

INSTITUTIONAL COMPUTING AND INFORMATION SERVICES (ICIS) OFFICE  
KNOWLEDGE MANAGEMENT (KM) PROJECT  
KNOWLEDGE NAVIGATION SERVICE

# **JPL ENTERPRISE PORTAL SYSTEM REQUIREMENTS DOCUMENT (SRD)**

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## 1.0 Purpose and Scope

The purpose of this document is to describe the system requirements for an Enterprise Information Portal (EIP) for the Jet Propulsion Laboratory (JPL). The EIP will provide an enterprise web gateway to JPL's knowledge resources to allow JPL employees personalized easy access to electronic institutional information, as well as relevant information outside of JPL. The system will replace JPL's current Electronic Lab-wide Information Access System (ELIAS) (an internal home page) located at <http://elias.jpl.nasa.gov>.

The scope of this document is the JPL Knowledge Management system, a federation of enterprise-level information systems designed to provide the foundation for the creation, storage, dissemination, and reuse of JPL's knowledge. The EIP is a component of the JPL Knowledge Management system.

The purpose of Knowledge Management at JPL is to make relevant information available quickly and easily to JPL employees to use productively. As such, the EIP system described herein should meet the goal of providing access to relevant information in an efficient manner. To this end, the search engine piece of the portal is an important part of the overall project. Note that there is a separate requirements document for the search engine and that it should be able to run independently of the portal.

In addition, the portal shall enable smaller working groups to set up an online space or "community" where they can publish the latest announcements, share research information and establish a virtual homepage based on common interests, needs or tasks.

### 1.1 Definition

The term *Enterprise Information Portal*, or EIP, has several distinct but related meanings in the field of information technology. For the purpose of this document, the following definition is used:

An Enterprise Information Portal is a web-based software application or system of software that serves as a single gateway to data and knowledge within the corporate enterprise. The essential characteristics of the EIP are that it aggregates, manages, analyzes, organizes, and distributes corporate information into a single system tailored to the preferences of the individual user.

## 2.0 Applicable Documents and Standards

### 2.1 Documents

- a. *A Knowledge Management Architecture for JPL (JPL Publication 99-18)*, Jet Propulsion Laboratory, Pasadena, California, 15 January 1999.
- b. *Security of Information Technology*, NPG 2810, National Aeronautics and Space Administration, Washington DC.
- c. *JPL Information Technology Security Requirements for Computer Systems (JPL D-7155E)*, Jet Propulsion Laboratory, Pasadena, California, December 1998.
- d. *JPL Internal Search Engine Requirements, version 2.0*, (JPL-18680) Jet Propulsion Laboratory, Pasadena, California, 29 November 1999.
- e. *JPL Meta-Search Engine Requirements, version 1.4*, (JPL D-18681) Jet Propulsion Laboratory, Pasadena, California, 26 October 1999.

## 3.0 Functional Requirements Description

### 3.1 Server Requirements

#### 3.1.1 Server Platform

3.1.1.1 The system shall work on one of the following hardware platforms for system server software hosted at JPL, if any:

- a. Unix server running Sun Solaris, version 2.6
- b. Unix server running Linux., version
- c. Intel-based server running Microsoft Windows NT Server, version 4.0

#### 3.1.2 Protocols

3.1.2.1 The system shall support the following Internet protocols as originally specified by the Internet Engineering Task Force and the International Standards Organization including:

- a. Transport Control Protocol / Internet Protocol (TCP/IP)
- b. Hypertext Transfer Protocol (http), version 1.1
- c. Secure-Hypertext Transfer Protocol (https)
- d. Network News Transport Protocol (NNTP), Internet-Draft:  
<http://www.ietf.org/internet-drafts/draft-ietf-nntpext-base-09.txt>
- e. Web-based Distributed Authoring and Versioning (WebDAV)
- f. Lightweight Directory Access Protocol (LDAP), version 3.0

#### 3.1.3 Content Sources

3.1.3.1 The system shall provide access mechanisms including, but not limited to, the following web-based content source MIME types:

Web document formats:

- a. HTML, version 4.0 and below
- b. XML
- c. XHTML, version 1.0
- d. Plain Text (.txt)

Application document formats:

- e. Microsoft Office, including versions Office 97 (Win), Office 2000 (Win), and f. Office 98 (Mac):
  - g. Word (.doc)
  - h. Excel (.xls, .xlb)
  - i. PowerPoint (.ppt)
  - j. Portable Document Format (.pdf)
  - k. Postscript Format (.ps)
  - l. STEP-Compliant CAD files, <http://step.nasa.gov>

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m. Other formats as specified in Appendix B, Chapter 8, “Standards” of A *Knowledge Management Architecture for JPL* (JPL D-16577), Jet Propulsion Laboratory, Pasadena, California, 15 January 1999.

### 3.1.4 Syndication Content formats

3.1.4.1 The system shall provide access mechanisms including, but not limited to, the following web-based content formats:

- a. Information Content and Exchange (ICE), World Wide Web Consortium (W3C) Note 26 October 1998: <http://www.w3.org/TR/NOTE-ice>

### 3.1.5 Databases

3.1.5.1 The system shall provide support for the following standards for database access:

- a. Java Data Base Connectivity (JDBC),
- b. Open Data Base Connectivity (ODBC)

### 3.1.6 Portal Applications

3.1.6.1 The system shall provide a mechanism to develop and deploy portal applications that operate within a data channel window as defined below.

Web Application Data Interchange Formats – *Web Application Data Interchange Format* is defined as the data format used by the Enterprise Portal to communicate with other web application servers or applications built using a web application server. It is desired that the Enterprise Portal be able to exchange data with these applications.

- a. The system shall support the following web application data interchange format:
  - (1) XML

### 3.1.7 System Integration Tools and Methods

3.1.7.1 The system shall provide the following tools and methods for integrating with existing JPL, NASA and external data specified in the “Interfaces” section of this document:

- a. The system shall provide an Application Programming Interface (API) that meets the following requirements:
  - (1). The API should be based on open standards and languages including, but not limited to, XML, C++, Java, or Perl.
  - (2). The API shall provide a Software Developer Kit (SDK) or equivalent tools for developing custom applications that communicate with the system.

b. The system shall provide tools for helping content publishers to publish data to data channels.

(1) Data preparation tools shall possess the following characteristics:

- (i) Be platform independent
- (ii) Be web accessible
- (iii) Be transparent enough for a non-technical user to learn quickly.

### 3.2 Client Requirements

Definition – A *client* is defined as an end-user of the EIP system. A client in this context is distinguished from an *administrator*, who maintains the system software. System users include JPL employees, contractors, and partners.

#### 3.2.1 Client User Access

3.2.1.1 Client access control shall be optionally configurable based on

- a. IP address
- b. domain name

#### 3.2.2 Client User Interface

3.2.2.1 The system client user interface must be accessible through the following web browsers:

- a. Netscape Navigator version 4.0 or later
- b. Microsoft Internet Explorer version 4.0 or later

3.2.2.2 The end-user client interface shall work without the use of non-bundled web browser plug-ins.

3.2.2.3 The end-user client interface may require the use of Java and/or Javascript on the browser

3.2.2.4 The end-user client interface shall provide equivalent functionality for all supported desktop computing platforms, including but not limited to the following operating systems:

- a. Windows 95/98
- b. Windows NT/2000
- c. Macintosh
- d. Unix (Solaris, HP/UX, Linux, Irix)

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3.2.2.5 The end-user client interface may provide reduced functionality for non-desktop computing platforms, including but not limited to the following operating systems:

- a. PalmOS
- b. Windows CE

### 3.2.3 Client Functions

3.2.3.1 The system shall allow the display of multiple data channel windows within a single web page. A data channel window is hereafter defined as a window or equivalent user-interface element within a single web page that allows grouping by function or subject matter.

3.2.3.2 The system shall provide a data channel window, tab, or equivalent user-interface element that accommodates a browseable directory of JPL web sites.

3.2.3.3 The system shall maintain (although not necessarily simultaneously display) the following information for each JPL Web site contained in the browse directory

- a. Title
- b. URL
- c. Description
- d. Keywords
- e. Categorization Information
- f. Access restrictions
- g. Date record last updated

3.2.3.4 The browse directory shall display web sites in an administrator-configurable hierarchy (i.e. taxonomy) provided by JPL, such as the one at <http://eis.jpl.nasa.gov/~jedutra/taxonomysite/>

3.2.3.5 The system shall allow the user easy access to syndicated news feeds from both:

- a. online sources including but not limited to A.P, Reuters or CNN
- b. JPL subscribed sources including but not limited to *Aviation Week and Space Technology*, *Science* or *Nature*.

3.2.3.6 The system shall accommodate a search function that meets all requirements specified in the following documents:

- a. JPL Internal Search Engine Requirements (JPL D-18680)
- b. Meta-Search Engine Requirements (JPL D-18681)

3.2.3.7 The system shall provide a start page for each user that is customizable according to the preferences of each user.

3.2.3.8 User configurable attributes of the start page shall include:

- a. Which data channel windows appear on screen.
- b. The layout of data channel windows.



- c. The content within specific data channel windows
- d. Font face, size and color

3.2.3.9 The system shall keep track of each user's state based on last log out time.

3.2.3.10 The system shall provide a mechanism for end-users to automatically receive notifications of changes in at least the following:

- a. system-level changes as specified by administrators.
- b. changes within individual data channels.
- c. changes to sub-elements within a data channel, such as changes to a document file.

3.2.3.11 The system notification methods shall include but not be limited to the following methods:

- a. Email

3.2.3.12 End-users shall be able to control which notifications, if any, they subscribe to.

3.2.3.13 The system shall allow end-users to receive notifications based on:

- a. Event triggers (A notification is sent when an event occurs, such as when a data channel receives a new object.)
- b. Time Period (A summary of changes is sent at a user-specified time period, e.g. once a day.)

#### 3.2.4 Administrator Functions

3.2.4.1 The system shall allow an administrator to control the system-wide appearance of the following web page attributes:

- a. Font face
- b. Font size
- c. Font color
- d. Font style (e.g. bold, italics, underline)
- e. Header content and appearance
- h. Footer content and appearance

3.2.4.2 The system shall allow an administrator to configure start pages for new users according to employee type or any other administrator-defined group. A user template is defined as a pre-defined arrangement of data channel windows within the start page, as well as specific content within those data channel windows.

3.2.4.3 The system shall accommodate both required data channels that the user cannot remove, and optional data channels that the user can choose to display or not.

3.2.4.4 The system shall provide a mechanism to allow administrators to develop custom web-based applications that run within a data channel window.

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- 3.2.4.5 The system shall provide a mechanism to add single registered users via a web-based form.
- 3.2.4.6 The system shall provide a mechanism to add multiple registered users from a database or LDAP directory via a web-based form.
- 3.2.4.7 The system shall provide a mechanism to delete a registered user via a web-based form.
- 3.2.4.8 The system shall provide a mechanism to edit user registration information.
- 3.2.4.9 The system should support the LDAP protocol for integration with JPL LDAP directories.
- 3.2.4.10 The system should support JPL's user authentication system which is kerberos4, kerberos5 and NT domain
- 3.2.4.11 The system should support Public Key Infrastructure (PKI) authentication as specified by the IETF in the X.509 protocol.
- 3.2.4.12 The system shall allow as signing administration rights and permissions to users or user groups.
- 3.2.4.13 The system shall allow as signing users to groups.
- 3.2.4.14 The system shall allow group membership to be imported from an LDAP directory.
- 3.2.4.15 The system shall accommodate assigning view permissions to individual data channels and data channel applications.
- 3.2.4.16 The system shall accommodate assigning administration permissions to individual data channels and data channel applications.
- 3.2.4.17 The system shall provide a mechanism for generating reports about logs such as traffic to the system based on both total hits and unique visitors.
- 3.2.4.18 The system shall provide a mechanism for tracking usage of specific data channels.
- 3.2.4.19 The system shall provide system performance reporting capabilities.
- 3.2.4.20 The system shall grant JPL exclusive control of content published by the portal.
- 3.2.5 The system shall supply context-sensitive on-line help to the user.

## **4.0 Performance Requirements**

4.1.1 The system shall support user account access (having a user name and password) for all JPL employees, contractors, and partners. As of the time of writing of this document, this number is approximately 8,000 users.

4.1.2 The system shall support up to 5500 active users. Active users are defined as being currently logged on to the system and using a portal Web client.

4.1.3 The system shall support up to 550 concurrent actions. These are actions being performed on the server to support users (ie, log-on, authentication, password change, dynamically generate HTML pages, download documents, process queries).

4.1.4 The system shall be available and operational 24 hours per day, 7 days a week.

4.1.5 The system shall be scalable to multiple servers to allow tuning system performance.

4.1.6 The system shall accommodate third-party hardware and software load-balancing systems.

## **5.0 Support Requirements**

5.1.1 The vendor shall provide technical support to any user with a JPL domain e-mail address.

5.1.2 The vendor shall provide telephone technical support Monday through Friday, 7:45 am through 4:45 p.m. Pacific Time.

5.1.3 The vendor shall respond within two working hours to a telephone technical support call. If the call is received after 2:45 p.m. Pacific Time then the call may be returned as late as 8:45 am Pacific Time on the next JPL working day. It is the preference of JPL to have telephone technical support calls answered by a live voice in an expedient manner.

5.1.4 The vendor shall have a capability of receiving e-mail requests for technical support.

5.1.5 The vendor's technical support system shall promptly acknowledge the receipt of an e-mail request for technical support via return e-mail to the sender.

5.1.6 The vendor shall be capable of providing on-site expert technical support.

5.1.7 The vendor shall be capable of fulfilling a request for expert on-site technical support within 3 JPL working days.

5.1.8 The vendor shall provide a Web accessible tracking program for all technical support requests.

5.1.9 The date and time of any required system shut down shall be configurable by authorized administrators at a specified date and time.

## **6.0 Software Requirements**

### **6.1 Host Location**

The system software may be hosted at JPL, off-site or at a combination of both, pursuant to compliance with JPL and NASA information security requirements (*JPL D-7155E*.)

### **6.2 Modular Software Architecture**

The software shall be able to run unbundled from proprietary software in such a way that different components (ie search engine, content management systems) can be easily changed out to allow for other vendor's products to run in tandem with the portal software.

### **6.3 Logging**

The system software shall log all access attempts to the system by IP address.

### **6.4 Security**

6.4.1 Pursuant to NASA Procedures and Guidelines, "Security of Information Technology", NPG 2810, the EIP system software will handle the following categories of information:

- a. Scientific, Engineering, and Research (SER) Information
- b. Administrative Information (ADM)
- c. Public Access (PUB) Information

6.4.2 The system software shall adhere to all SER, ADM, and PUB requirements specified in *JPL Information Technology Security Requirements for Computer Systems*, (*JPL D-7155E*).

## **7.0 Interface Requirements**

7.1.1 The vendor shall provide a list of open protocols that are supported and a statement as to what degree they are supported.

7.1.2 The system shall create an on-line phone and location directory from a daily extract of information stored in the JPL Human Resources Oracle database.

7.1.3 The system shall provide a link to JPL's Oracle Web business applications home page.

7.1.4 The system shall provide a link to JPL's Document and Data Management systems including:

- a. JPL Product Data Management System  
<https://www-pdms.jpl.nasa.gov/titlepage.html>
- b. JPL Electronic Libraries (Xerox DocuShare)  
<http://eis-lib.jpl.nasa.gov>
- c. JPL Institutional Environment Navigator  
<http://dmie.jpl.nasa.gov>
- d. JPL Technical Questions Database  
[http://webdev4/quest\\_new/](http://webdev4/quest_new/)
- e. JPL Expert Connection  
[http://webdev4/jpl\\_knowwho/index.cfm](http://webdev4/jpl_knowwho/index.cfm)
- f. JPL Library on-line (BEACON)  
<http://beacon.jpl.nasa.gov:80>

7.1.5 The system shall be capable of launching the JPL MeetingMaker calendaring software from within the EIP.

7.1.6 The system shall be capable of launching the JPL EudoraPro e-mail software within the EIP.

7.1.7 The system shall provide links to the URL's that are currently linked to the ELIAS home page, <http://elias.jpl.nasa.gov>.

7.1.8 The system shall provide some mechanism for the archiving of materials posted to the portal.

## **8.0 Training**

8.1.1 Vendor shall provide appropriate training in the design, implementation, administration and maintenance of the portal server and accompanying application to JPL technical personnel.

8.1.2 Vendor shall provide appropriate training to information publishers creating data streams for display in portal data channels.

## **9.0 Test Requirements**

***9.1 The vendor shall perform internal acceptance testing prior to each delivery.***

***9.2 The vendor shall perform user interface testing on the software prior to each delivery.***

***9.3 The vendor shall perform performance testing on the software prior to each delivery.***

***9.4 The vendor shall perform load testing prior to each delivery.***

9.4.1 The load levels tested shall be:

- a. 625 simultaneous users
- b. 1250 simultaneous users
- c. 2500 simultaneous users

9.4.2 The period for each load level tested shall be a continuous 24 hours.

***9.5 The vendor shall perform stress testing prior to each delivery.***

9.5.1 The stress testing performed shall determine at what load level the system shall become non-responsive to a user and experience a software failure (crash).

***9.6 The Vendor shall perform regression testing on the system prior to each delivery.***

***9.7 The vendor shall report testing results to JPL prior to each delivery.***