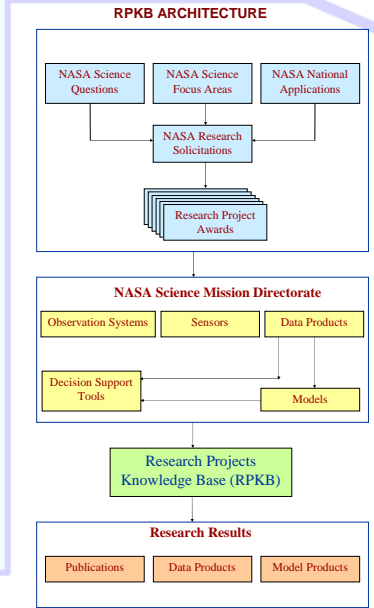
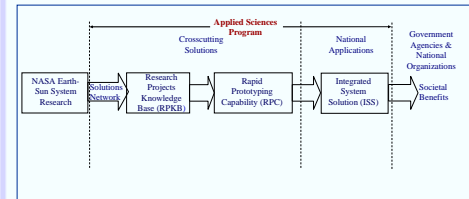


INTRODUCTION

The Research Projects Knowledge Base (RPKB) is being designed and will be implemented in a manner that is fully compatible and interoperable with NASA's enterprise architecture tools developed to support NASA's Applied Sciences Program. Through user needs assessment, collaboration with Stennis Space Center, Goddard Space Flight Center, and NASA's DEVELOP Staff personnel insight to information needs for the RPKB were gathered from across NASA scientific communities of practice. To enable efficient, consistent, standard, structured and managed data entry and research results compilation, a prototype RPKB has been designed and fully integrated with the existing NASA Earth Science Systems Components database (Missions-to-Models M2M database). The RPKB will compile research project and keyword information relevant to the six major Science Focus Areas, 12 National Applications, and the Global Change Master Directory (GCMD). The RPKB will be developed in a multi-tier architecture that will include a SQL Server relational database backend, middleware and front end client interfaces for data entry. The application of data mining / knowledge discovery in RPKB is useful for intelligent query answering and multi-layered database construction. Using advanced enterprise architecture (EA) tools such as the Earth Science Architecture Tool (ESAT), RPKB will enable NASA and partner agencies to efficiently identify the significant results for new experiment directions and principal investigators to formulate experiment directions for new proposals.

PURPOSE

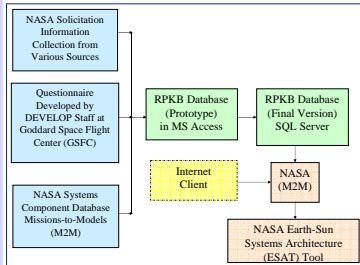
The purpose of RPKB is to meet the needs of NASA to systematically examine the portfolio of research results from six science focus areas of the Earth System Science Directorate to identify candidate technologies and results that offer the best potential for transition from research to operations by mining the data from the RPKB.



RESEARCH PROJECTS KNOWLEDGE BASE (RPKB) DESIGN

The RPKB is designed based on the questionnaire developed by the NASA Goddard Space Flight Center's DEVELOP staff. The RPKB captures standard information of NASA Funded Research Projects.

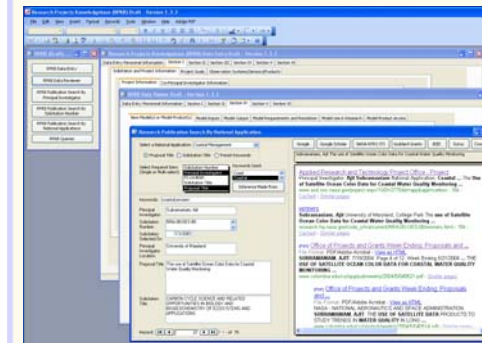
- NASA Grant Number
- Solicitations Number, Title, Award Date
- Proposal Title, Principal and Co-Principal Investigator Details
- Project Goals
- Science Focus Area(s) of Research and applicable National Application(s)
- NASA Observation Systems / Sensors Used
- Existing Data Products / Models / Decision Support Tools (DST) Used
- Project Keywords
- New Data Products / Models / DST's Developed by the Project
- Publications from the Project
- Project Reports



RPKB DEVELOPMENT

The prototype of RPKB has been developed in MS Access and includes partial integration of NASA M2M database. The primary RPKB functionalities include:

- > RPKB Data Entry
 - Solicitations and Awards, Principal Investigator details, Observation Systems / Sensors used, Models, Data Products etc.
- > RPKB Data Reviewer
 - Retrieves data from the RPKB database based on the selection of a solicitation number
- > RPKB Publications search by Principal Investigator, Solicitation Number, Proposal Title, National Application.



RPKB is populated with Data Entry Personnel Information, Project Information (Section I), Publication Details (Section II), New Data Products and Vital Facts Information (Section III), New Model Information (Section IV), New Decision Support Tool Information (Section V) and Project Report Information, consisting of existing data products, models and decision support tools used in the research (Section IV).

Select a Science Focus Area: Water & Energy Cycles/Weather

Publications by Science Focus Area:

Solicitation Number: 04010010

Name of the Principal Investigator: Stephens, Graeme L.

Title of the Proposal: Validation and Enhancement of AMSR-E Cloud and Precipitation Products

Science Focus Area: Water & Energy Cycles/Weather

Title of the Article: On the Combination of Active and Passive Measurements in the Study of Clouds and Precipitation

RPKB is populated with Research Project Results and can be searchable by:

- Science Focus Area
- National Application Area
- Principal Investigator
- Observation System / Sensor
- New and Existing Decision Support Tools (DST) used
- New and Existing Models / Data Products Used
- Solicitation Number
- Proposal Title
- Keywords



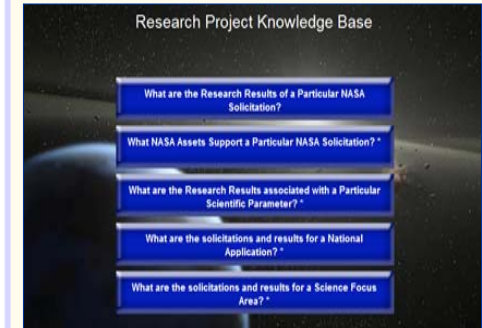
The functionality of RPKB also includes capturing data of a new model or model product / data product developed from a research project.

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- 6 NASA, Goddard Space Flight Center (DEVELOP)

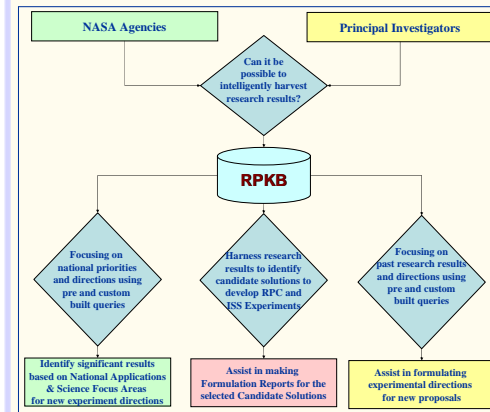
RPKB VISUALIZATION - METIS EARTH-SUN ARCHITECTURE (ESAT) TOOL

The Applied Sciences Program has developed Earth-Sun System Architecture (ESAT) Tool to model NASA enterprise architecture. The ESAT tool displays a block of questions on Research Project Results and the visual representation of the information will be displayed by the tool by fetching data from RPKB Database.



RPKB KNOWLEDGE DISCOVERY AND DATA MINING

The RPKB Data Mining is essential to improve the ability of users and operational organizations to identify, access and harness NASA research results to enhance or improve their decision support tools. The RPKB will enable NASA and partner agencies to efficiently identify the significant results for new experiment directions and principal investigators to formulate experiment directions for new proposals. The harvested data from RPKB would be helpful in developing Formulation Reports; which are the official records of the Candidate Solutions to be stored as part of the central solutions network inventory.



NASA SCIENCE FOCUS AREAS

The Earth Science Enterprise has defined its research strategy around a hierarchy of scientific questions. These science questions are addressed by the respective focus areas. The database will be populated with research results across the six major focus areas.

Focus Area	Science Questions
Atmosphere	<ul style="list-style-type: none"> • What trends in atmospheric constituents and solar radiation are driving global climate? • How will future changes in atmospheric composition affect ozone, climate, and global air quality?
Carbon Cycle and Ecosystems	<ul style="list-style-type: none"> • How are global ecosystems changing? • What changes and consequences in land cover and land use? • How do ecosystems respond and affect carbon cycle?
Climate Variability and Change	<ul style="list-style-type: none"> • How is global ocean circulation varying? • What are changes in earth's ice cover mass? • How is sea level affected by climate changes? • How well can transient climate variations be predicted?
Earth Surface and Interior	<ul style="list-style-type: none"> • What are the motions of earth and interior processes? • How earth's surface being transformed? • How to predict and mitigate natural hazards?
Water and Energy Cycle	<ul style="list-style-type: none"> • What are the effects of clouds and surface hydrological processes on climate? • How are precipitation, evaporation and cycling of water changing? • How will water cycle dynamics change?
Weather	<ul style="list-style-type: none"> • How can weather forecast duration and reliability be improved?

NASA APPLICATION AREAS

NASA has identified 12 application areas of national priority, each of which has a suite of support tools which are provided with environmental predictions from NASA models, which in turn receive raw and processed data from many sensors on space-based or ground-based platforms. NASA and partnering organizations focus on 12 applications of national priority:

Agricultural Efficiency	Air Quality	Aviation
Carbon Management	Coastal Management	Disaster Management
Ecological Management	Energy Management	Homeland Security
Invasive Species	Public Health	Water Management

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