

DIMS –
Data Information and Management System



Management of Digital Products
Services and Systems

Increasing amounts of digital data often push monolithic data management solutions to their limits. All too often with every new application a new solution is conceived and developed to support the payload data handling. Over a period of time solutions accumulate and the multitude of procedures becomes unmanageable. Frequently the validity time of digital data exceeds the life-time of the data management software, and expensive content migrations have to be performed to be able to continue data exploitation or the support for the provided services must be stopped prematurely.

DIMS changes this trend by providing a single integrated solution that is flexible enough to be adapted to nearly any conceivable data management scenario.

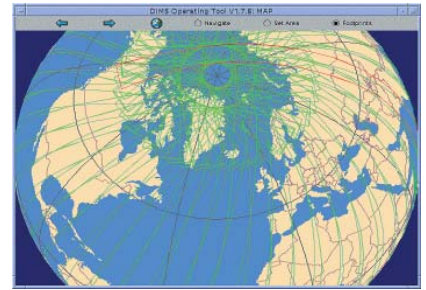
DIMS is designed as a facility that provides the core components to support the tasks required to handle earth observation data of multiple missions. Beyond data storage and processing, uses for DIMS are foreseen in numerical data processing, forecasting and similar application areas.

An Integrated Solution

Highly scalable and flexible, DIMS provides a sustainable solution that supports all the basic workflows of digital data management like production management, cataloguing, long-term archiving, WWW user access, ordering and on-line/off-line delivery by means of a set of comprehensive services including WWW user information services (with on-line delivery), off-line delivery, post-processing, data product inventory and archiving, ordering control and production control. GIS user services will be available in the near future. A cornerstone of the system is a highly scalable product library which is the source of processing input and the destination of the processing output. It provides a complete and consistent reference to all data products.

Flexible Data Product Model

When data from different missions are involved, a solution with a flexible product model is required. The DIMS product model is highly configurable and allows the definition of arbitrary metadata structures. The actual products are stored in one or more file system archives while the metadata is stored in an object relational inventory



that ensures fast access. Depending on the relational database vendor chosen, low-level geographic search capabilities can be exploited to allow for fast complex geographic searches for data product footprints.

An integrated browsing image system adds to the ease of data retrieval.

Service Based Architecture

The service based architecture is very flexible and can be customized and scaled to a large degree by means of configuration. The CORBA based communication bus allows for flexible, network based inter-service requests and information exchanges. The key features of the DIMS solution are

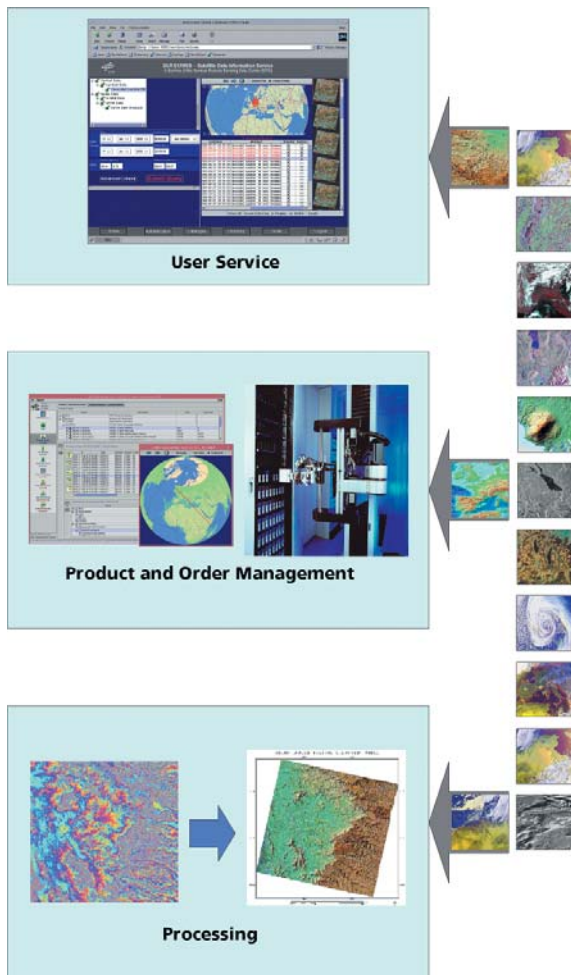
- Control of production and product generation
- Fully integrated data product archive, possibly with an automatic robot archive and inventory with optimized access methods
- Multi-mission support for products from many sensors, satellites and missions in parallel
- Online user information services
- Unified workflow based data processing framework
- Near-real-time production and distribution

GIS interfaces are in preparation.

Flexible Adapters and Workflows

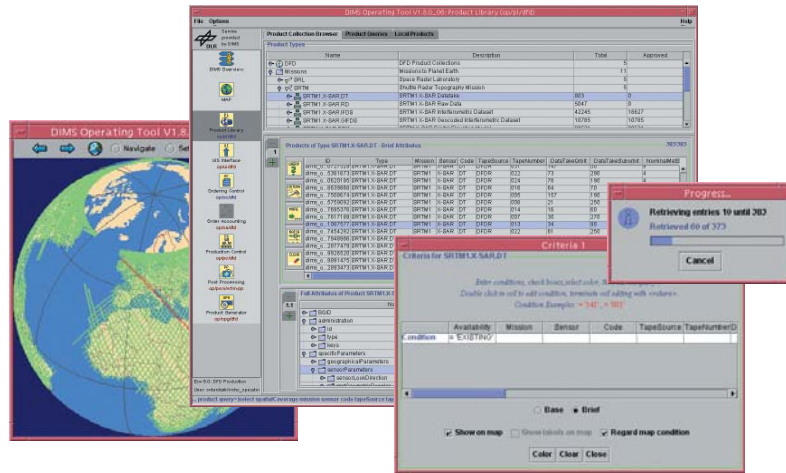
To achieve the multi-mission capability of DIMS, it has been designed to be decoupled from the internal structure and processing requirements of the data that is handled.

Data is ingested into the system via adapter modules. To incorporate a new product type it suffices to provide a small program that extracts the desired inventory information and optionally generates a quicklook image for the product.



this page left: DIMS Domains (Processing, Product and Order Management, User Services)
 this page top: Product Footprints
 next page top: Graphical Operator Interface
 next page center: Customized Data Delivery
 next page bottom: From Bitstream to Information

Data processing is carried out via configurable workflows that can be as simple as a single step processor call or as complex as a month long procedure on a multi machine cluster to compute the mean value of a measured quantity derived from several product types. The frameworks and programming interfaces provided by DIMS allow "fast lane" configurable workflow definition as well as elaborate special purpose workflow logic to be integrated easily. While the core services and frameworks of DIMS are implemented in the Java programming language, there are processing adapters for C/C++ and FORTRAN as well.



Standard Extension Development Model

From long experience with the integration of data products and processing workflows into the DIMS installation at DLR sites, a proven development model has evolved that helps to speed up integration work and ensures that all aspects of a data processing scenario from acquisition/ingestion via data storage to data dissemination are handled.

Common Operator Interface

The distributed DIMS components provide a unified graphical user interface for operator and supervision tasks. On the one hand this minimizes the need for operator training when new service instances and workflows are established; on the other hand, the developers of data processing algorithms and workflow integrators are freed from the need to build operator interfaces to their components. While primarily designed for automatic processing the request handling within services can also be controlled to a large extent by an operator. This adds extra flexibility for workflow integration and data anomaly handling. Views and controls are presented via a single tool providing remote access from a Windows or Unix console.

In-built User Services and Commercial Data Delivery

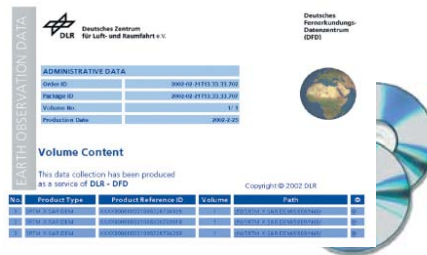
To facilitate access to the acquired data by the user community the business process "ordering" is integrated

into the system. Well-defined interface components are used to communicate with external users and facilities. There are in-built order management and delivery components. Web based ordering via an ordering server as well as ordering through standard interfaces such as CIP. DIMS will implement

component distribution at runtime with minimum service disruption. Individual services can be started and shut down independently allowing for on-the-fly reconfiguration and software maintenance.

Software Life Cycle Support

DIMS is maintained to incorporate or to interface with emerging standards. Customers can be supported continuously to maximize the usefulness of the DIMS system through operator training courses, developer workshops, integration support as well as customized extension development and remote maintenance.



OpenGIS standards for direct access to georeferenced primary data in the near future. Users of OpenGIS compatible GIS applications that implement the web coverage protocol specification can then transparently download and use data managed by DIMS. Existing or customized user service infrastructures can be connected with minimal effort.

Scalability through Distributed Components

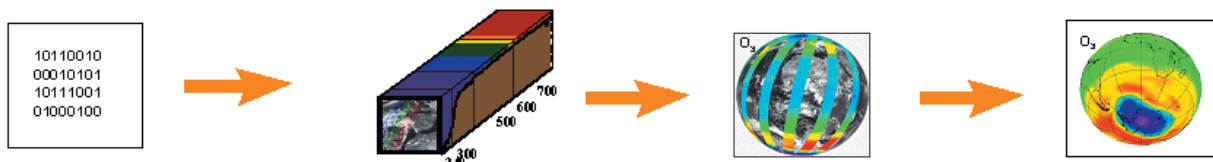
A minimum system can be set up on a single Unix or Linux machine. A large system may include hierarchical storage solutions to provide terabytes of archive storage. A high level of data throughput can be achieved by a network of hosts. Several operating systems are supported; they can be mixed freely within DIMS. The naming and service detection technology allows to reconfigure the

Data Information and Management Service at DLR

On the basis of the DIMS software, DLR-DFD provides data services internally and on behalf of others. Based on their digital data and requirements the following services can be provided:

- data ingestion integration support
- long-term data archiving and cataloguing
- WWW/GIS user services
- data ordering and distribution on-behalf of customers
- data processing integration and operation support

The operational DIMS facility is open for the integration of many types of data products and applications. The established infrastructure ensures reliable operations for many terabytes of data.



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The DLR is the national aerospace center of the Federal Republic of Germany. As such, it is engaged in extensive research and development projects in collaboration with national and international partners. In addition to conducting its own research, the DLR also serves as Germany's space agency, managing the country's space activities on behalf of the German Federal Government.

The DLR has a total of some 5,000 employees and eight locations in Cologne-Porz (executive offices), Berlin, Bonn, Braunschweig, Göttingen, Lampoldshausen, Oberpfaffenhofen and Stuttgart, as well as offices in Brussels, Paris and Washington, D.C.



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