
- **IBM E&TS is a services-oriented organization that is highly complementary to Mercury's customer-focused product organization**
- **IBM and Mercury engineering teams are collaborating on design of Cell-based products**
- **Work has been underway on design of initial products for many months**

- **Architecture and frequency improvements driven by game consoles**

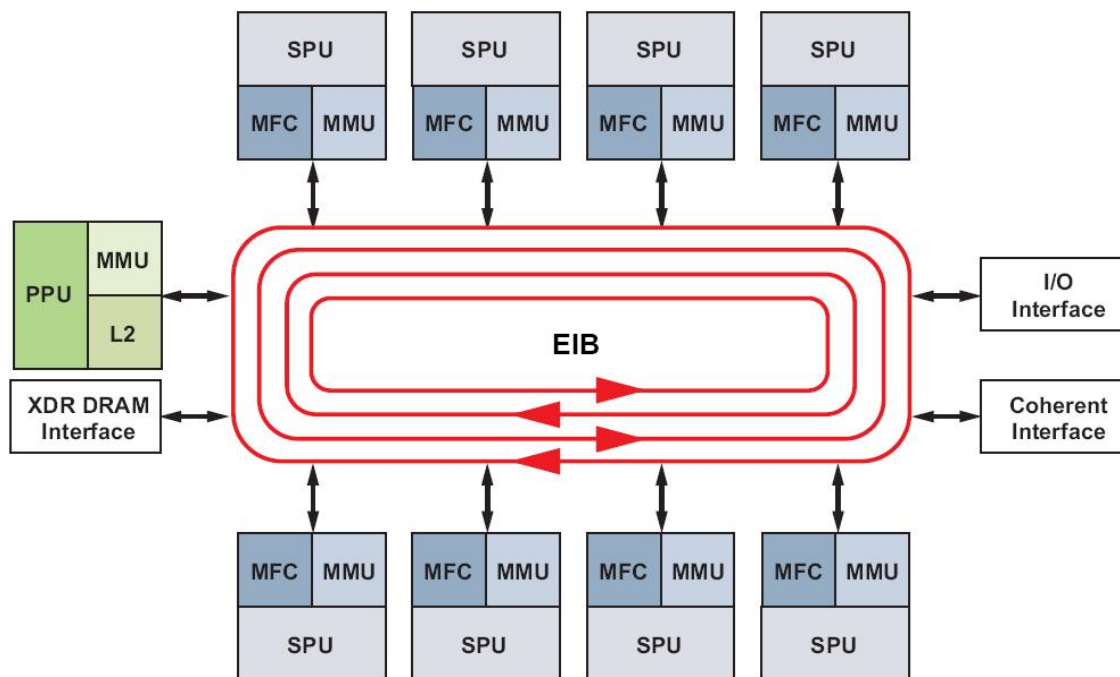
- PS One launched in Japan in December 1994
- PS2 launched in Japan in March 2000, about 5 years later.
- PS3 unveiled on May 16, 2005. It will launch “Spring 2006”, about 6 years later.

- **Process shrinks likely (to reduce manufacturing cost) within the lifetime of a single console**

- Should improve power characteristics
- May allow sorting for chips yielding at modestly higher frequencies.

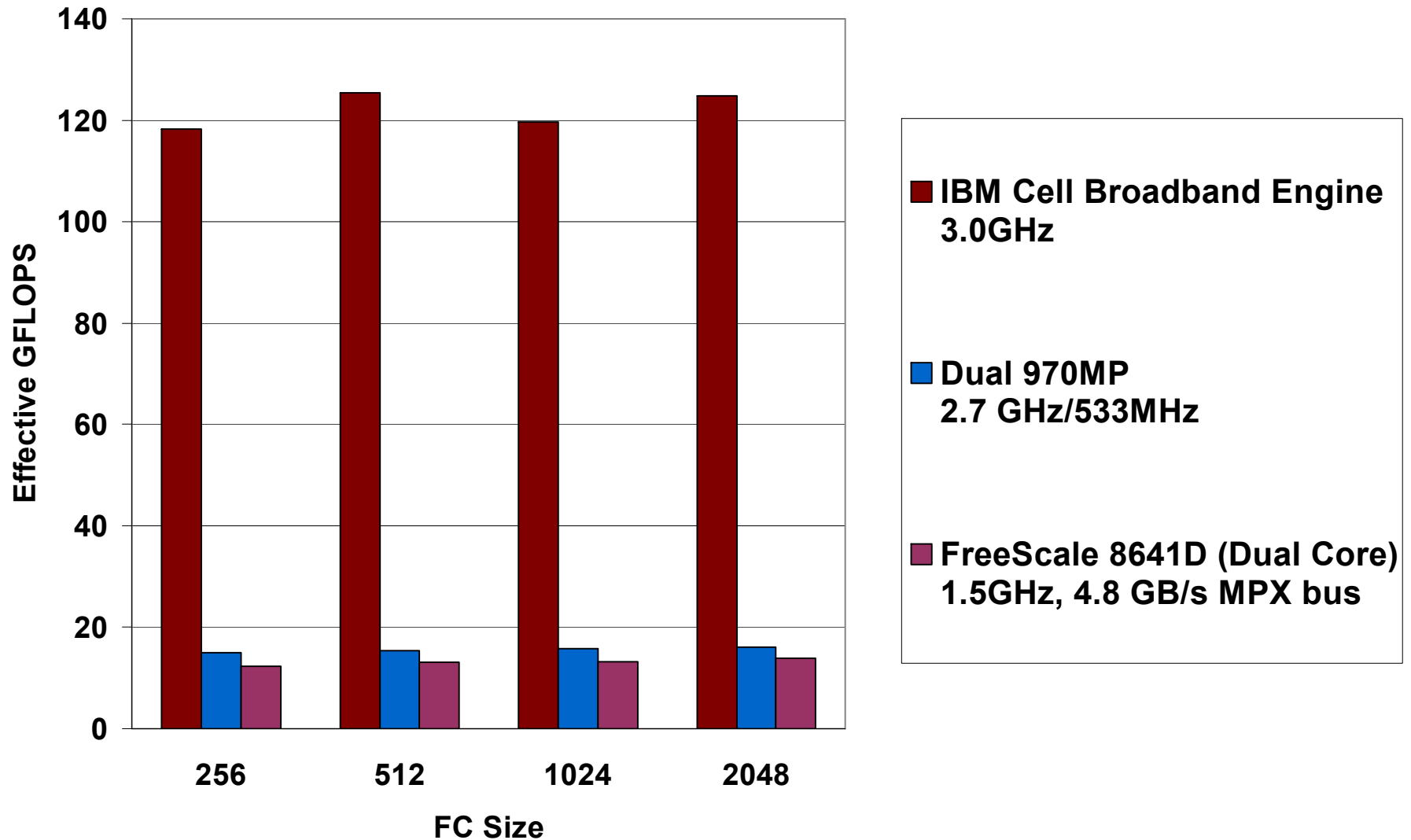


Cell BE Processor Block Diagram

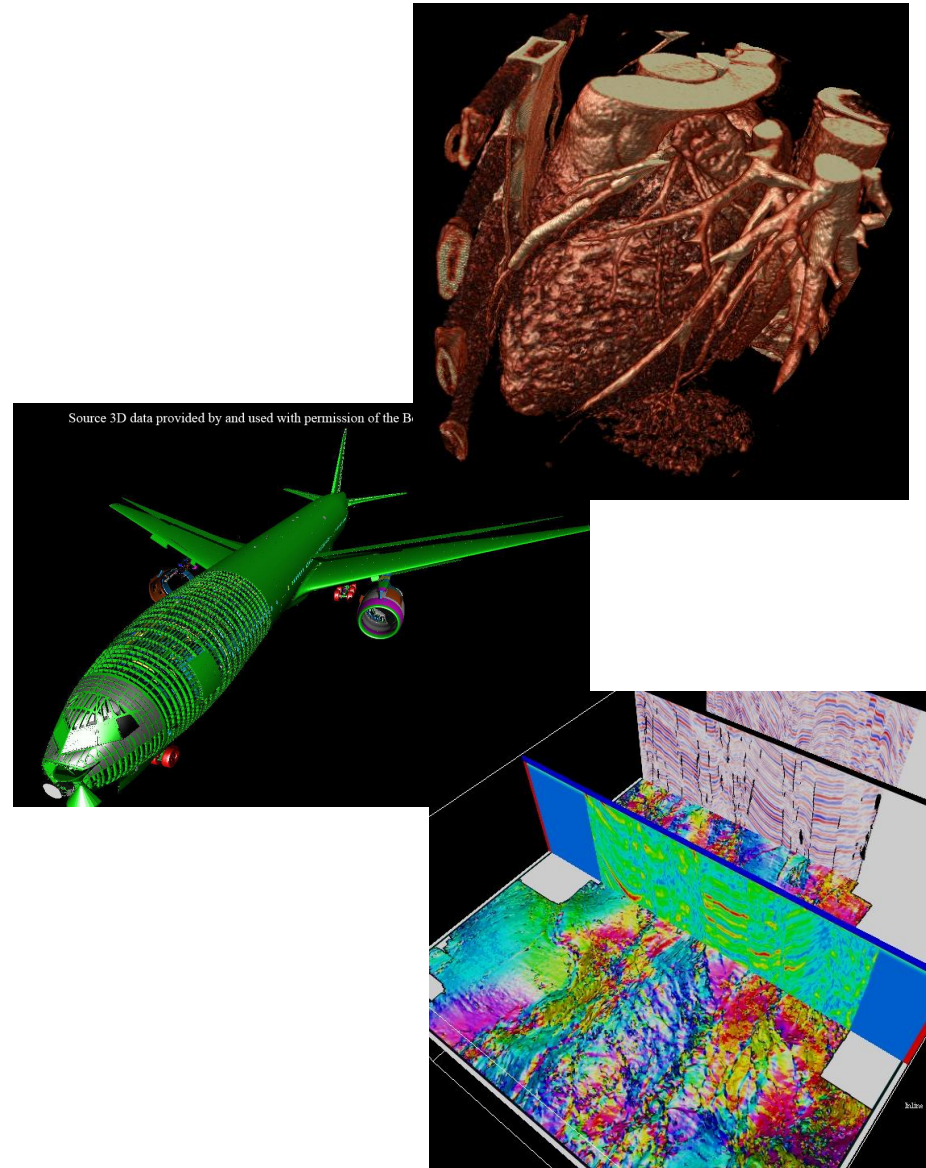


- **Cell BE processor boasts nine processors on a single die**
 - 1 Power® processor
 - 8 vector processors
- **A high-speed data ring connects everything**
 - 192 GB/s maximum sustained bandwidth @ 3GHz
- **Flexible IO**
 - Up to 60 GB/s
- **Multicomputer on a single chip**

Fast Convolution – Absolute Performance



- We are actively engaged with customers on Cell technology in these industries:
 - Medical imaging, both traditional 2D and real-time 3D
 - Semiconductor inspection
 - Visualization & simulation
 - Seismic
 - Defense
 - Telecommunications



- **Image Exploitation appears to be on the threshold of undergoing a sea change.**
- **Technology is here today which can greatly improve the way we operate**
 - New high performance computers with large storage
 - New algorithms to support Image Exploitation
- **Image exploitation is being driven from ground stations to sensor platforms**
- **Cell technology offers order-of-magnitude improvement in performance per processor**
 - Significant improvement in performance per Watt