

Knowledge Management at NASA: Quick Overview...

Jeanne Holm
Chief Knowledge Architect
NASA/Jet Propulsion Laboratory

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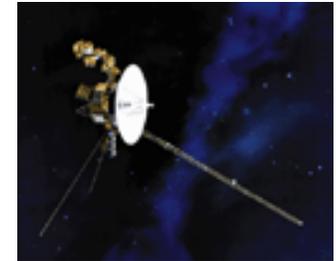
Key Areas for NASA's KM Strategy

Collaborate



Sustain NASA's knowledge across missions and generations

Identify and capture the information that exists across the Agency



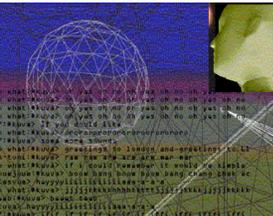
Communicate



Help people find, organize, and share the knowledge we already have

Efficiently manage NASA's knowledge resources

Innovate



Increase collaboration and to facilitate knowledge creation and sharing



Motivate



Develop techniques and tools to enable teams and communities to collaborate across the barriers of time and space



KM Critical Success Factors

Collaborate



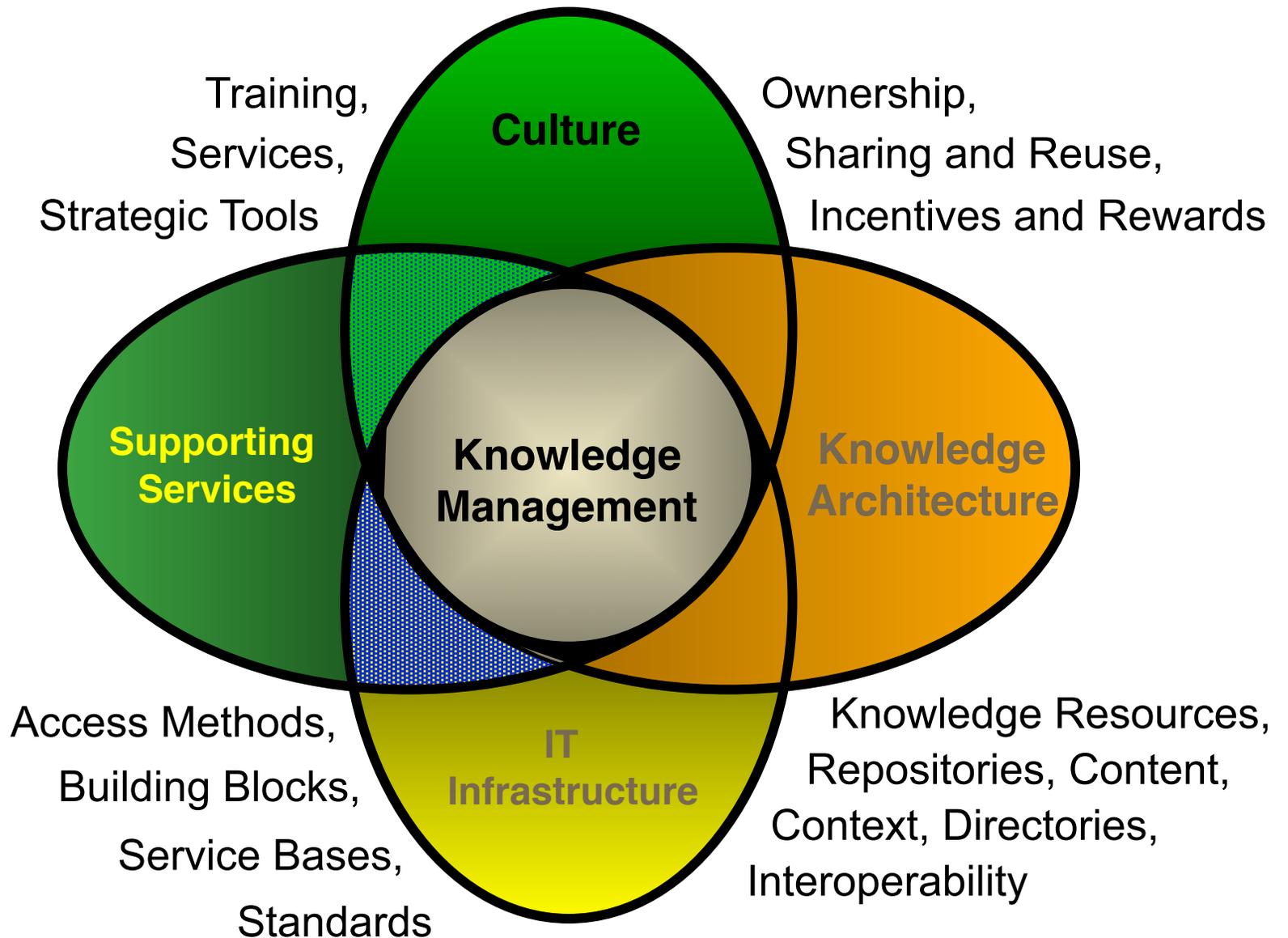
Communicate



Innovate



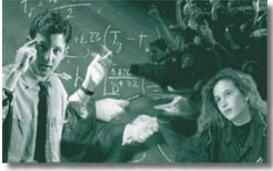
Motivate





Generations Share Differently

Collaborate



Communicate



Innovate



Motivate



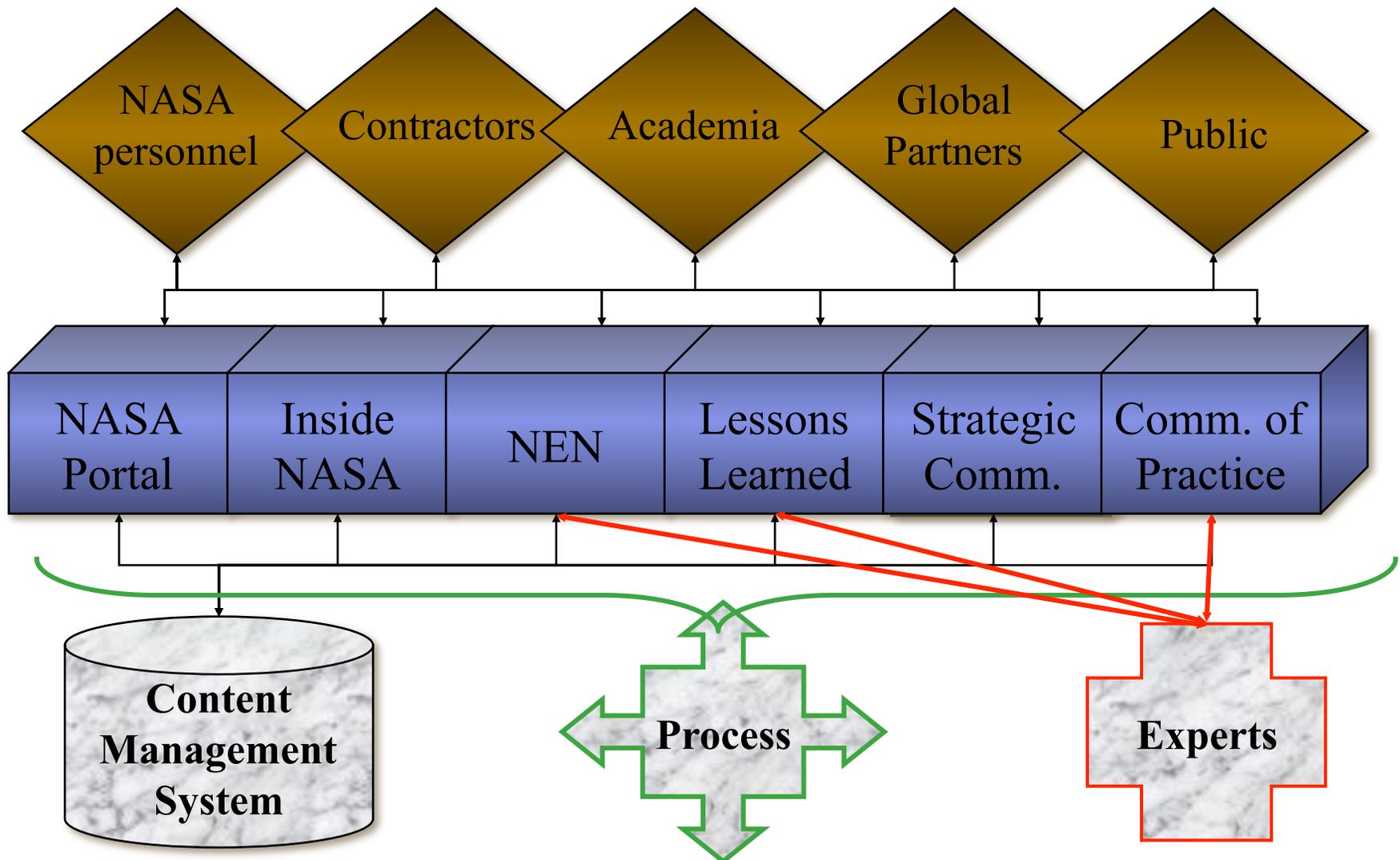
- ◆ 1930-50's era generation
 - Focus on society
 - Friendships are forged through adversity
- ◆ 1960-70's era generation
 - Focus on community
 - Friendships forged through identification with a cause
- ◆ 1980-90's era generation
 - Focus on the individual
 - Friendships forged through individual goal accomplishment
- ◆ 2000's era generation
 - Focus on common interests
 - Friendships are created or thrive virtually...
- ◆ This leads us to the need to share across generations and communicate in different modalities





Knowledge Management Environment

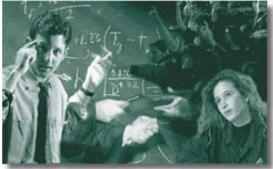
- ◆ Integrating knowledge management into our engineering and project management lifecycle





The NASA Public Portal

Collaborate



Communicate



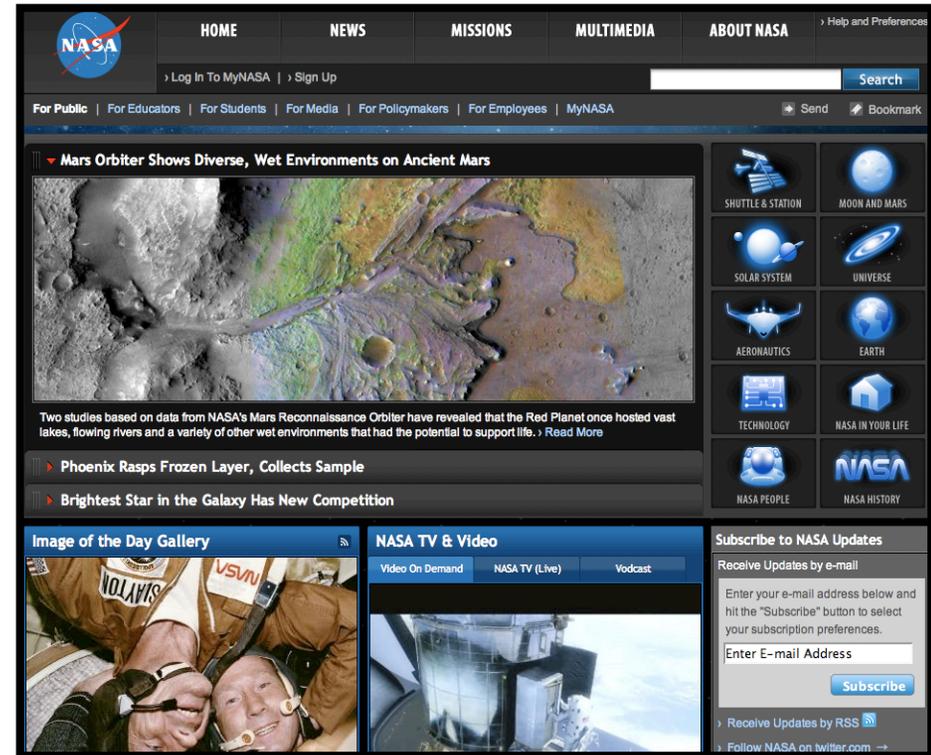
Innovate



Motivate



- ◆ Created to bring NASA content to broad audience
- ◆ Designed with embedded processes for knowledge capture, distribution, and reuse
- ◆ Coordinated message and focus of agency strategies via community and Board
- ◆ Provided infrastructure for future KM tool deployment and repurposing
- ◆ Most visited site in gov't
 - 250 million people in 2008
 - 5.5M simultaneous in 2009





NEN: Communities for Collaboration

Collaborate



Communicate



Innovate



Motivate



Integration to document management

Saved searches and subscriptions

Key lessons are integrated into the community

Find information

Discussions and Q&A

NASA TV | NASA Employment Customer Support | Site Help

NASA Engineering Network NASA Domain | Lessons Learned

Employee Locator | Google Search for [] Search

You are logged in as Jeanne Holm Site Map | Logout | My Account | Site Colors | Administration

Program/Project Management

NEN Home

Lessons Learned

Engineering Communities

Engineering Resources

Engineering Search

My Saved Searches

My Subscriptions

Office of the Chief Engineer

APPEL

NESC

Program and Project Management

PPMB

7120.5D

What's New

InsideNASA

Program/Project Management

Main Page | PPMB | 7120.5D

Program/Project Management Announcements

Current New Mine Pending All

PM Challenge 2008 Call for Speakers Jun 8, 2007

Anyone interested in speaking at NASA's PM Challenge conference should submit abstracts and biographies by September 14. More information is at <http://pmchallenge.gsfc.nasa.gov>

« Prev | 1-1 | Next »

FAQs on NPR 7120.5 (D)

Below is a list of discussion forums. Click on a forum to view related topics.

Forum (1-7 of 7)	Msgs	Last Post
Decision Authority	4	3/6/2007 9:44 AM
Governing Documents	1	3/5/2007 2:01 PM
New Definitions in 7120.5 (D)	3	3/5/2007 1:44 PM
Schedules and Approvals	1	3/5/2007 1:42 PM
Project Reviews and Review Boards	2	3/5/2007 1:40 PM
Ask a New Question	1	2/6/2007 2:37 PM
Dollar Threshold for Projects	2	12/14/2006 6:15 PM

All Forums

Learn Project Management with NASA APPEL min

- APPEL website
- Case Studies
- 100 Lessons Learned for Project Managers
- News & Events
- ASK Magazine
- ASK OCE

NASA Project Management min

- NPR 7120.5D, Requirements for Space Flight Programs and Projects
- NPR 7120.5C, Requirements for All Other Programs and Projects
- Latest Program and Project Management Lessons from Lessons Learned Database
- NASA Earned Value Management

Project/Program Management Community min

Welcome to the Program/Project Management Community. I am the Leader of the Program & Project Management Community of Practice. I welcome your ideas and experiences. --

Michael Blythe

+ Read Biography

Contact: Michael P. Blythe

Co-Facilitators: Daria Topousis, Manson Yew

POLARIS

Program/Project Online Library And Resource Information System

<https://polaris.nasa.gov/>

Program and Project Planning Checklists

Tools Program & Project List

Design Suggestions & Recommendations

Let us know what you think! Click on the button below to make a suggestion.

Suggestion refers to...

Make this anonymous

Submit

Industry Project Management Associations min

- PM Boulevard
- Project Management Center
- Project Management Institute

NASA National Aeronautics and Space Administration

Inspector General Hotline - 1-800-424-9183 | Equal Employment Opportunities | Dispute Resolution | Freedom of Information Act | Privacy Policy and Important Notices

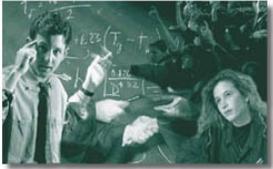
Editor: Manson Yew
NASA Official: Gregory Robinson
+ Contact NEN

NEN v 2.0



Finding NASA Experts via Social Networks

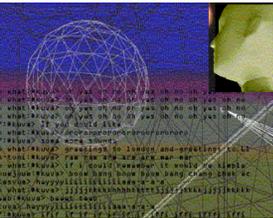
Collaborate



Communicate



Innovate



Motivate



Pulls expert attributes from existing systems

Sort and browse location, project, and expertise

Social network map shows possible experts in relation to searcher

- ◆ POPS (People, Organizations, Projects, and Skills), led by Andy Schain



Inside NASA

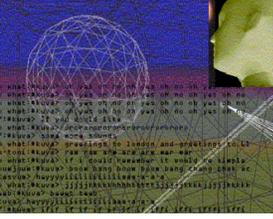
Collaborate



Communicate



Innovate



Motivate



- ◆ For employees and partners
- ◆ Customizable
- ◆ Access to e-mail
- ◆ Secure instant messaging
- ◆ Collaborative tools
- ◆ Application integration
- ◆ Wikis and blogs (e.g. Shana Dale)
- ◆ Audience is >7500 per month accessing ~1.5M pieces of information

The screenshot shows the 'InsideNASA' website interface. At the top, there's a navigation bar with 'NASA TV | NASA Employment' and 'Customer Support'. Below that, the main content area is divided into several sections:

- Home:** Includes '2009 Flu Info', 'NASA-Wide Announcements', and 'Quick Picks'.
- News:** Features articles like 'NASA Applied Sciences Projects Improve Famine Predictions Worldwide' and 'NASA's Spitzer Space Telescope captured this image of comet Holmes in March 2008'.
- Navigation:** A sidebar on the left contains links for 'Administration @ HQ', 'Centers', 'Communities & Teams', 'Education', 'Employee Resources', 'Financial Resources', 'Information Resources', 'Missions & Projects', 'NASA Engineering Network', 'NASA Lessons Learned', 'Science', 'What's New', 'POPS Expertise Locator', 'NASA Operations', and 'NASA Communication Policy'.
- Table:** A 'The TSP Ticker' table is visible, showing financial data for various funds.
- Weather:** A 'Current Weather' section with a map and a 'Local Forecast' input field.
- Footer:** Contains the NASA logo, 'National Aeronautics and Space Administration', contact information, and legal notices.



NASA SpaceBook: Sneak Peek

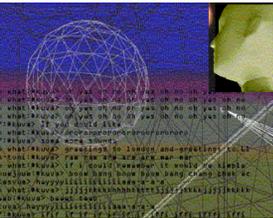
Collaborate



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Motivate



The screenshot shows the NASA SpaceBook homepage. At the top is the NASA logo and the text "NASA SpaceBook Connect, communicate, collaborate...". Below this is a navigation bar with links for Home, MySpace, Groups, Organizations, Collaborate, and Resources. A search bar and user information (Welcome Ellen R Trevarthen) are also present. The main content area includes a "Welcome to NASA SpaceBook!" message, a "View Get Started Video" button, and a "NASA Wide Announcements" section. On the right side, there are two search widgets: "People Finder" and "Search Groups". At the bottom, there are three widgets: "Recent Bloggers" listing users like Vinita Joshi and etouchCA, "Popular Forums" listing topics like Java FAQ and CMR Discussion Forum, and "Top Forum Posters" listing users like Vivek Gupta and Vinita Joshi. A status bar at the very bottom shows "Status: Online" and other user controls.

Select content and unique functionality from InsideNASA and Spacebook and apply *strategic governance* and allow *open community development* to push it forward



Virtual Worlds

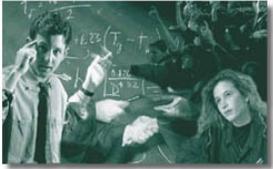
◆ An immersive avatar-driven environment

– Mission support

- Modeling and simulation and collaboration
- Outreach
- Education
- Training



Collaborate



Communicate



Innovate



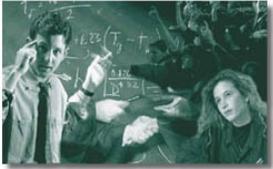
Motivate





Science Exploration and Engagement

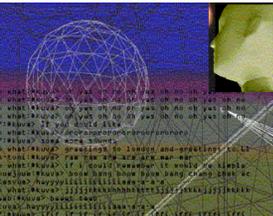
Collaborate



Communicate



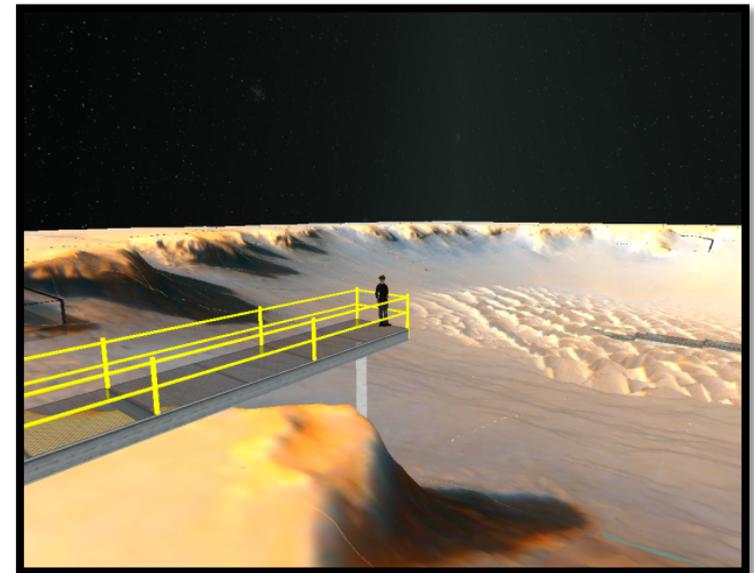
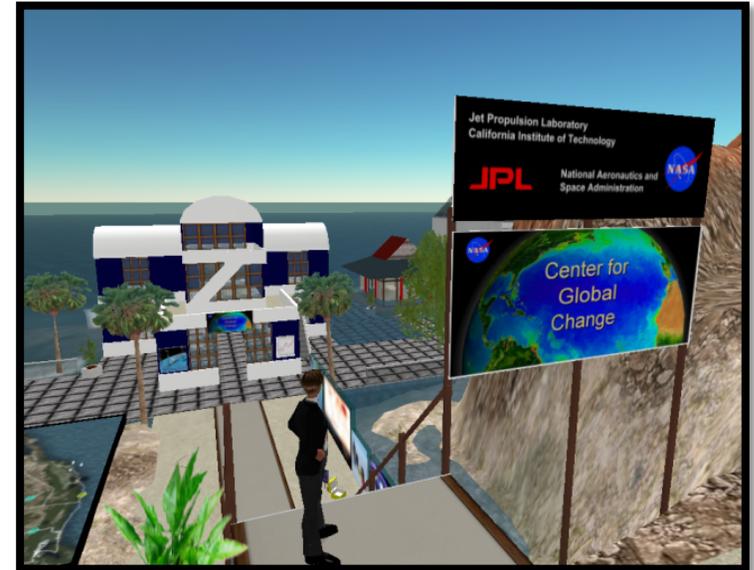
Innovate



Motivate



- ◆ Venue for immersive learning and multi-generational interaction
- ◆ Scientific data visualization





Information and Data Management Program

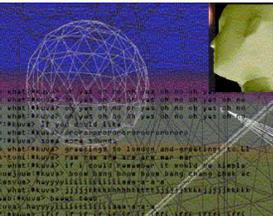
Collaborate



Communicate



Innovate



Motivate



- ◆ Build specific information integration components to enable advanced analysis across disparate Agency data sources based on sound, valid, and timely information
 - Content and data from diverse sources
 - Visibility to authoritative and pre-decisional status to make better decisions faster
 - Organized to allow consumers from science to mission to business to browse across available data products
- Create governance model for highly distributed social media, information management, and knowledge-sharing activities
- Drive search and query standards and facilitates analysis
- Provide understanding of NASA's collections through clearly organized and relational views of content that show ties to and from data
- Publishable APIs drives application development standards,
 - Lowers total cost of ownership for hardware, ITS, support, and development time
- Share instances and models of NASA data that allow repurposing of data
- Build on *NASA Information Architecture* and coordinates with Enterprise Architecture and service-oriented architecture



Use Cases

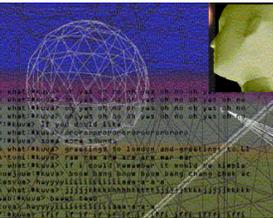
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Innovate



Motivate



- ◆ Project scientist seeks historical climate models that will help to predict future polar ice formation
- ◆ Mission Operations/Anomaly Response Teams (Constellation, SSP, Flight Projects, Range Safety, Launch Abort) need data quickly from disparate systems, including specific parts history, test data, tolerance specs, weather, to provide accurate analysis to respond to critical flight situations
- ◆ Flight Programs' Product Data Management Teams need official internal data for key decision points (KDP) reviews, not only from their own flight programs, but from analogous programs for models and design validation
- ◆ Administration requires access to diverse data and contextual information via Data.Gov



IDM Conceptual Framework

Collaborate



Communicate



Innovate



Motivate



Service Goals & Purpose
 More speed and fidelity in analysis
 Find related stuff
 Faster more efficient development

Business Modeling Services
 Service Orchestration
 Choreography
 WS/BPEL

Controlled Vocabularies
 Metadata Management
 Taxonomies/Thesauri
 Ontologies

Governance
 What's In & What's Out (native, related, foreign)
 Build v. Buy
 Configuration Management
 Sun-setting Applications & Services
 Investment Decision Support

Middleware Infrastructure
 Data Marts
 Service Integration/Mediation
 Event Management & Messaging
 Subscription Service
 Relational Data Mapping
 Indexing Services

Registry Services
 Data Exchange Agreements
 Memorandums of Understanding
 Service Level Agreements
 Data Models

Guidelines & Standards
 Loosely Coupled
 Best Practices
 SPARQL
 XMLS/RDF/OWL
 REST, SOAP
 APIs
 WSDL

Cognition Tools
 Data mining
 Machine understanding
 Algorithm service

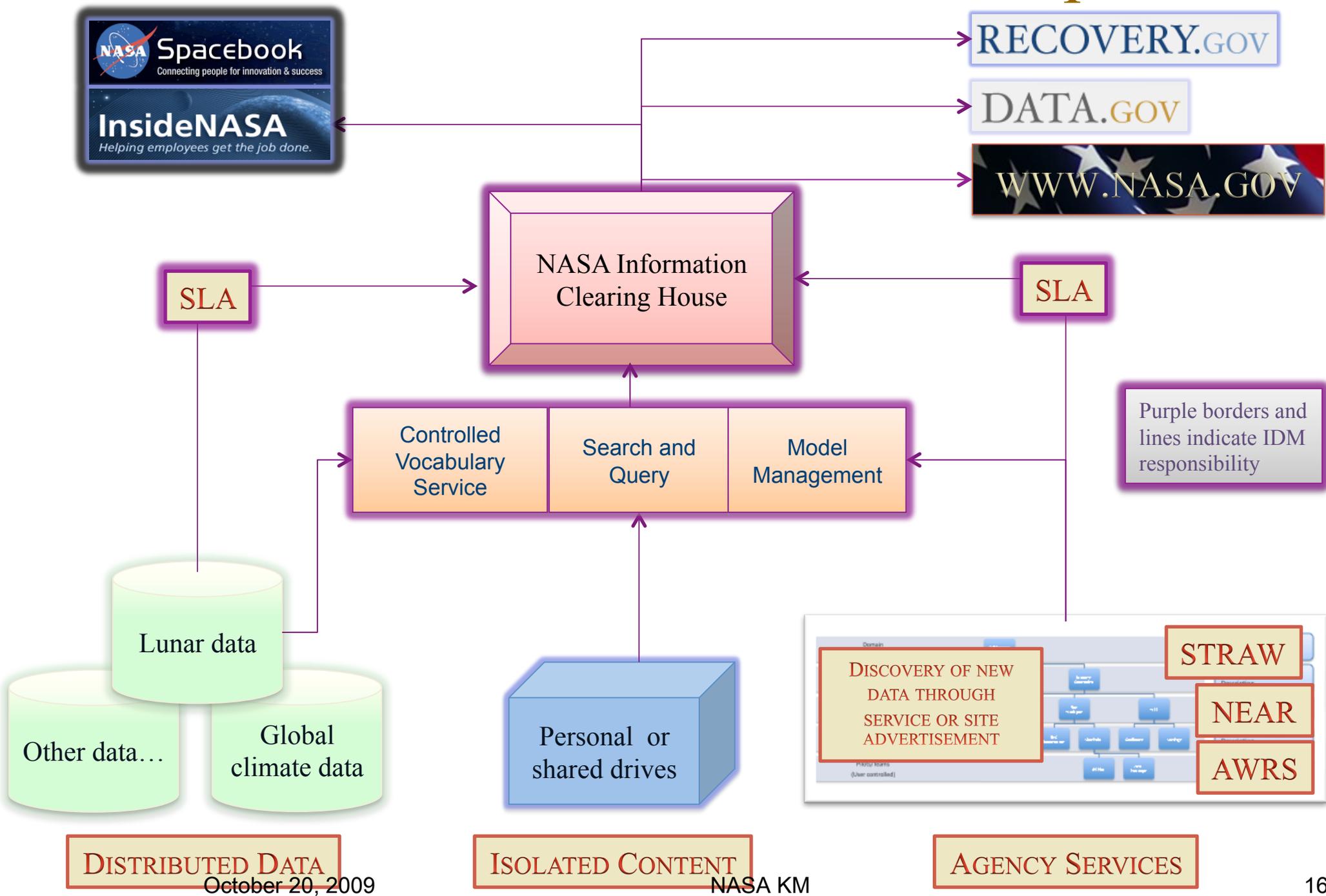
Search
 Engines
 Discovery Service
 User Interfaces

Developer Tools
 How to establish connection to a service
 How to build a query
 How to introduce new applications
 How to introduce new technologies
 How to sunset applications and tools

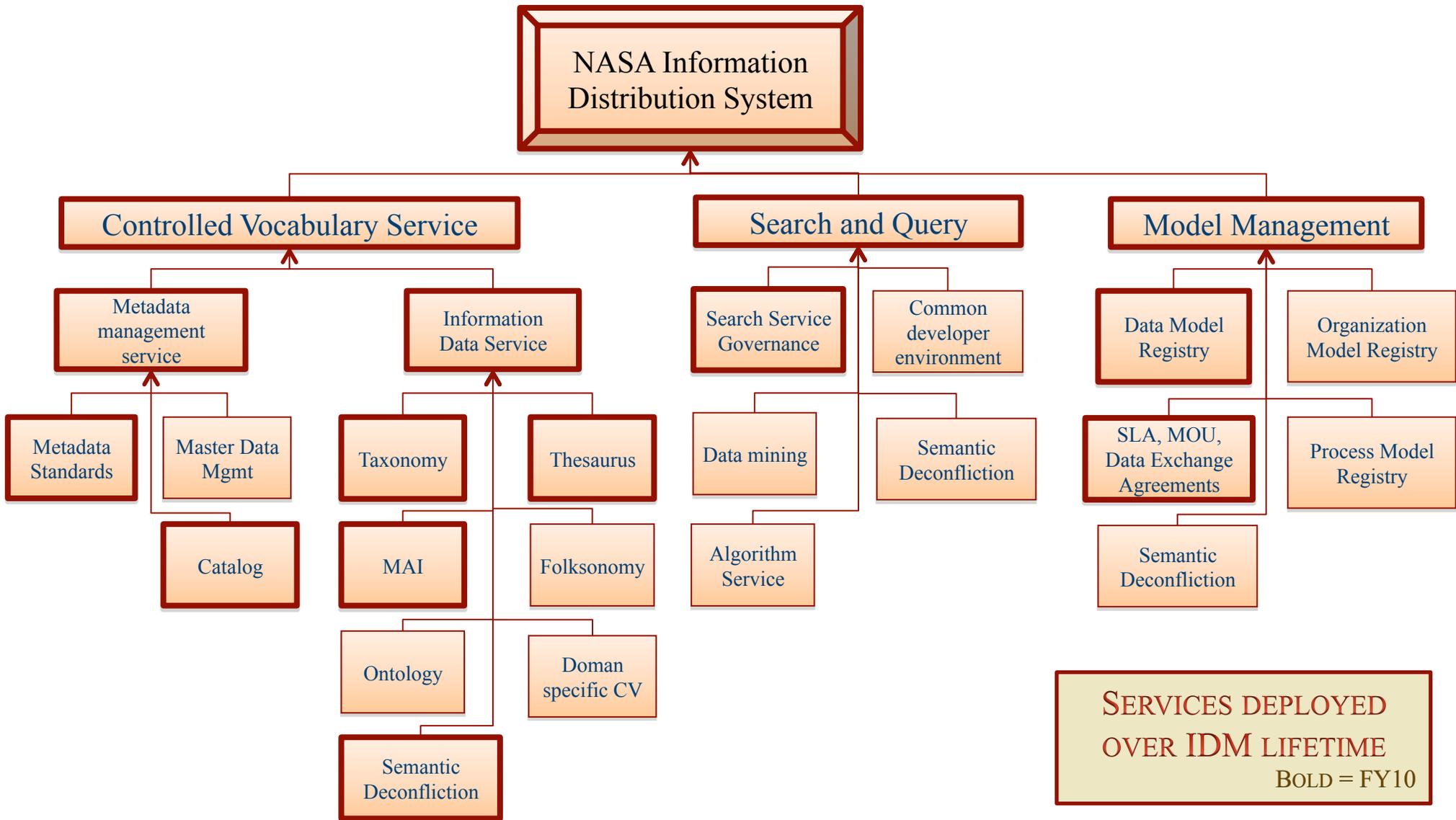
General Infrastructure
 ITS Roles - Based Authentication
 Hosting & Monitoring

Query
 Builders
 Syntax
 User Interfaces

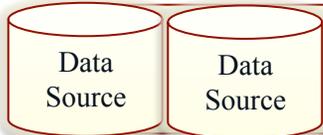
IDM Architecture Concept



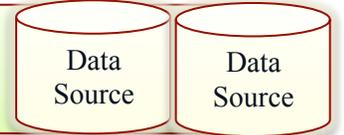
IDM Service Work Breakdown Structure



SERVICES DEPLOYED
OVER IDM LIFETIME
BOLD = FY10



Data standards, communication protocols, IT security



Knowledge Management Roadmap



Sharing Knowledge

- Adaptive knowledge infrastructure is in place
- Knowledge resources identified and shared appropriately
- Timely knowledge gets to the right person to make decisions
- Intelligent tools for authoring through archiving
- Cohesive knowledge development between NASA, its partners, and customers

Enables sharing of essential knowledge to complete Agency tasks



- International Space Station
- MarsNet
- Mars Exploration Rovers
- Space Interferometry Mission



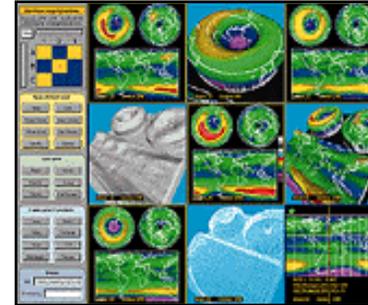
Integrating Distributed Knowledge

- Instrument design is semi-automatic based on knowledge repositories
- Mission software auto-instantiates based on unique mission parameters
- KM principals are part of NASA culture and supported by layered COTS products
- Remote data management allows spacecraft to self-command

Enables seamless integration of systems throughout the world and with robotic spacecraft



- Kepler (galactic survey)
- JASON (oceanography)
- Phoenix to Mars
- Constellation Program



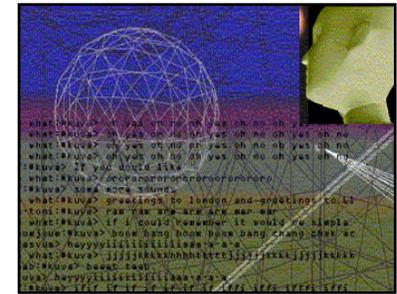
Capturing Knowledge

- Knowledge gathered anywhere from hand-held devices using standard formats on interplanetary Internet
- Expert systems on spacecraft analyze and upload data
- Autonomous agents operate across existing sensor and telemetry products
- Industry and academia supply spacecraft parts based on collaborative designs derived from NASA's knowledge system

Enables capture of knowledge at the point of origin, human or robotic, without invasive technology



- Mars robotic outposts
- Constellation Program
- Terrestrial Planet Finder



Modeling Expert Knowledge

- Systems model experts' patterns and behaviors to gather knowledge implicitly
- Seamless knowledge exchange with robotic explorers
- Planetary explorers contribute to their successor's design from experience and synthesis
- Knowledge systems collaborate with experts for new research

Enables real-time capture of tacit knowledge from experts on Earth and in permanent outposts



- Interstellar missions
- Permanent lunar and Martian colonies

2003

2007

2010

2025