National Aeronautics and Space Administration

Where the Information Age meets the Space Age: IT at the Goddard Space Flight Center

Office of the Chief Information Officer

NASA IT Vision: *The NASA IT Organization is the* ***very best*** *in government*

Adrian Gardner

CIO & ITCD Director

May 19, 2010

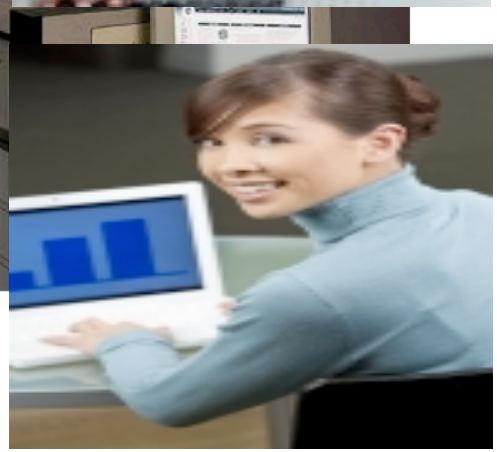
Overview

- Information Technology: Where we've been & where we're going
- Key strategies for success
- Innovation and Emerging Technologies: Doing things smarter
- Who's going to do this?

Mission Planning circa 1960

Mission Planning circa 2010

The Mission Design Lab at GSFC

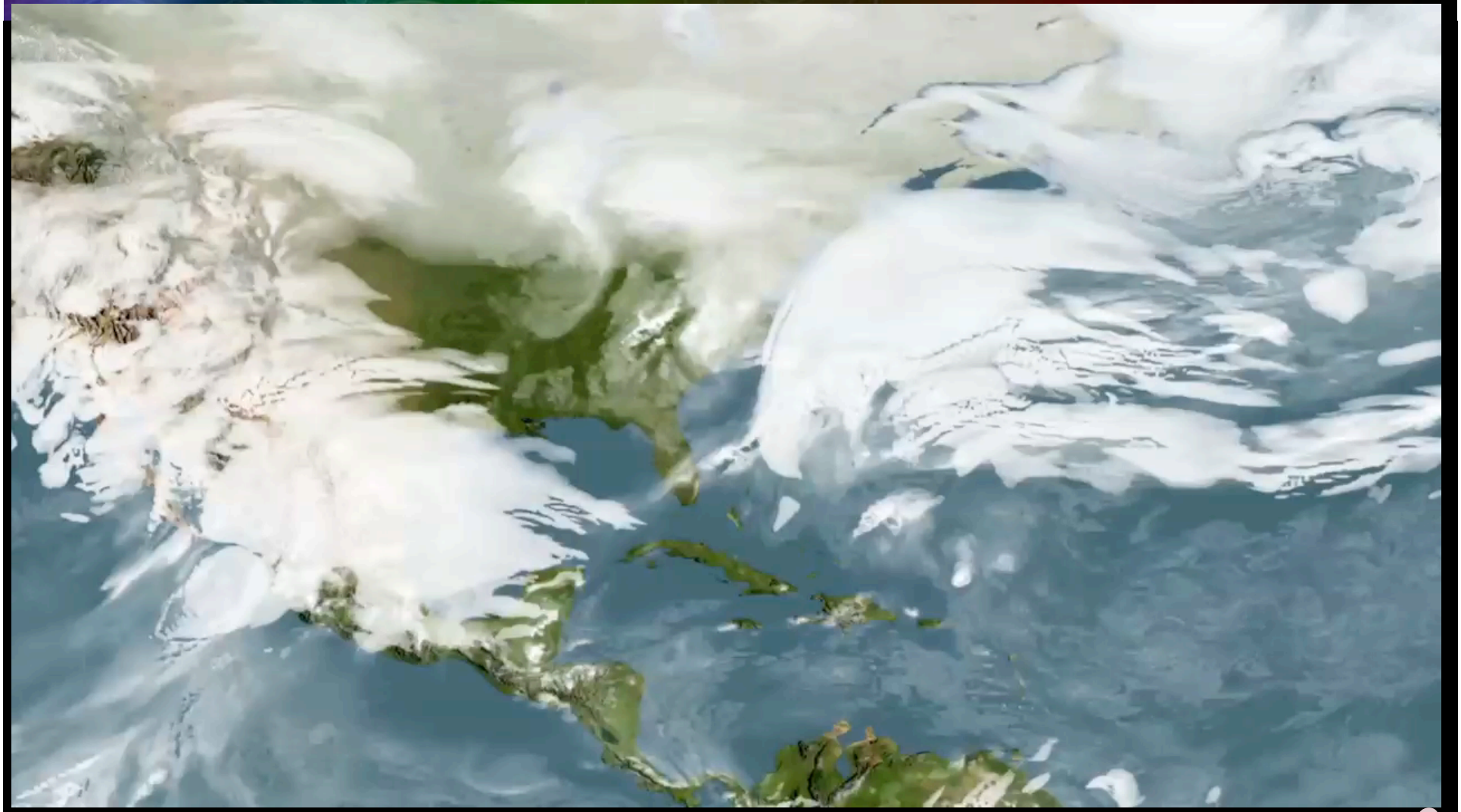


Mission Planning 2060?

Perhaps Sooner than 2060?

Consumer Electronics Show 2009

What IT has enabled in one generation



Snowmagedon 2010

Overview

- Information Technology: Where we've been & where we're going
- **Key strategies for success**
- Innovation and Emerging Technologies: Doing things smarter
- Who's going to do this?

IT's Value: The Last 30 Years Versus the Next 30 Years

Back Then: IT automated critical processes

- Payroll
- Accounting and finance
- Human Resource Management
- Logistics
- Scheduling
- Office automation
- Reporting
- Text-based communications
- …

Up Next: IT is crucial to reinventing key processes

- Automation in decision making
- Globally extended collaboration
- Any-time, any-where info access
- Just-in-time supply chains
- Pay only as long as you need it
- Rapidly redeploy and adapt
- Intelligent automated agents
- Multimodal communication
- …

(Source: Gartner 2010)

Strategy: Change IT's value proposition

Old School

Resource-based IT

- IT enables the mission
- Prove that we are not wasting resources
- Benefits realization is a customer responsibility
- Schedule-driven by resource availability — fully loaded
- Balance supply and demand
- Technical performance = value

The New Reality

Results-based IT

- IT is an integral part of the mission
- Prove that we are raising productivity and innovation
- Benefits realization is everyone's responsibility
- Just in time delivery of products and services
- Demand drives supply
- Mission performance = value

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

Strategy: Project Management with Real Impact

- Projects Deliver Capabilities, BUT Engaged People Deliver Mission Value
- The top three criteria by which stakeholders judge a project's success:
  - Product: Met customer requirements
  - Use: Being used by the organization
  - Value: Efficiency/effectiveness for the customer organization

(Source: Gartner 2010)

Strategy: Comprehensive Risk Management ……it's more than Security

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

……But even with a comprehensive plan, zero risk is not achievable

- Assess and balance trade-offs
- Focus on mission impacts - IT does not decide what is an acceptable risk
- Understand that strengthen risk protection has costs (monetary & opportunity costs)
- Model IT risk management after NASA mission risk management culture

Overview

- Information Technology: Where we've been & where we're going
- Key strategies for success
- **Innovation and Emerging Technologies: Doing things smarter**
- Who's going to do this?

Consumerization of IT Creates New Expectations

Technology innovation is driven by consumer adoption

Government must be agile to survive

"The Seed of Revolution is Repression"

Woodrow T. Wilson

Digital natives (younger workers) have new expectations

Competition driving the cost of products down

The line between personal and workplace is increasingly blurred

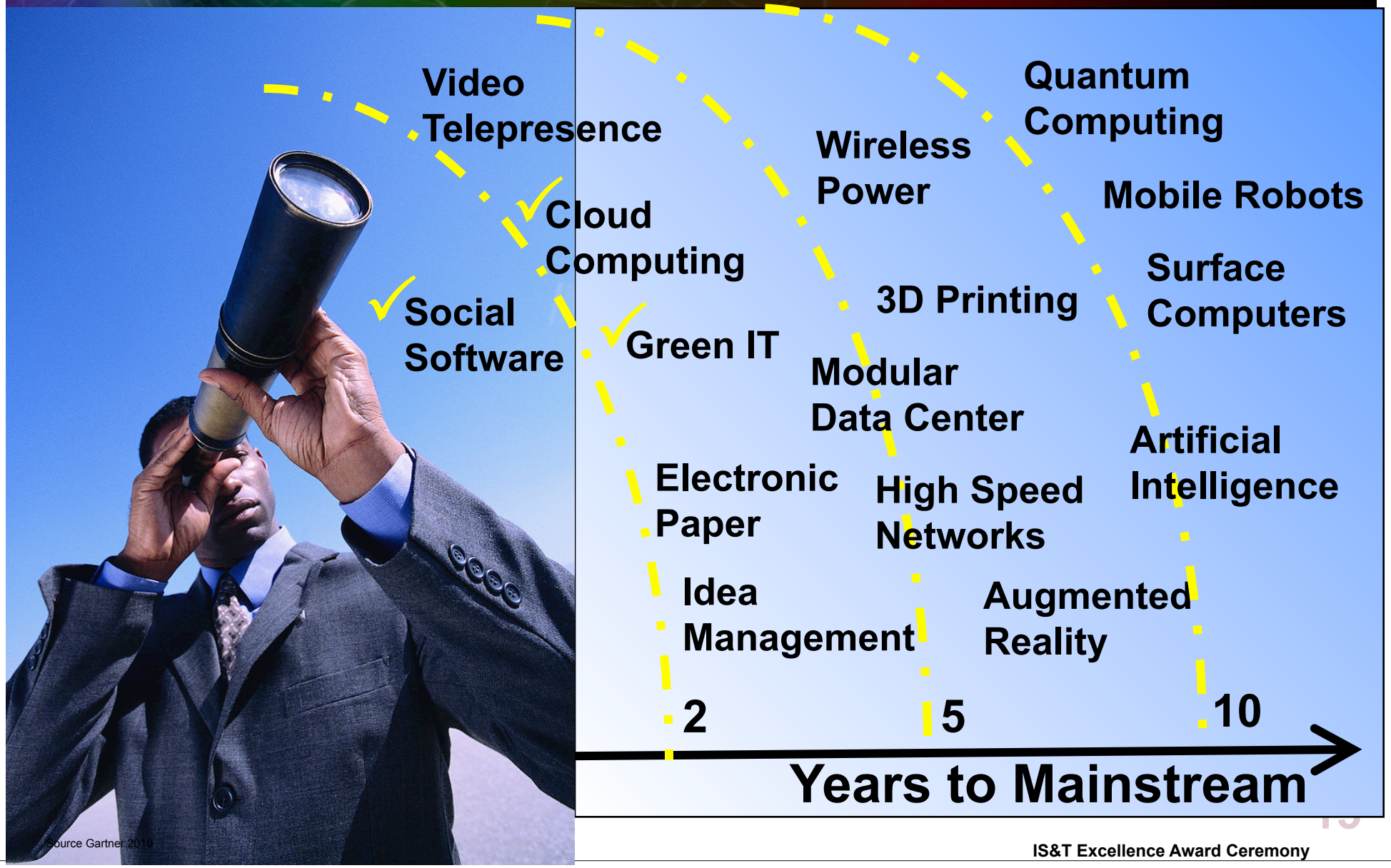
© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

More Than Technology: Creating a Culture to Foster Innovation

- ✓ **Strategy:** Executives "walk the talk." Innovation is a mission strategy.
- ✓ **Values:** Structured risk-taking is encouraged, employees try maverick ideas.
- ✓ **Workplace:** High performance teams with decision making authority.
- ✓ **Commitment:** Key people commit to making innovation work. Management accepts and manages the risk of change.
- ✓ **Rewards:** Creativity is developed, valued, encouraged and rewarded.

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

Emerging Technologies Enabling Transformative Innovations



Source Gartner 2010

Social Software & A Day in the Life of the Networked Knowledge Worker

Uncover useful info for my project
Folksonomies (social tagging) and content analytics

Find people with info I need
Social network analysis

Manage my info sources/repositories
Personal portal with RSS feeds and mashups

Stay current in my field, learn from other experts
Learning communities

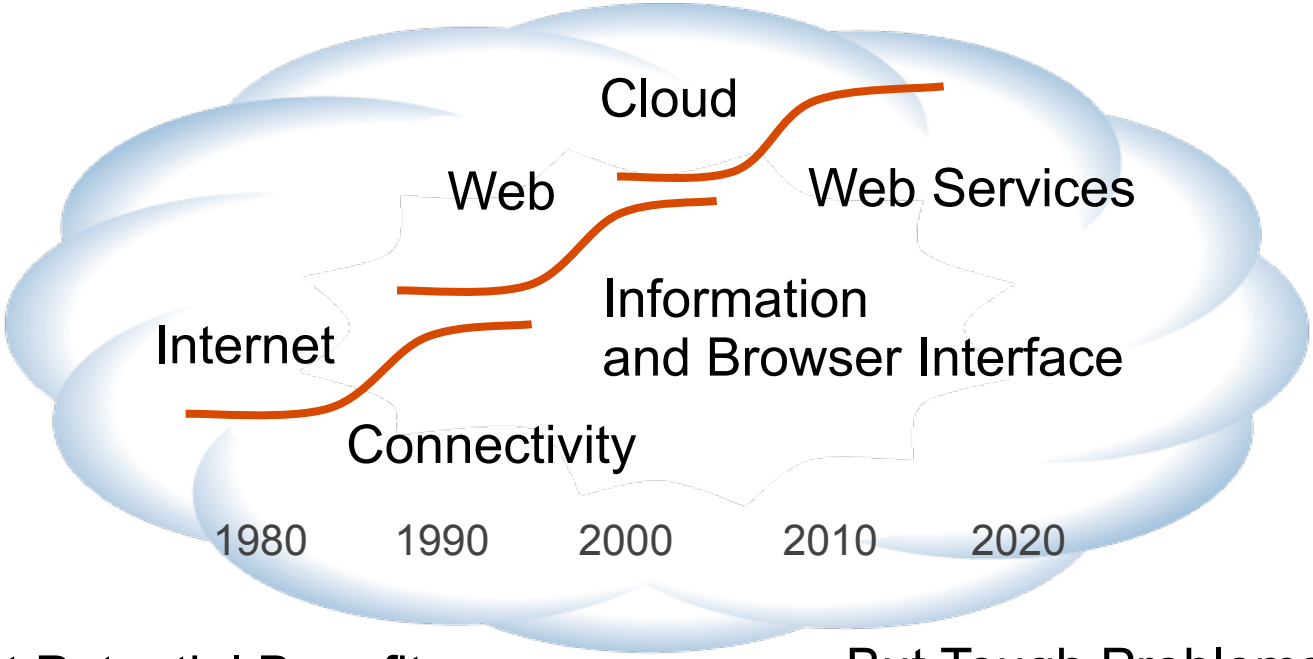
Work any time or place
Mobile computing, Web 2.0, videoconferencing

Maintain my digital persona and reputation
Social networking and communities

Find and contribute new ideas and input
Idea management, wikis and blogs

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

Cloud Computing - drives revolutionary changes in how solutions are designed & delivered



Significant Potential Benefits

- Speed, Flexibility, Agility
- Cost savings
- Simplicity
- Capabilities

But Tough Problems Remain

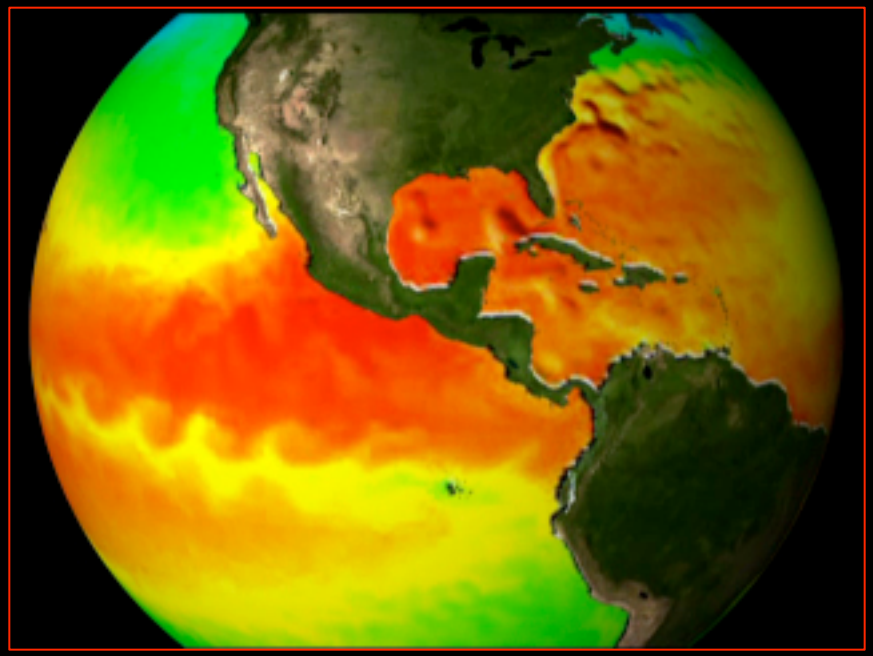
- Data Location/ Ownership
- Security and privacy
- Regulatory Compliance
- Licensing Issues

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

Nebula - NASA's First Venture into Cloud Solutions (ARC/GSFC)

Exterior and interior views of the Nebula platform at Ames Research Center

Human influence on Climate Change and the Greening of IT



Greening of Information Technology

Drivers for Greener IT

- Government social responsibility
  - » EO 13514 “the Federal Government must lead by example”
- NASA image
- Compliance
  - ➢ OMB Passback – 30% Energy Reduction in Three years
- Operational efficiency
  - ➢ Data centers major power users
  - ➢ 30% reduction @ GSFC by 2015

Near-term IT Green Initiatives

- Communication and collaboration tools to reduce the need for travel
- Teleworking
- Content & document management to reduce the need for paper
- Smart building technologies
- Consumption tracking and management
- Energy usage as a procurement factor

Overview

- Information Technology: Where we've been & where we're going
- Key strategies for success
- Innovation and Emerging Technologies: Doing things smarter
- **Who's going to do this?**

Will our workforce
be able to keep up?

Five Ways to Bolster Mission Smarts

Leverage	IT and engineering capabilities across the Center
Develop	Raise general level of mission smarts of the IT organization
Integrate	Bring mission-smart people into IT requirements development and service delivery
Attract	Recruit mission-smart people from outside the center or agency
Source	Seek mission smarts from service providers and consultants

© 2009 Gartner, Inc. and/or its affiliates. All rights reserved.
Gartner is a registered trademark of Gartner, Inc. or its affiliates.

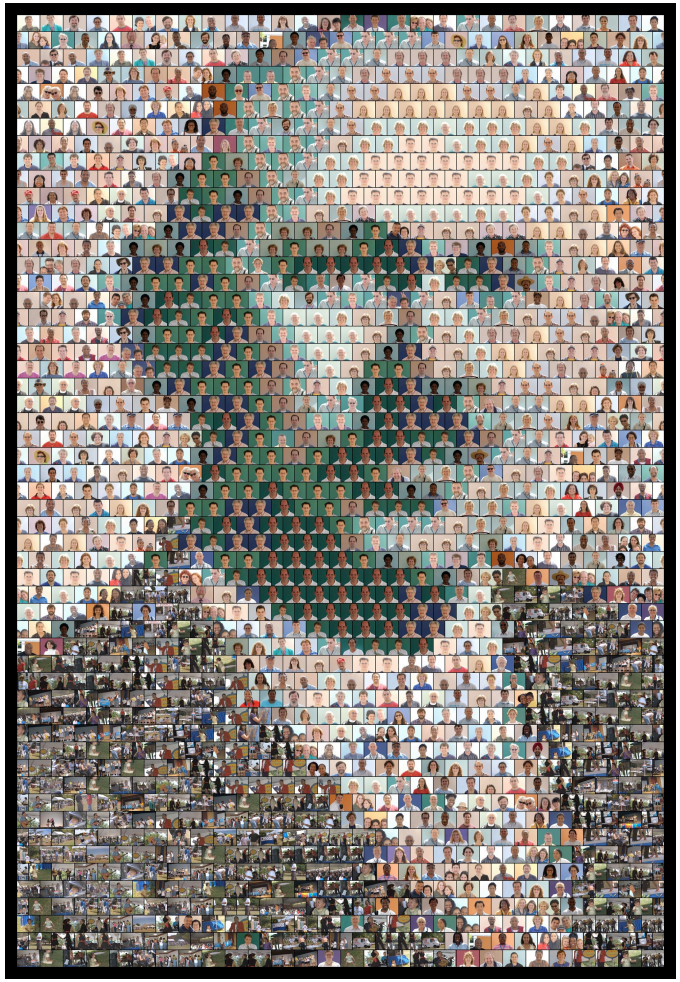
Summary

- NASA's Mission is changing: Our processes and IT has to change with it
- Smart strategies will guide the way
- There is a wealth of innovative solutions and emerging technology opportunities out there
- Ultimately, it is not about the CIO and my team, it's about us, … all of us

The End

"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."

Robert H. Goddard
(1882-1945)



Acknowledgements

- Paul Hunter, Danielle Moore, and Melissa Larkin, ITCD
- Tamra Hall, Gartner, Inc.
- Horace Mitchell, Greg Shirah, and Bill Putnam, GSFC Software Integration and Visualization Office
- Debra Mccallum, GSFC Public Affairs Office
- Bob Startzel, TRAX
- Rob Morton & Paul Veraart, ODIN - Lockheed Martin Information Technology