

Update on NASA Earth Science

Briefing to Unidata Policy Committee
22 September 2005



Michael Goodman
Earth and Planetary Science Branch
Marshall Space Flight Center





NASA Headquarters Organization

Michael Griffin, Administrator
Fred Gregory, Deputy Administrator (resignation announced)
Rex Geveden, Associate Administrator
Paul Morrel, Chief of Staff
Scott Pace, Program Analysis and Evaluation

NASA Advisory Council
Aerospace Safety Advisory Panel

Administrator Staff Offices
Robert Cobb, Inspector General
James Garvin, Chief Scientist
Bryan O'Connor, Chief Safety Mission and Assurance Officer

Exploration Systems
Douglas Cooke (acting)

Space Operations
William Gerstenmaier

- Johnson
- Kennedy
- Marshall
- Stennis

Science
Mary Cleave

- Ames
- Goddard
- JPL

Aeronautics Research
Victor Lebacqz

- Dryden
- Glenn
- Langley

Chief Financial Officer
Gwendolyn Sikes

Chief Information Officer
Pat Dunnington

Chief System Engineer
Gregory Robinson (acting)

Institutions & Management
Jim Jennings

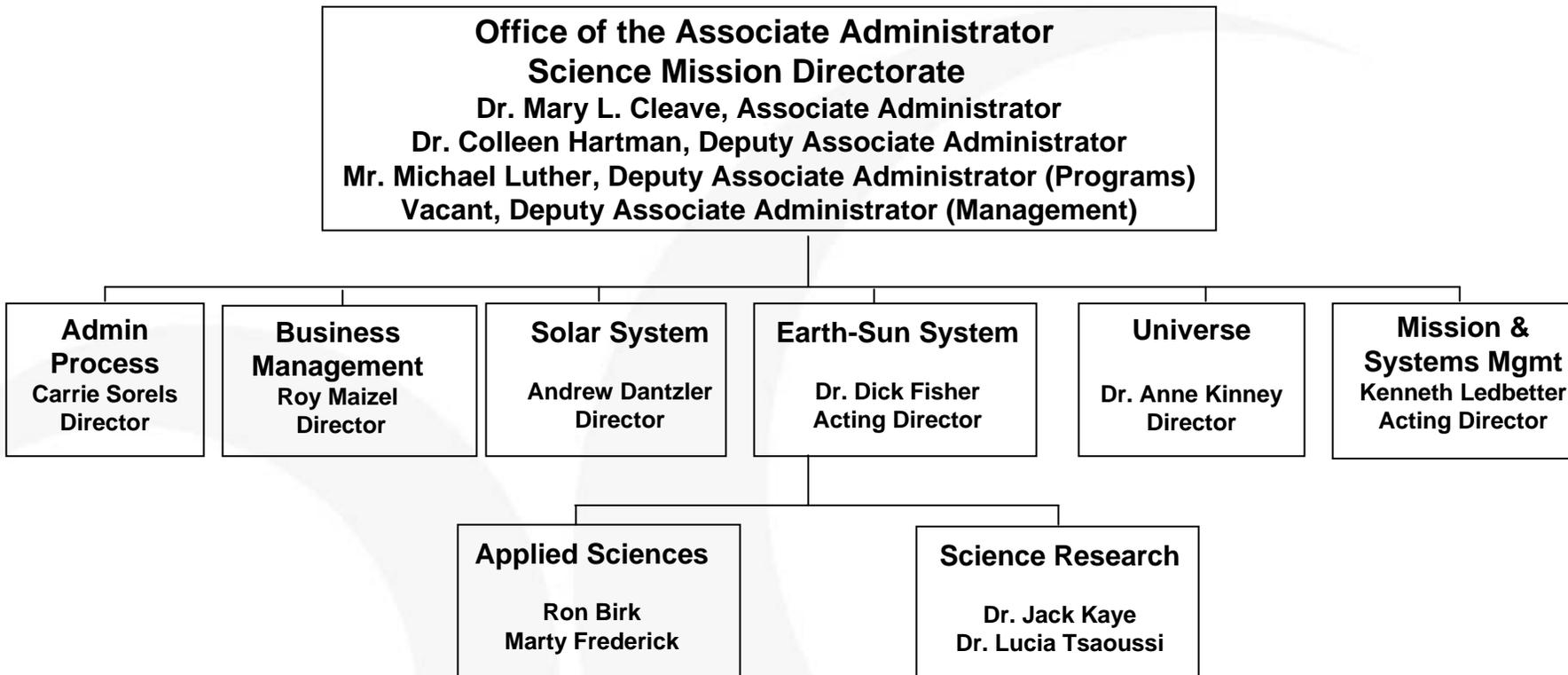
General Counsel
Michael Wholley

Chief of Strategic Communications
Joe Davis





Science Mission Directorate and Earth-Sun System Division Organization





US Group on Earth Observations

- US Group Earth Observations (USGEO) tasked six groups
 - Near-Term Opportunities
 - National Integrated Drought Information System
 - Sea Level Observing and Coast Management System
 - Global Land Observing System
 - Air Quality Forecast and Assessment System
 - Improved Observations for Disaster Warning
 - Architectural Data Management Working Group
- Each of the six groups are developing implementation reports on how the federal government can foster development of integrated systems that will provide societal benefits
 - Identify existing capabilities and systems
 - Identify gaps in capabilities
 - Identify existing plans and new initiatives
 - Identify system integration capabilities that can be leveraged
 - Identify data management infrastructure, protocols, standards and tools that can enhance the development of the NTOs





Evolution of EOSDIS Elements

■ Goal

- Assess, by considering the future objectives, the current state of EOSDIS in order to:
 - Identify the components that can/must evolve;
 - Identify those components that need to be replaced because of the rapid evolution of information technologies; and
 - Identify those components that require a phase-out strategy because they are no longer needed.

■ Objectives

- Increase end-to-end data system efficiency and operability
- Increase data usability by the science research, application, and modeling communities
- Provide services and tools needed to enable ready use of NASA's Earth science data in the next-decadal models, research results, and decision support system benchmarking
- Improve support for end users





Evolution of EOSDIS Elements – Status

- **Independent Study Team**
 - Provide recommendations consistent with the Goal and Objectives
 - Composed of members from the University community, and
 - NASA scientists and IT experts who are external to EOSDIS
- **Internal NASA Technical Working Group**
 - Support the Study Team through their knowledge of the existing EOSDIS system
 - Earth Science Data and Information System (ESDIS) Project
 - Distributed Active Archive Centers
 - Science Investigator-led Processing Systems
 - Information Management System
- **The Technical Working Group is currently re-examining the roles, requirements and responsibilities of each of the EOSDIS system components**
- **The Study Team is providing guidance and critical review**
- **Final report with recommendations to NASA HQ are due at the end of the year**





Backup

Backup Charts





Evolution of EOSDIS Elements - Vision Background

- Our vision describes a system in 2015 projecting current technology trends. By that time, all missions supported by the EOSDIS system are in extended mission or no longer flying.
- NASA has an irreplaceable data set created by the EOS Program.
- Continuing analysis of this data set is consonant with the three Presidential initiatives:
 - Climate Change Research Initiative,
 - Global Earth Observation, and
 - Vision for Space Exploration.
- NASA will ensure safe stewardship of the data through its lifetime. In keeping with current agreements, the operational management and permanent long term archive of the data have transitioned to the USGS and NOAA operational agencies.
- NASA has a continuing unique role in enabling scientific research based on EOSDIS data holdings.





Vision

- NASA's research communities have access to all EOS data through services at least as rich as any contemporary science information system, for example:
 - Data access latency is no longer an impediment
 - The physical location of data storage is irrelevant
 - Finding data is based on common search engines (e.g., Google2015)
 - Services are primarily invoked by machine-to-machine interfaces
 - Multiple data and metadata streams can be seamlessly combined
 - Custom processing (e.g., subsetting, averaging, reprojection) provides only the data needed, the way they are needed
 - Open interfaces and best practice standard protocols are universally employed
- The research and value-added provider communities use EOS data interoperably with any other relevant data sources (e.g., NPOESS, METOP, GPM, numerical models, in situ systems) and systems (e.g., Global Earth Observation System of Systems).
- The EOS archive holdings are regularly peer reviewed for scientific merit:
 - Procedures for such reviews have been developed and tested over a decade
 - Derived products that are not deemed scientifically useful are phased out.





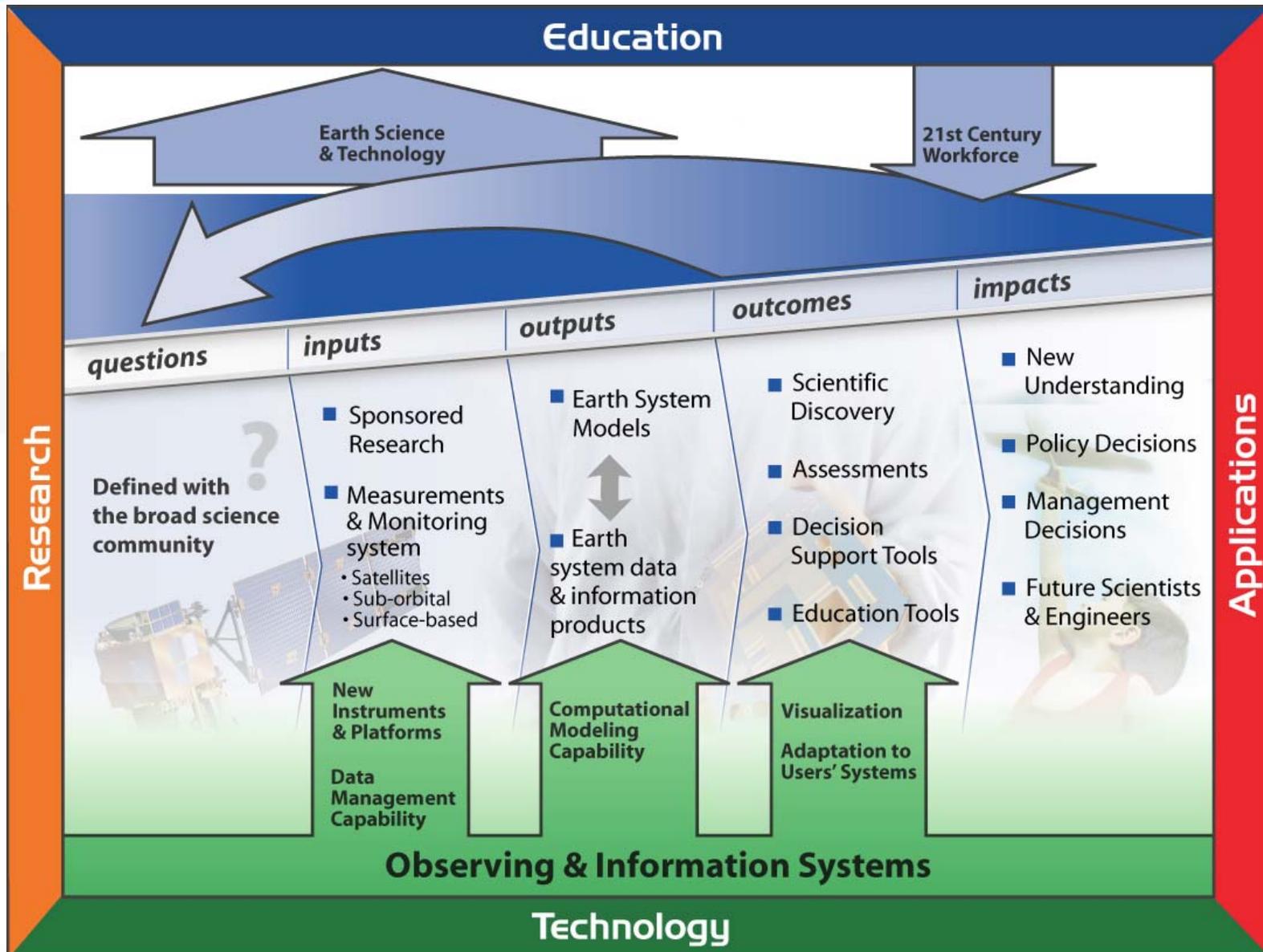
Vision (cont'd)

- Mechanisms to collect and preserve the pedigree of derived data products are readily available.
- Processing and data are mobile: processing can be moved to data and/or data can be moved to processing.
- NASA data systems have evolved into components that allow fine-grained control over cost drivers.
- Expert knowledge is readily accessible to enable researchers to understand and use the data.
- Community feedback directly to those responsible for a given system element is readily available.





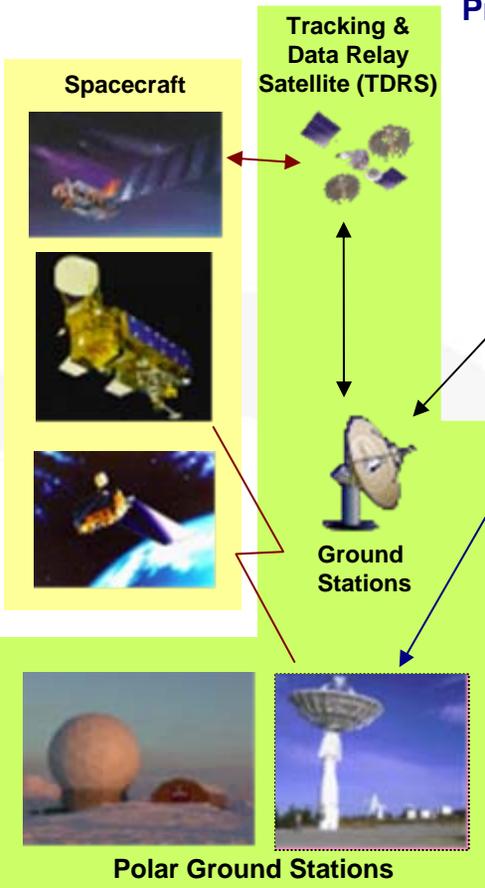
Earth-Sun Research is Part of an End-to-End Program of Science for Society





Earth Science Data System Architecture

Data Acquisition



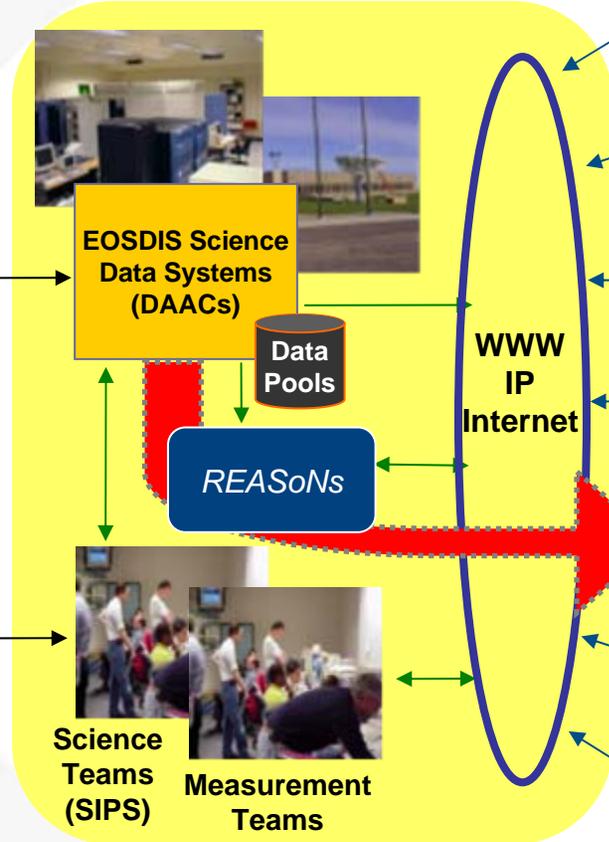
Flight Operations, Data Capture, Initial Processing & Backup Archive



Data Transport to DAACs



Science Data Processing, Data Mgmt., Data Archive & Distribution



Distribution, Access, Interoperability & Reuse

- Research
- Education
- Value-Added Providers
- Interagency Data Centers
- Earth System Models
- International Partners
- Benchmarking DSS

Technology Infusion





ACCESS Research Announcement

- ACCESS is intended to provide strategic, near-term improvements in NASA's Earth science data and information systems that support Earth science communities. Solicitation seeks improvements for data systems using existing technologies.
- Goals of ACCESS Announcement:
 - Enhance or create tools and services to support evolution to science measurement processing systems.
 - Tools and services to support and/or enhance NASA's Science Focus Area communities (a special articulated focus on data system needs of the atmospheric composition science focus communities following Aura launch).
- Cooperative Agreement funding for 2 year award periods with a possibility of a 3rd year extension. Planned to fund from 12-22 proposals ranging from \$100-300k/year for types #1 or 2, and up to \$500k/year for proposals addressing both types.
- 51 proposals were received for the initial ACCESS call. Announcement of awards is planned for mid to late October 2005.

