Managing Engineering data

April 8, 2003

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Agenda

- Identification of a problem
- Vision and Mission
- High Level Requirements
- Tools
- Industry examples
- The Environment
- Benefits

Identification of a Problem at NASA

- e-government capabilities
  - Presidential initiative for e-government
- Data Access
  - Immediate access to historical data
  - Inconsistent data accessibility
- Data connectivity
  - NASA to contractors
  - NASA to NASA
  - NASA to other government agencies
  - Inter-discipline data connectivity
- Processes
  - Inefficient processes
  - Inconsistent use of common processes

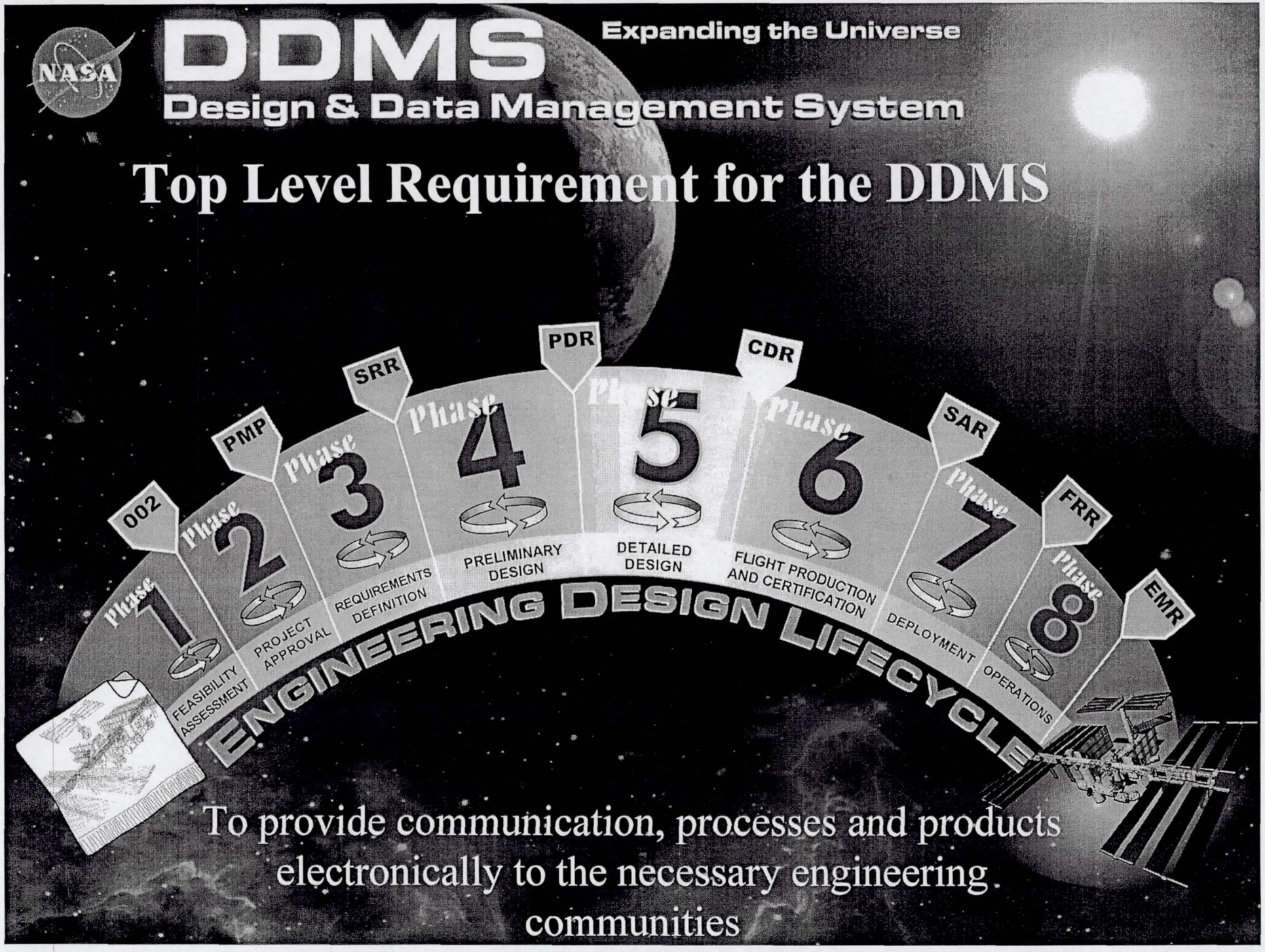
DDMS Vision and Mission Statement

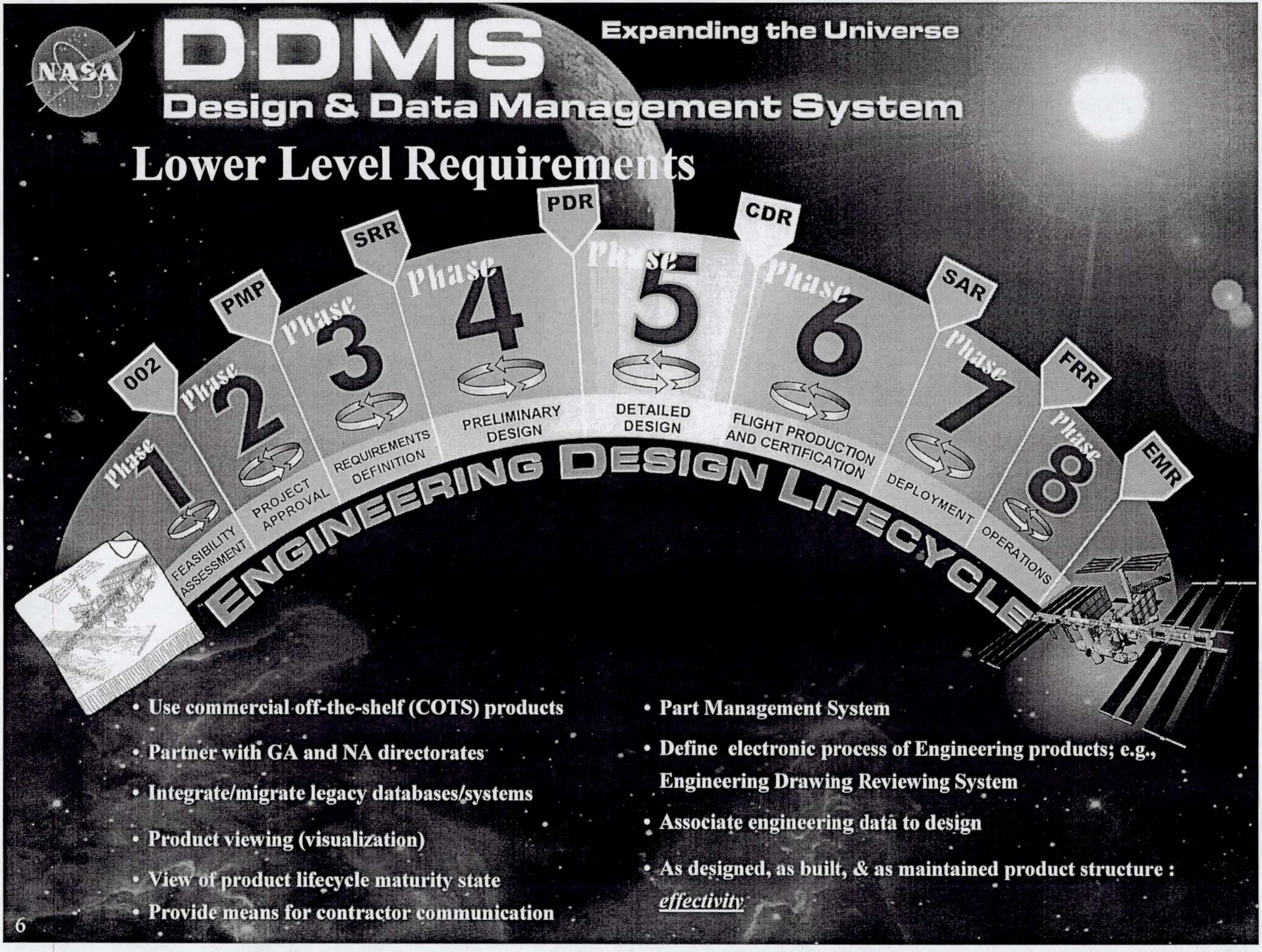
Vision:

Engineers spending more time pushing the envelope and less time pushing paper

Mission:

The Design and Data Management System (DDMS) Project is a cooperative effort between the Engineering and Information Systems Directorates whose overall objective is to move Johnson Space Center toward an integrated approach to collecting, managing and warehousing its engineering data.


DDMS
Expanding the Universe
Design & Data Management System
Top Level Requirement for the DDMS
002
PMP
SRR
PDR
CDR
SAR
FRR
EMR
Phase 1
FEASIBILITY ASSESSMENT
Phase 2
PROJECT APPROVAL
Phase 3
REQUIREMENTS DEFINITION
Phase 4
PRELIMINARY DESIGN
Phase 5
DETAILED DESIGN
Phase 6
FLIGHT PRODUCTION AND CERTIFICATION
Phase 7
DEPLOYMENT
Phase 8
OPERATIONS
ENGINEERING DESIGN LIFECYCLE
To provide communication, processes and products electronically to the necessary engineering communities

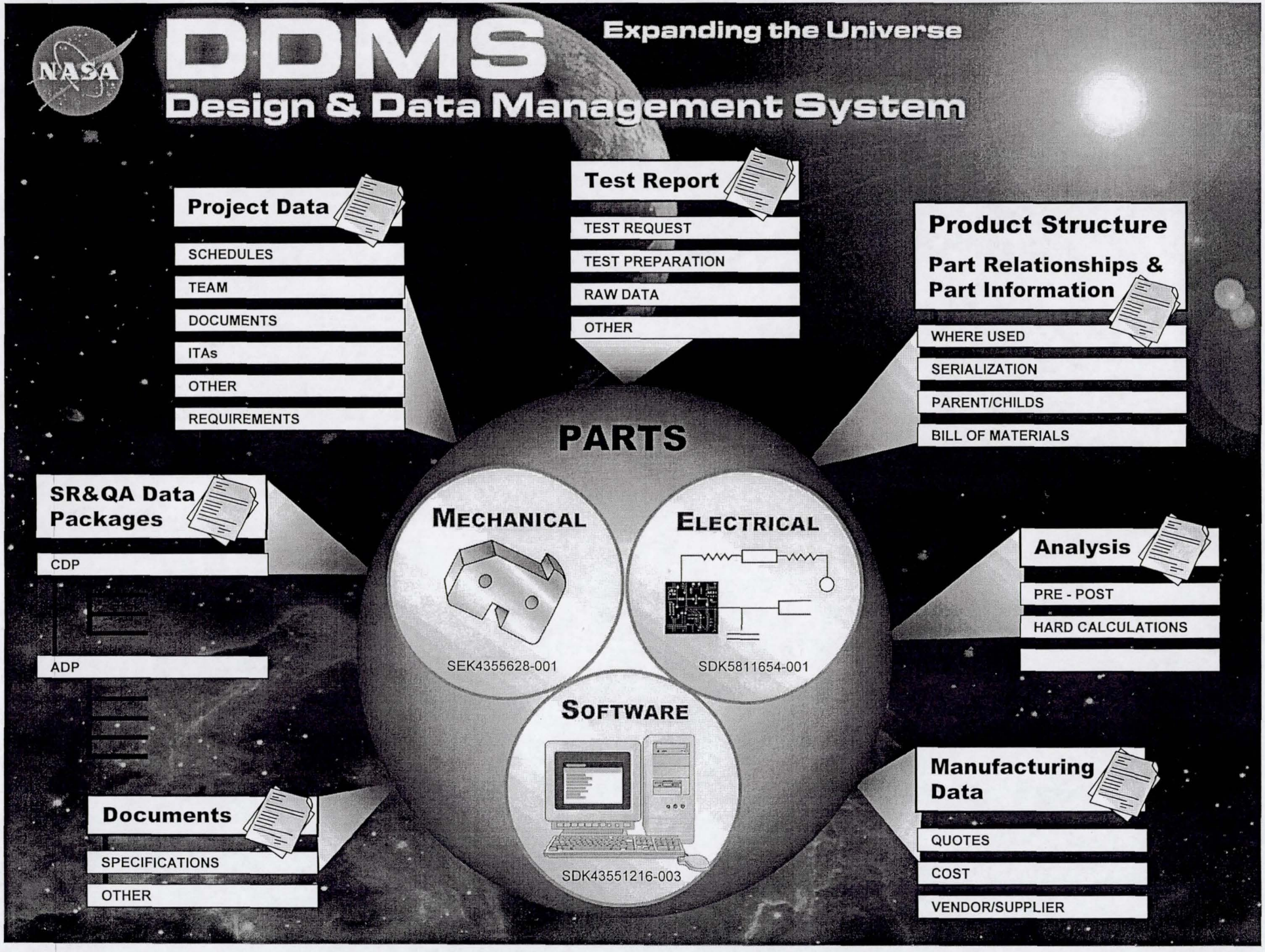

DDMS
Expanding the Universe
Design & Data Management System
Lower Level Requirements
002
PMP
SRR
PDR
CDR
SAR
FRR
EMR
Phase 1
FEASIBILITY ASSESSMENT
Phase 2
PROJECT APPROVAL
Phase 3
REQUIREMENTS DEFINITION
Phase 4
PRELIMINARY DESIGN
Phase 5
DETAILED DESIGN
Phase 6
FLIGHT PRODUCTION AND CERTIFICATION
Phase 7
DEPLOYMENT
Phase 8
OPERATIONS
ENGINEERING DESIGN LIFECYCLE
• Use commercial off-the-shelf (COTS) products
• Partner with GA and NA directorates
• Integrate/migrate legacy databases/systems
• Product viewing (visualization)
• View of product lifecycle maturity state
• Provide means for contractor communication
• Part Management System
• Define electronic process of Engineering products; e.g., Engineering Drawing Reviewing System
• Associate engineering data to design
• As designed, as built, & as maintained product structure : effectivity

Tools selected/used for implementation

- **Windchill**
  - **Product Lifecycle Management (PLM) tool**
    - **Document management** — **Design visualization**
    - **Engineering collaboration** — **Configuration and data management**
- **SAP**
  - **Enterprise Resource Planning (ERP) tool**
    - **IFMP agency wide implementation**
      - **Assets allocation** — **Cost tracking**
      - **Procurement** — **Resource management**
- **Web Services**
  - **Extensible Markup Language (XML)**
    - **Other commercial products selected for communication, architecture and security**
- **Other tools**
  - **DOORS- Requirements traceability**
  - **MS Project – Schedule tracking**

Industry Examples

- Boeing- 777 Commercial carrier
- Lockheed- Joint Strike Fighter (JSF)
- DoD- Future combat systems (FCS)
- NASA (Langley/MSFC)- Next generation reusable launch space transportation system


DDMS
Expanding the Universe
Design & Data Management System
Project Data
SCHEDULES
TEAM
DOCUMENTS
ITAs
OTHER
REQUIREMENTS
Test Report
TEST REQUEST
TEST PREPARATION
RAW DATA
OTHER
Product Structure
Part Relationships & Part Information
WHERE USED
SERIALIZATION
PARENT/CHILDS
BILL OF MATERIALS
PARTS
MECHANICAL
SEK4355628-001
ELECTRICAL
SDK5811654-001
SOFTWARE
SDK43551216-003
SR&QA Data Packages
CDP
ADP
Analysis
PRE - POST
HARD CALCULATIONS
Documents
SPECIFICATIONS
OTHER
Manufacturing Data
QUOTES
COST
VENDOR/SUPPLIER

Current DDMS/EDMS Team members

- **Programs**
  - **ISS**
    - **HHRS, PALS, VMDB Documents (03')**
  - **OSP**
    - **Program document management**
    - **Engineering collaboration**

- **Institution**
  - **STIC Library**
  - **EA Project Management**
  - **EA division documents**

Benefits

- Increase in performance efficiency
- Access data electronically over the web
- Ability to search for data from a single source
- Ability to easily develop and track metrics of design processes
- Ability for engineers to work collaboratively in real time regardless of location (including contractor community)
- Access control/security
- Data mining via document or part association
- Reduce systems administration of servers and software products
- Reduce maintenance costs on multiple software products
- Electronic document approval/review/status tracking
- Reduce data re-entry (improve data integrity)