Long Term Preservation of Earth Observation Space Data

RELEVANT STANDARDS and PROCEDURES

**CHANGE LOG**

| Reason for change | Issue | Date |
| --- | --- | --- |
| Provided simple list of standards | First Emission | 9/5/2010 |
| Addition of standards at request of working group | Second Emission | 13/8/2010 |
| Analysis and mapping of standard to LTDP guidelines | Third Emission | 7/9/2010 |
| Addition of standards at request of working group | Fourth Emission | 5/10/2010 |
| Addition of single standards | Fifth Emission | 7/10/2010 |
| Polishing language and formatting | Sixth Emission | 27/10/2010 |
| Addition of five new standard developing bodies and 106 new standards (grouped into families for formats) with input from Victoria Bennett | Seventh Emission | 19/02/2013 |
| Revised after input and comments from Mirko Albani Daniel Boucon and Yanmei WU | Eight emission | 9/4/2013 |

| Role | Name | Signatures |
| --- | --- | --- |
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# Introduction

## European LTDP Initiatives

Monitoring of global change processes has lead to increasing demand for long-term time series of Earth Observation (EO) data spanning 20 years, or more. These data are necessary to support international activities such as the United Nations Framework Convention on Climate Change (UNFCCC). Content of EO space data archives is extending from a few years to decades and their scientific value is continuously increasing hence is well recognized the need to preserve them without time limitation and to keep the archived EO space data well accessible and exploitable as they constitute a humankind asset. To preserve these digital assets is the aim of digital long-term preservation.

A cooperative and harmonized collective approach on Long Term Data Preservation (LTDP) is ongoing in Europe (i.e. a European EO LTDP Framework) with the goal to coordinate and optimize European efforts in the LTDP area. The aim is to ultimately preserve the entire European EO space data set for the benefit of all European countries and users, while at the same time reducing the overall costs of data preservation. Reduction of operation costs will also reduce the risk that old archived data are discarded by commercial operators because the reduced commercial interest may in some cases not justify the effort to further archive these data.

ESA is coordinating the LTDP initiative in Europe and has an ongoing LTDP programme for the period 2009-2011 with the objective to guarantee the preservation of the data from all EO ESA and Third Parties ESA managed missions on the long term, also ensuring their accessibility and usability, as part of the joint and cooperative approach in Europe.

## Document Scope and Purpose

This document contains a survey of the different ongoing, completed or future initiatives that could provide technological developments & methodologies or procedures in the Long Term Data Preservation (LTDP) area or that could have impacts on the LTDP initiative currently ongoing in Europe (see http://earth.esa.int/gscb/ltdp/EuropeanLTDPFramework.pdf) for the set-up of a European LTDP Framework.

The Purpose of this document is to

* Identify organisations who produce standards, methodologies or procedures which could support or enhance LTDP related activities
* Identify and rank the most relevant standard and procedures and provide the following key information for further inspection and analysis
  + Descriptions
  + Standards accrediting or developing organization
  + Version
  + Further Information
  + Relevance to LTDP
* Provide quick reference tables (conclusions and recommendations section) to allow archives to quickly identify and find appropriate standards or procedures which support the different LTDP themes.

The Survey resulted in a long candidate list which contained in excess of 600 different standards and procedures that have been briefly inspected for relevance to LTDP. Most standards and procedures were rejected on grounds that they were not highly relevant or generally applicable for the long tern preservation of Earth Observation data sets. The result of this process is the shortlist of approximately 150 standards and procedures presented in this document. The document should therefore not be considered to be a comprehensive listing of standards and procedures which could potentially support the long term preservation goals of archives. Further independent investigation may be required for specialised long term preservation objectives.

The document however does constitute a fundamental starting point to allow relevant results from the described standards and procedure to be identified, further analyzed and utilized when feasible to favour the set-up of the European LTDP Framework. This document was produced in the framework of the STFC support contract to ESA on LTDP and constitutes deliverable D3.2 of Work Package 1: provision of management and high level expertise support.

## Survey methodology and legend

The survey has been based, in addition to experts’ consultation, on web search and inspection of several key standards accrediting and developing organisations listed below. Standards and procedure from these organisation were then inspected and ranked according the criteria specified in section 2 of this document.

### Standards Accrediting Organizations

#### International Organization for Standardization (ISO)

URL : <http://www.iso.ch>

ISO is a non-governmental worldwide federation of national standards bodies who's mission is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity. ISO's work results in international agreements that are published as International Standards. By the end of 2002, ISO's work has resulted in over 13,700 International Standards and standards-type documents.

#### International Telecommunications Union (ITU)

URL: <http://www.itu.int>

ITU is the leading [United Nations](http://www.unsystem.org/) agency for information and communication technology issues, and the global focal point for governments and the private sector in developing networks and services. For nearly 145 years, ITU has coordinated the shared global use of the radio spectrum, promoted international cooperation in assigning satellite orbits, worked to improve telecommunication infrastructure in the developing world, established the worldwide standards that foster seamless interconnection of a vast range of communications systems and addressed the global challenges of our times, such as mitigating climate change and strengthening cyber security.

#### World Wide Web Consortium (W3C)

URL: <http://www.w3.org>

The World Wide Web Consortium (W3C) is an international community where [Member organizations](http://www.w3.org/Consortium/Member/List), a full-time [staff](http://www.w3.org/People/), and the public work together to develop [Web standards](http://www.w3.org/standards/). Led by Web inventor [Tim Berners-Lee](http://www.w3.org/People/Berners-Lee/) and CEO [Jeffrey Jaffe](http://www.w3.org/People/Jeff/), W3C's mission is to lead the Web to its full potential.W3C develops technical specifications and guidelines through a process designed to maximize consensus about the content of a technical report, to ensure high technical and editorial quality, and to earn endorsement by W3C and the broader community.

#### Organization for the Advancement of Structured Information Standards (OASIS)

URL: <http://www.oasis-open.org/home/index.php>

OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society. The consortium produces more Web services standards than any other organization along with standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. Founded in 1993, OASIS has more than 5,000 participants representing over 600 organizations and individual members in 100 countries.

OASIS is distinguished by its transparent governance and operating procedures. Members themselves set the OASIS technical agenda, using a lightweight process expressly designed to promote industry consensus and unite disparate efforts. Completed work is ratified by open ballot. Governance is accountable and unrestricted. Officers of both the OASIS Board of Directors and Technical Advisory Board are chosen by democratic election to serve two-year terms. Consortium leadership is based on individual merit and is not tied to financial contribution, corporate standing, or special appointment.

#### National Information Standards Organization (NISO)

URL: <http://www.niso.org>

NISO, the National Information Standards Organization, a non-profit association accredited by the American National Standards Institute ([ANSI](http://www.ansi.org/)), identifies, develops, maintains, and publishes technical standards to manage information in our changing and ever-more digital environment. NISO standards apply both traditional and new technologies to the full range of information-related needs, including retrieval, re-purposing, storage, metadata, and preservation.

Founded in 1939, incorporated as a not-for-profit education association in 1983, and assuming its current name the following year, NISO draws its support from the communities it serves. The leaders of over 70 organizations in the fields of publishing, libraries, IT, and media serve as its voting members. Hundreds of experts and practitioners serve on NISO working groups, committees, and as officers of the association.

#### The Consultative Committee for Space Data Systems (CCSDS)

URL: <http://public.ccsds.org/default.aspx>

The Consultative Committee for Space Data Systems (CCSDS) was formed in 1982 by the major space agencies of the world to provide a forum for discussion of common problems in the development and operation of space data systems.  It is currently composed of ten member agencies, twenty-two observer agencies, and over 100 industrial associates.

Since its establishment, it has been actively developing Recommendations for data- and information-systems standards to a) reduce the cost to the various agencies of performing common data functions by eliminating unjustified project-unique design and development, and b) promote interoperability and cross support among cooperating space agencies to reduce operations costs by sharing facilities.

#### Open Geospatial Consortium (OGC)

URL: <http://www.opengeospatial.org/>

The Open Geospatial Consortium, Inc (OGC) is an international industry consortium of **401** companies, government agencies and universities participating in a consensus process to develop publicly available interface standards. [OpenGIS® Standards](http://www.opengeospatial.org/standards/) support [interoperable](http://www.opengeospatial.org/resource/faq/openness/#10) solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT. The standards empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications.

#### The European Committee for Standardization

URL: <http://www.cen.eu/>

The European Committee for Standardization (CEN) is a business facilitator in Europe, removing trade barriers for European industry and consumers. Its mission is to foster the European economy in global trading, the welfare of European citizens and the environment. Through its services it provides a platform for the development of European Standards and other technical specifications.

#### European Committee for Electrotechnical Standardisation

URL: <http://www.cenelec.eu/>

CENELEC, the European Committee for Electrotechnical Standardization, was created in 1973 as a result of the merger of two previous European organizations: CENELCOM and CENEL. Nowadays, CENELEC is a non-profit technical organization set up under Belgian law and composed of the National Electrotechnical Committees of 31 European countries. In addition, 11 National Committees from neighbouring countries are participating in CENELEC work with an Affiliate status.

#### European Telecommunications Standards Institute

URL: <http://www.etsi.org/>

The European Telecommunications Standards Institute (ETSI) produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and internet technologies.

#### European Cooperation for Space Standardisation

URL: <http://ecss.nl/>

The European Cooperation for Space Standardization (ECSS) is an initiative established to develop a coherent, single set of user-friendly standards for use in all European space activities. Until now there is no uniform system of space standards and requirements in Europe.

#### NATO STANAG

URL: <http://www.nato.int/cps/en/natolive/stanag.htm>

NATO Standardization Agreements for procedures and systems and equipment components, known as STANAGs, are developed and promulgated by the NATO Standardization Agency in conjunction with the Conference of National Armaments Directors and other authorities concerned.

#### Committee on Earth Observation Satellites

URL: <http://www.ceos.org/>

Established in 1984, the Committee on Earth Observation Satellites (CEOS) coordinates civil space-borne observations of the Earth.  Participating agencies strive to enhance international coordination and data exchange and to optimize societal benefit. Currently 28 space agencies along with 20 other national and international organizations participate in CEOS planning and activities

#### Web Service Interoperability Organization

URL: <http://www.ws-i.org/>

The Web Services Interoperability Organization (WS-I) is an open industry organization chartered to establish Best Practices for Web services interoperability, for selected groups of Web services standards, across platforms, operating systems and programming languages

#### World Meteorological Society

URL: <http://www.wmo.int/>

The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behavior of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.

#### IEEE

URL: <http://www.ieee.org/>

IEEE is the world’s largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through IEEE's highly cited publications, conferences, technology standards, and professional and educational activities.

#### Simulation Interiperability Standards Organization

URL: <http://www.sisostds.org/>

The Simulation Interoperability Standards Organization (SISO) is an international organization dedicated to the promotion of modelling and simulation interoperability and reuse for the benefit of a broad range of M&S communities.

#### Object Management Group

URL: <http://www.omg.org/>

OMG’s mission is to develop, with a worldwide membership, enterprise integration standards that provide real-world value. OMG is also dedicated to promoting business technology and optimization for innovation through its Business Ecology® Initiative (BEI) program and associated Communities of Practice.

#### United States Defence Standard

URL: <http://www.dsp.dla.mil/APP_UIL/displayPage.aspx?action=content&contentid=66>

A United States Defence Standard, often called a military standard, "MIL-STD", or "MIL-SPEC", issued to help achieve standardization objectives by the U.S. Department of Defence. Standardization is beneficial in achieving interoperability; ensuring products meet certain requirements, commonality, reliability, total cost of ownership, compatibility with logistics systems, and similar defence-related objectives.

## Organizations and Initiatives contributing to the development of Standards

#### Online Computer Library Center (OCLC)

URL: <http://www.oclc.org/>

Founded in 1967, OCLC Online Computer Library Center is a nonprofit, membership, computer library service and research organization dedicated to the public purposes of furthering access to the world's information and reducing the rate of rise of library costs. More than 72,000 libraries in 171 countries and territories around the world use OCLC services to locate, acquire, catalog, lend and preserve library materials

#### European Space Agency (ESA)

URL: <http://www.unidata.ucar.edu/>

Unidata, funded primarily by the National Science Foundation, is one of eight programs in the University Corporation for Atmospheric Research (UCAR) Office of Programs (UOP). UOP units create, conduct, and coordinate projects that strengthen education and research in the atmospheric, oceanic and earth sciences.

Unidata is a diverse community of over 160 institutions vested in the common goal of sharing data, and tools to access and visualizes that data. For 20 years Unidata has been providing data, tools, and support to enhance Earth-system education and research. In an era of increasing data complexity, accessibility, and multidisciplinary integration, Unidata provides a rich set of services, standards and tools.

#### The British Library

URL: <http://www.bl.uk/>

The British Library contributes to the development of national and international standards, including the [MARC21](http://www.bl.uk/bibliographic/nbsils.html) format, and contributes to EC initiatives and other research projects. The complete [UKMARC Manual](http://www.bl.uk/ukmarc/index.html) and the [UKMARC Exchange Record Format](http://www.bl.uk/ukmarc/marcexchange.html) are also available online.

#### Open Archive Initiative

URL: <http://www.openarchives.org/>

The Open Archives Initiative develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. OAI has its roots in the open access and institutional repository movements. Continued support of this work remains a cornerstone of the Open Archives program. Over time, however, the work of OAI has expanded to promote broad access to digital resources for eScholarship, eLearning, and eScience.

#### American Library Association (ALA)

URL: <http://www.ala.org/>

Founded on October 6, 1876 during the Centennial Exposition in Philadelphia, the American Library Association was created to provide leadership for the development, promotion, and improvement of library and information services and the profession of librarianship in order to enhance learning and ensure access to information for all. The current strategic plan, ALA Ahead to 2010, calls for continued work in the areas of Advocacy and Value of the Profession, Education, Public Policy and Standards, Building the Profession, Membership and Organizational Excellence.

#### Chartered Institute of Library and Information Professionals (CILIP)

URL: <http://www.cilip.org.uk/>

CILIP maintains, monitors and promotes standards of excellence in the creation, management, exploitation and sharing of information and knowledge resources. CILIP enables its members to achieve and maintain the highest professional standards in delivering an information service.

#### The Internet Engineering Task Force (IETF)

URL: <http://www.ietf.org/>

The Internet Engineering Task Force (IETF) is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet

#### Library of Congress Network Development and MARC standards Office

URL: <http://www.loc.gov/standards/>

The Network Development and MARC Standards Office is a center for library and information network standards and planning in the [Library of Congress](http://www.loc.gov/). Established in 1976 to provide focus for networking activities in the Library of Congress, the office was expanded in 1984 to include MARC standards responsibilities. Thus, staff are involved in many facets of network development including:

* standards, which are basic to efficient, long-term interchange with other systems such as those for [Machine-Readable Cataloging (MARC)](http://www.loc.gov/marc/index.html) and [Z39.50](http://www.loc.gov/z3950/) information retrieval protocols;
* planning, which involves working out detailed models and specifications with other institutions and with internal Library of Congress units; and
* coordinating and testing implementation that takes the standards development and planning to fulfillment through the completion of operational networking systems.

#### Treasury Board of Canada

URL: <http://www.tbs-sct.gc.ca/>

The Treasury Board (TB), a federal Cabinet committee of the Canadian government, is responsible for accountability and ethics, financial, personnel and administrative management, comptrollership, and approving regulations and most Orders-in-Council.

The Treasury Board has an administrative arm known as the TB Secretariat. It is tasked to build effective policies and management frameworks, and empower its federal partners to manage their resources efficiently and effectively, and to report results in a timely and informative manner.

To provide a policy framework and direction for federal departments and agencies to manage geospatial data, the Treasury Board has published the [TB Standard for Geospatial Data](http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16553&section=text).

#### Library and Archives Canada (LAC)

URL: http://www.collectionscanada.gc.ca/index-e.html

Library and Archives Canada preserves and makes accessible the documentary heritage of Canada. It also serves as the continuing memory of the Government of Canada and its institutions. This heritage includes publications, archival records, sound and audio-visual materials, photographs, artworks, and electronic documents. Its mandates include:

* to preserve the documentary heritage of Canada for the benefit of present and future generations;
* to be a source of enduring knowledge accessible to all, contributing to the cultural, social and economic advancement of Canada as a free and democratic society;
* to facilitate in Canada co-operation among communities involved in the acquisition, preservation and diffusion of knowledge;
* to serve as the continuing memory of the Government of Canada and its institutions.

#### Natural Resources Canada, GeoConnections Program

URL: http://geoconnections.nrcan.gc.ca/home

The **Canadian Geospatial Data Infrastructure (CGDI)** is an initiative of the Canadian government to respond to the challenge of providing Canadians with better access to digital geospatial information, so that social and economic decisions are taken with the benefit of the best, most comprehensive information. The CGDI is facilitated by the **GeoConnections** program in Natural Resources Canada (NRCan).

The **GeoConnections** program mandate is to build the CGDI, in partnership with federal, provincial and territorial governments, and its academic and private sector partners. The goal of the CGDI is to ensure fast, consistent and harmonized access to geospatial data and services for all Canadians.

To develop and adopt common international standards, GeoConnections and the CGDI support and rely on the work of the [**International Organization for Standardization (ISO)in Geneva, Switzerland**](http://www.iso.org/iso/home.htm) , and the [Open Geospatial Consortium (OGC)](http://geoconnections.nrcan.gc.ca/984#OGC) and the [Federal Geographic Data Committee (FGDC)](http://geoconnections.nrcan.gc.ca/984#FGDC) in the USA.

#### Digital Library Federation (DLF)

URL: <http://www.diglib.org/>

The DLF identifies documents, endorses, and promotes adoption of standards and best practices that support the effective acquisition, interchange, persistence, and assessment of digital library collections and services.

#### Natural Environment Research Council (NERC)

URL: <http://www.nerc.ac.uk/>

NERC is the UK's main agency for funding and managing research, training and knowledge exchange in the environmental sciences. NERC coordinates some of the world's most exciting research projects, tackling major issues such as climate change, environmental influences on human health, the genetic make-up of life on earth, and much more.

Working internationally, NERC has bases in the most hostile parts of the planet. It runs a fleet of research ships and aircraft and invests in satellite technology to monitor gradual environmental change on a global scale. It provides knowledge, forewarning and solutions to the key global environmental challenges facing society.

#### Open Grid Forum (OGF)

URL: <http://www.ogf.org/>

OGF  is an open community committed to driving the rapid evolution and adoption of applied distributed computing. Applied Distributed Computing is critical to developing new, innovative and scalable applications and infrastructures that are essential to productivity in the enterprise and within the science community. OGF accomplishes its work through open forums that build the community, explore trends, share best practices and consolidate these best practices into standards.

#### European Parliament (EU)

URL: <http://www.europarl.europa.eu/>

The European Parliament is the elected body which represents the people of the Member State of the European Union. The European Parliament drafts legislation for Member States of the European Union and influence all areas of the lives of citizens. This includes education, culture, health, transport, consumer issues and the environment.

#### NASA

URL: <http://standards.nasa.gov/>

The NASA Technical Standards Program (NTSP) is sponsored by the Office of the NASA Chief Engineer. The primary mission is the enhancement of NASA's engineering capabilities by providing technical standards required to meet the needs of the Agency. The NTSP provides these standards to the Agency by doing the following:

* supporting the development of non-Government standards
* developing NASA technical standards where needed
* providing NASA-wide access to standards developed by national and international organizations.
* providing single point access to technical information, tools, and best practices needed to achieve technical excellence and further mission success.

#### Federal Geographic Data Committee

URL: <http://www.fgdc.gov/>

The Federal Geographic Data Committee (FGDC) is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. This nationwide data publishing effort is known as the [National Spatial Data Infrastructure](http://www.fgdc.gov/nsdi/nsdi.html) (NSDI). The NSDI is a physical, organizational, and virtual network designed to enable the development and sharing of this nation's digital geographic information resources. FGDC activities are administered through the FGDC Secretariat, hosted by the U.S. Geological Survey.

#### International Council on Archives

URL: <http://www.ica.org/>

Archives constitute the memory of nations and of societies, shape their identity, and are a cornerstone of the information society. By providing evidence of human actions and transactions, archives support administration and underlie the rights of individuals, organizations and states. By guaranteeing citizens’ rights of access to official information and to knowledge of their history, archives are fundamental to democracy, accountability and good governance.

The mission of ICA is to promote the preservation and use of archives around the world. In pursuing this mission, ICA works for the protection and enhancement of the memory of the world and to improve communication while respecting cultural diversity

This resulted in a long list which contained somewhere in the region of 300 – 500 standards. These projects were then inspected for relevance to the LTDP project. The majority of initiatives were rejected on ground that their key outputs were not appropriate for the long tern preservation of Earth observation data sets. The most relevant have been included in a short list and summarized in this working document for closer perusal.

#### Ground Segment Coordination Body (GSCB)

URL: <http://earth.esa.int/gscb/>

The Global Monitoring for Environment and Security (GMES) programme is based on a fleet of European Earth observation satellites, built and operated by ESA, member states and commercial entities. GMES will also offer data from non-European satellites.

In order to provide operational and sustainable user services and to avoid unnecessary duplication in technologies, the challenge is to harmonise the various approaches to the ground segments of the different satellites and to involve the users. To begin this harmonisation process, a **Ground Segment Coordination Body (GSCB)** was created to adopt a common, coordinated and cost-effective approach that responds to the needs of Earth observation users.

Although GSCB is not a standardisation body, this coordinated approach has made a significant contribution towards the definition of interoperability and interaccessibility standards. The Body has to cope with the challenge of different national programmes and of bringing together systems already in operation with others still in planning.

#### CompuServe

#### URL: <http://webcenters.netscape.compuserve.com/menu/>

#### CompuServe, (CompuServe Information Service, also known by its acronym CIS), was the first major commercial online service in the United States. It dominated the field during the 1980s and remained a major player through the mid-1990s, when it was sidelined by the rise of information services such as AOL that charged monthly subscriptions rather than hourly rates. Since the purchase of CompuServe's Information Services Division by AOL, the CompuServe Information Service has operated as an online service provider and an Internet service provider. The original CompuServe Information Service, later rebranded as CompuServe Classic, was shut down July 1, 2009. The newer version of the service, CompuServe 2000, continues to operateThe Graphics Interchange Format (GIF) is a [bitmap](http://en.wikipedia.org/wiki/Raster_graphics) [image format](http://en.wikipedia.org/wiki/Image_file_formats) that was introduced by [CompuServe](http://en.wikipedia.org/wiki/CompuServe) in 1987 and has since come into widespread usage on the [World Wide Web](http://en.wikipedia.org/wiki/World_Wide_Web) due to its wide support and portability.

#### United States Geological Survey

#### URL: <http://www.usgs.gov/>

#### The USGS is a science organization that provides impartial information on the health of the United States ecosystems and environment, the natural hazards that threaten them, the natural resources they are reliant upon , the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information

#### Distributed Mangements Task Force (DMTF)

URL: <http://www.dmtf.org/>

The group spans the industry with 160 member companies and organizations, and more than 4,000 active participants crossing 43 countries. The [DMTF board of directors](http://www.dmtf.org/about/list) is led by 17 innovative, industry-leading technology companies. They include Advanced Micro Devices (AMD); Broadcom Corporation; CA, Inc.; Cisco; Citrix Systems, Inc.; EMC; Fujitsu; HP; Huawei; IBM; Intel Corporation; Microsoft Corporation; NetApp; Oracle; RedHat; SunGard and VMware, Inc.

With this deep and broad reach, DMTF creates standards that enable interoperable IT management. DMTF management standards are critical to enabling management interoperability among multi-vendor systems, tools and solutions within the enterprise.

#### Documentation Standards Working Group(DSWG)

URL: <http://network.icom.museum/cidoc/working-groups/documentation-standards/>

The Documentation Standards Working Group has developed a Statement of principles of museum documentation. [This document](http://network.icom.museum/fileadmin/user_upload/minisites/cidoc/DocStandards/principles6_2.pdf) has now been finalized, and was adopted at the 2012 CIDOC AGM in Helsinki.

The working group aims to act as a point of liaison with relevant bodies and initiatives which develop standards of relevance to museum documentation. Examples of such bodies are the [Text Encoding Initiative](http://www.tei-c.org/), [CCO](http://www.vraweb.org/ccoweb/) and [MICHAEL](http://www.michael-culture.org/en/home). Members of the group are working on a [mapping of TEI to the CIDOC CRM](http://www.edd.uio.no/artiklar/tekstkoding/tei_crm_mapping.html).

In the area of terminology control, the group plans to review technical frameworks such as the updated thesaurus standards from [NISO](http://www.niso.org/committees/MT-info.html) and the British Standards Institution, [SKOS](http://www.w3.org/2004/02/skos/) and [Topic Maps](http://www.topicmaps.org/). In addition, it is interested in specific controlled terminology resources of relevance to museums, such as ICONCLASS.

#### SeaDataNet

URL: <http://www.seadatanet.org/Standards-Software>

Use of common vocabularies in all metadatabases and data formats is an important prerequisite towards consistency and interoperability. Common vocabularies consist of lists of standardised terms that cover a broad spectrum of disciplines of relevance to the oceanographic and wider community. Using standardised sets of terms solves the problem of ambiguities associated with data markup and also enables records to be interpreted by computers. This opens up data sets to a whole world of possibilities for computer aided manipulation, distribution and long term reuse.

Therefore common vocabularies were set-up and populated by SeaDataNet. Vocabulary technical governance is based on the NERC DataGrid (NDG) Vocabulary Server Web Service API. Non-programmatic access is provided to end-users by a client interface for searching, browsing and CSV-format export of selected entries. The API is compliant to WS Basis Profile 1.1, which is adopted as standard for all Web Services in SeaDataNet. The Vocabulary Server is populated with lists describing a wide range of entities relevant to marine metadata and data such as parameters, sea area names, platform classes, instrument types, and so on.

#### DLR

URL: [www.**dlr**.de/en/](http://www.dlr.de/en/)

The research and development work conducted by DLR in the field of Earth observation covers virtually the entire range of satellite-based Earth observation topics, from innovation in sensor systems and evaluation of data to the preparation and development of new missions, their ground operations and data processing for applications. Using the wide range of expertise at its disposal, DLR works closely with industry, academia, and public sector users to make the entire range of applications of satellite-based remote sensing available for the benefit of society.

#### CNES

URL: <http://www.cnes.fr>

Founded in 1961, the Centre National d’Etudes Spatiales (CNES) is the government agency responsible for shaping and implementing France’s space policy in Europe. Its task is to invent the space systems of the future, bring space technologies to maturity and guarantee France’s independent access to space. CNES is a pivotal player in Europe’s space programme, and a major source of initiatives and proposals that aim to maintain France and Europe’s competitive edge.

#### Laboratory for Applied Ontology

URL: <http://www.loa.istc.cnr.it/>

The Laboratory for Applied Ontology (LOA) performs basic and applied research on the ontological foundations of conceptual modeling, exploring the role of ontologies and ontology management in different fields, such as: knowledge representation, knowledge engineering, database design, information retrieval, natural language processing, and the semantic web. The group is characterized by a strong interdisciplinary approach that combines Computer Science, Philosophy and Linguistics, and relies on logic as a unifying paradigm. On the application side, special emphasis is given to the use of ontologies for e-government, enterprise modeling and integration, natural language processing, and the Semantic Web.

# Relevant STANDARDs

In this section standards and procedures have been individually assessed for relevance to the eight main LTDP “themes” as stated in the ESA LTDP Guidelines document. Within this “Guidelines” document “guiding principle” and a set of “key guidelines” that should be applied to guarantee the preservation of EO space data in the long term ensuring accessibility and usability has been defined. The eight themes are as follows:

Theme 1: Preserved Data Set Composition

Theme 2: Archive Operation and organization

Theme 3: Archive Security

Theme 4: Data Ingestion

Theme 5: Archive Maintenance

Theme 6: Data Access and Interoperability

Theme 7: Data Exploitation and Re-processing

Theme 8: Data Appraisal and Purge Prevention

3

Level 3 represents a high degree of relevance to the LTDP theme. Although it may not fully support all described aspects of the theme it none the less has produced a standard or procedure which may be readily exploited by majority of EO data sets.

2

Level 2 represent a good degree of relevance to the LTDP theme. They may have received a lower grade if the standard may need to be adapted, is relevant to only some datasets or preservation scenarios and architectures.

1

Level 1 represents a standard or procedure which has some potential relevance to an LTDP theme but would only be relevant to a small proportion of datasets or specialized preservation scenarios.

## Authentication

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community Framework for Electronic Signatures. | | | | | | | | |
| **Description** | | | | | | | | |
| The Community Framework for Electronic Signatures is the European legislation ensuring the ease of use, and legal recognition of electronic signatures, on the same footing as a handwritten one. The legislation defines the qualities required for a legally admissible electronic signature, and defines the requirements for a qualified certificate. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| [European Parliament](http://www.dcc.ac.uk/resources/standards/diffuse/body?sponsor_id=97)  European Parliament  [Council of the European Union](http://www.dcc.ac.uk/resources/standards/diffuse/body?sponsor_id=98) | | | | | | | | |
| **Version** | | | | | | | | |
| [13 December 1999 - Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community Framework for Electronic Signatures.](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:013:0012:0020:EN:PDF) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for *Electronic Signatures*](http://en.wikipedia.org/wiki/Electronic_signatures) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  |  |  |  |

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| OASIS Digital Signature Service | | | | | | | | |
| **Description** | | | | | | | | |
| The Digital Signature Services (DSS) specifications describe two XML-based request/response protocols, a signing protocol and a verifying protocol. Through these protocols a client can send documents to a server and receive back a signature on the documents; or send documents and a signature to a server, and receive back an answer on whether the signature verifies the documents. The DSS Core specifications provide the basic protocols and elements which are adapted to support specific use cases in the DSS profiles. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: <http://docs.oasis-open.org/dss/v1.0/oasis-dss-core-spec-v1.0-os.html> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=dss> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ISO/IEC 9594-8: Information Technology - Open Systems Interconnection - The Directory: Public-key and Attribute Certificate Frameworks | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/IEC 9594-8 provides a set of 3 frameworks for authentication and secure communication, to be used within a defined security policy. These are:   * Attribute Certificates, including the definition of the information objects for Privilege Management Infrastructure; * Authentication services, including format, creation and storage in the Directory and use of authentication information by applications. Simple authentication (password protected) and strong authentication (encrypted) are described.   The Directory makes use of both Public-key and Attribute Certificates and provides a framework for their use. Extensible specifications and a set of standard extensions schema are provided for: issuing, managing, using and revoking these certificates. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO, ITU | | | | | | | | |
| **Version** | | | | | | | | |
| [2005 - ISO/IEC 9594-8: Information Technology - Open Systems Interconnection - The Directory: Public-key and Attribute Certificate Frameworks](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43793) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for *X.509* (also published as ISO/IEC 9594-8)](http://en.wikipedia.org/wiki/X.509)Alternative current version of ISO/IEC 9594-8  [Wikipedia entry on *Privilege Management Infrastructure*](http://en.wikipedia.org/wiki/Privilege_Management_Infrastructure)Discusses ISO 9594-8 (ITU-T Recommendation X.509)  [X500Standard.com](http://www.x500standard.com/index.php)The website of the X.500 Directory standard explains how the whole X.500 family of standards work together. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  |  |  |  |

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| Security Assertion MarkUP Language | | | | | | | | |
| **Description** | | | | | | | | |
| The Security Assertion Markup Language (SAML), developed by the Security Services Technical Committee of OASIS, is an XML-based framework for communicating user authentication, entitlement, and attribute information. As its name suggests, SAML allows business entities to make assertions regarding the identity, attributes, and entitlements of a subject (an entity that is often a human user) to other entities, such as a partner company or another enterprise application. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version SAML 2.0 : <http://saml.xml.org/saml-specifications> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://saml.xml.org/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  |  |  |  |

## 

## Digital Document Preservation Standards

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ISO/TR 18492: Long-Term Preservation of Electronic Document-Based Information | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TR 18492 gives guidance to digital repositories on the maintenance of, access to, and the authenticity of, electronic documents, in the light of the likelihood of computer hardware and software obsolescence. It applies to any digital documents whose useful life is likely to be longer than the hardware and software used to create access and maintain them.  The technical report provides guidance on best practice and a framework for developing a long-term digital preservation strategy, which will ensure access and authenticity over the long term. These include:   * Goals of a preservation strategy * Required elements of a preservation strategy: media renewal, metadata and migration * Development of a preservation strategy: policy, quality control, security and environmental control and monitoring. * Information on selected national electronic records preservation programmes * A bibliography   The report does not cover the creation, capture and classification of digital documents. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version : [2005 - ISO/TR 18492: Long-Term Preservation of Electronic Document-Based Information](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38716) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 2 |  |  |
| This standard has relevance to documents which support reuse of data | | | | | | | | |

## File Formats and Description Languages

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| Standard Archive Format for Europe | | | | | | | | |
| **Description** | | | | | | | | |
| The SAFE (Standard Archive Format for Europe) has been designed to act as a common format for archiving and conveying data within ESA Earth Observation archiving facilities.  SAFE benefits from the experience gathered while developing standards related to data formats. SAFE intends to resolve the major challenges coming from the packaging and the long-term preservation of Earth Observation data. Special attention has been taken to ensure that SAFE conforms to the [ISO 14721:2003 OAIS (Open Archival Information System) reference model](http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=24683&ICS1=49&ICS2=140&ICS3) and related standards such as the [CCSDS/ISO XFDU (XML Formatted Data Units) packaging format](http://sindbad.gsfc.nasa.gov/xfdu/).  Although the primary goal of SAFE, in the framework of the HARM project, is to handle EO data with processing levels close to the usually called "level 0", no limitation exists regarding the packaging of higher level products as well as other technical and scientific information. Actually, experience has demonstrated that packaging and archiving higher processing levels or auxiliary data in a common format may be effective in many situations. SAFE embodies this concept by offering a single framework for packaging a large variety of information. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ESA | | | | | | | | |
| **Version** | | | | | | | | |
| **Volumes 1** and **2** of the **SAFE Control Books** define the **SAFE Core Specifications** and the **Recommendation for Specialisations**.  URL: <http://earth.esa.int/SAFE/specifications.html> | | | | | | | | |
| **Further Information** | | | | | | | | |
| URL: <http://earth.esa.int/SAFE/index.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NetCDF (network Common Data Form) | | | | | | | | |
| **Description** | | | | | | | | |
| NetCDF (network Common Data Form) is a set of interfaces for array-oriented data access and a freely-distributed collection of data access libraries for C, Fortran, C++, Java, and other languages. The netCDF libraries support a machine-independent format for representing scientific data. Together, the interfaces, libraries, and format support the creation, access, and sharing of scientific data.  NetCDF data is:   * Self-Describing. A netCDF file includes information about the data it contains. * Portable. A netCDF file can be accessed by computers with different ways of storing integers, characters, and floating-point numbers. * Scalable. A small subset of a large dataset may be accessed efficiently. * Appendable. Data may be appended to a properly structured netCDF file without copying the dataset or redefining its structure. * Sharable. One writer and multiple readers may simultaneously access the same netCDF file. * Archivable. Access to all earlier forms of netCDF data will be supported by current and future versions of the software. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Unidata the netCDF software was developed by Glenn Davis, Russ Rew, Ed Hartnett, John Caron, Steve Emmerson, and Harvey Davies at the Unidata Program Center in Boulder, Colorado, with contributions from many other netCDF users. | | | | | | | | |
| **Version** | | | | | | | | |
| Most recent version is NetCDF 4 | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.unidata.ucar.edu/software/netcdf/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| NetCDF may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| Open document format for office applications (OpenDocument) | | | | | | | | |
| **Description** | | | | | | | | |
| OpenDocument is a non-proprietary file format standard for office documents. This open format aims to enable exchange of office documents without problems relating to software compatibility or vendor lock-in.  OpenDocument (ODF) defines three XML schemas which can be used together to describe and package most formats of office documents; including text, charts, graphics and spreadsheets. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO and OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| v1.2, ISO/IEC 26300:  Current version: <http://docs.oasisopen.org/office/v1.2/OpenDocument-v1.2.pdf> | | | | | | | | |
| **Further Information** | | | | | | | | |
| [OpenDocument v1.1 Relax-NG Schema](http://docs.oasis-open.org/office/v1.1/OS/OpenDocument-schema-v1.1.rng)Extracted from chapter 1 to 16 of the specification.  [OpenDocument v1.1 Manifest Relax-NG Schema](http://docs.oasis-open.org/office/v1.1/OS/OpenDocument-manifest-schema-v1.1.rng) Extracted from chapter 17 of the specification.  [OpenDocument v1.1 Strict Relax-NG Schema](http://docs.oasis-open.org/office/v1.1/OS/OpenDocument-strict-schema-v1.1.rng)Extracted from appendix A of the specification.  [Wikipedia entry for *OpenDocument*](http://www.dcc.ac.uk/resources/standards/diffuse/show?standard_id=111&sort=type) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| This format may be useful for the preservation of documents which support data reuse | | | | | | | | |

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| DocBook | | | | | | | | |
| **Description** | | | | | | | | |
| DocBook is a schema (available in several languages including RELAX NG, SGML and XML DTDs, and W3C XML Schema) maintained by the DocBook Technical Committee of OASIS. It is particularly well suited to books and papers about computer hardware and software (though it is by no means limited to these applications).  Because it is a large and robust schema, and because its main structures correspond to the general notion of what constitutes a “book,” DocBook has been adopted by a large and growing community of authors writing books of all kinds. DocBook is supported “out of the box” by a number of commercial tools, and there is rapidly expanding support for it in a number of free software environments. These features have combined to make DocBook a generally easy to understand, widely useful, and very popular schema. Dozens of organizations are using DocBook for millions of pages of documentation, in various print and online formats, worldwide. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| [DocBookv4.5](http://docbook.org/specs/wd-docbook-docbook-4.5.pdf) Public Review Draft [DocBook v4.4](http://www.docbook.org/specs/cd-docbook-docbook-4.4.pdf) Committee Draft [DocBook v4.3](http://www.docbook.org/specs/cd-docbook-docbook-4.3.pdf) Committee Draft [DocBook v4.2](http://www.docbook.org/specs/cs-docbook-docbook-4.2.pdf) Committee Specification  [DocBook v4.1](http://www.docbook.org/specs/cs-docbook-simple-1.1.pdf) Committee Specification | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=docbook> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| This format may be useful for the preservation of documents which support data reuse | | | | | | | | |

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| Portable Document Format (PDF) | | | | | | | | |
| **Description** | | | | | | | | |
| **PDF/A** is an [ISO](http://en.wikipedia.org/wiki/International_Organization_for_Standardization)-standardized version of the [Portable Document Format](http://en.wikipedia.org/wiki/Portable_Document_Format) (PDF) specialized for the [digital preservation](http://en.wikipedia.org/wiki/Digital_preservation) of [electronic documents](http://en.wikipedia.org/wiki/Electronic_document).  PDF/A differs from PDF by omitting features ill-suited to long-term archiving, such as [font](http://en.wikipedia.org/wiki/Font) linking (as opposed to [font embedding](http://en.wikipedia.org/wiki/Font_embedding)). (Similarly, the [PDF/X](http://en.wikipedia.org/wiki/PDF/X) [file format](http://en.wikipedia.org/wiki/File_format) is specially adapted to [digital printing](http://en.wikipedia.org/wiki/Digital_printing) and [graphic arts](http://en.wikipedia.org/wiki/Graphic_arts).)  The ISO requirements for PDF/A [file viewers](http://en.wikipedia.org/wiki/File_viewer) include [color management](http://en.wikipedia.org/wiki/Color_management) guidelines, support for [embedded fonts](http://en.wikipedia.org/wiki/Embedded_font), and a [user interface](http://en.wikipedia.org/wiki/User_interface) for reading embedded [annotations](http://en.wikipedia.org/wiki/Annotation). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| PDF/A-3 <http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=57229> | | | | | | | | |
| **Further Information** | | | | | | | | |
| [The PDF/A Competence Center](http://www.pdfa.org/)  [Wikipedia entry for *PDF/A*](http://en.wikipedia.org/wiki/PDF/A) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| This format may be useful for the preservation of documents which support data reuse | | | | | | | | |

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| NASA AMES | | | | | | | | |
| **Description** | | | | | | | | |
| The NASA Ames Format for Data Exchange, often referred to as NASA Ames Format, grew out of NASA aircraft campaigns and was first formalised at the Ames Research Centre, California, during the 1987 Stratosphere Troposphere Exchange Project (STEP), when uniform rules to record data were needed to facilitate the data exchange between the participants and allow shared use of a minimised amount of software to analyse and display different datasets. The issue was that the adopted data format should meet the following requirements:   * it had to be portable (readable on any machine by any programming language); * it had to be self-describing (that is, the data had to include an attachment containing all the information needed to read, understand and interpret them – thus ensuring the reader's autonomy); * it had to be readable by humans (to retain the benefit of its self-description!).   The first and third requirements implied the adoption of a text format (namely ASCII). The second condition was met by including in each data file a header containing the descriptive information (*metadata*).  Very well suited to field campaigns involving several teams that need to share their observations, the NASA Ames Format is not well adapted to very voluminous datasets. In this case, although less portable, a binary format is recommended. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Earth Science Division at NASA Ames Research Centre | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.3  <http://espoarchive.nasa.gov/archive/docs/formatspec.txt> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://badc.nerc.ac.uk/help/formats/NASA-Ames/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| NASA AMES may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| JCAMP - DX | | | | | | | | |
| **Description** | | | | | | | | |
| JCAMP-DX is a standard file form for exchange of infrared spectra and related chemical and physical information between spectrometer data systems of different manufacture, main-frame time-sharing systems, general purpose lab computers, and personal computers. It is compatible with all media: telephone, magnetic and optical disk, magnetic tape, and even the printed page (via optical reader). All data are stored as labeled fields of variable length using printable ASCII characters. A JCAMP-DX spectrum is a text file which can be viewed, corrected, and annotated with a text editor. The present focus is on infrared spectra, but JCAMP-DX can easily accommodate Raman, UV, NMR, mass, and other types of spectra, x-ray powder patterns, chromatograms, thermo grams, and other plots which require the capability of representing contours as well as peak position and intensity. JCAMP-DX also provides for combining adequate information about the sample and method of observation with its spectrum | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| International Union of Pure and Applied Chemistry (IUPAC) | | | | | | | | |
| **Version** | | | | | | | | |
| [JCAMP-DX for Infrared 4.24 (1988)](http://www.jcamp-dx.org/protocols.html#ir4.24)  [JCAMP-CS for chemical structure (1991)](http://www.jcamp-dx.org/protocols.html#cs)  [JCAMP-DX for NMR (1993)](http://www.jcamp-dx.org/protocols.html#nmr)  [JCAMP-DX for MS (1994)](http://www.jcamp-dx.org/protocols.html#ms)  [JCAMP-DX extension 5.01 (1999)........................>](http://www.jcamp-dx.org/protocols.html#5.01)  [JCAMP-DX for IMS (2001)](http://www.jcamp-dx.org/protocols.html#ims)  [NMR Pulse Sequence Definitions (2001)](http://www.jcamp-dx.org/protocols.html#nmrps) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.jcamp-dx.org/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| JCAMP-DX may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| HDF | | | | | | | | |
| **Description** | | | | | | | | |
| HDF5 is a data model, library, and file format for storing and managing data. It supports an unlimited variety of datatypes, and is designed for flexible and efficient I/O and for high volume and complex data. HDF5 is portable and is extensible, allowing applications to evolve in their use of HDF5. The HDF5 Technology suite includes tools and applications for managing, manipulating, viewing, and analyzing data in the HDF5 format. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| The HDF group | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.8.5  [http://hdfgroup.org/HDF5/doc/](http://www.hdfgroup.org/HDF5/doc/index.html) | | | | | | | | |
| **Further Information** | | | | | | | | |
| For more information on older versions tools and applications visit the HDF website below  http://www.hdfgroup.org/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| HDF may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| CDF | | | | | | | | |
| **Description** | | | | | | | | |
| The Common Data Format (CDF) is a self-describing data format for the storage and manipulation of scalar and multidimensional data in a platform- and discipline-independent fashion. When one first hears the term "Common Data Format" one intuitively thinks of data formats in the traditional (i.e. messy/convoluted storage of data on disk or tape) sense of the word. Although CDF has its own internal self describing format, it consists of more than just a data format. CDF is a scientific data management package (known as the "CDF Library") which allows programmers and application developers to manage and manipulate scalar, vector, and multi-dimensional data arrays. The irony of the term "FORMAT" is that the actual data format which CDF utilizes is completely transparent to the user and accessible through a consistent set of interface (known as the "CDF Interface") routines. Therefore, programmers are not burdened with performing low level I/O's to physically format and unformat the data file. This is all done for them automatically. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NASA | | | | | | | | |
| **Version** | | | | | | | | |
| Version: [V3.3.0](http://cdf.gsfc.nasa.gov/html/CDF_v330.html). | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://cdf.gsfc.nasa.gov/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| HDF may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| CEOS Superstructure format | | | | | | | | |
| **Description** | | | | | | | | |
| The Format Subgroup of the Committee on Earth Observation Satellites (CEOS) established the CEOS Superstructure Format[6] for Earth observation product delivery a number of years ago. It is widely used throughout the Earth observation community particularly for the distribution of SAR data. The format is based upon that developed for the Landsat mission. The aim of the CEOS Superstructure Format Usually referred to as simply the CEOS Format) is to minimise the effort needed to read and write data products from similar Earth observation sensors. This is achieved by establishing a standard for a family of formats, and then making further recommendations for specific sensor classes (for example, optical sensors and SAR sensors).  The CEOS Superstructure Format can be regarded as being semi-generic in that it consists of a generic component to define the superstructure of a file or set of files, combined with a partly generic fixed record format adjusted for particular types of data (e.g., SAR data or ERS Altimeter data). Unfortunately, due to the adoption of the format by a number of agencies (ESA, CCRS and NASDA in particular) and poor control by CEOS, the Format has developed a number of inconsistencies which has hindered the development of generic CEOS Format software. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CEOS | | | | | | | | |
| **Version** | | | | | | | | |
| Palsar  <http://www.palsar.ersdac.or.jp/e/guide/pdf/U_Guide_en.pdf>  ESA SAR.RAW format  <http://earth.esa.int/ers/ers_archive/00fee.html> | | | | | | | | |
| **Further Information** | | | | | | | | |
| The document below contains useful information on the CEOS superstructure format:  [Guidelines on Standard Formats and Data Description Languages](http://www.google.co.uk/url?sa=t&source=web&cd=1&ved=0CBUQFjAA&url=http%3A%2F%2Fwgiss.ceos.org%2Farchive%2Farchive.doc%2FFormat%2520Guidelines.doc&rct=j&q=ceos%20superstructure%20format&ei=qL97TNHfDtW6jAflws2XBg&usg=AFQjCNGHb9F_FYiWeqjIs05W9v0n32c9VA&sig2=jfpIqARgCBz9sDG1g-W05g) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| HDF may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| MPH/SPH/DHR data formats | | | | | | | | |
| **Description** | | | | | | | | |
| The MPH/SPH/DSR product formatis specifically used by ESA/ESRIN for ERS-1 and ERS-2 products. It is used for the Fast Delivery Products from the ground stations to the Processing and Archiving Facilities (PAFs) and to ESRIN, where it is archived in this format. This format also forms the current baseline for the Envisat-1 Ground Segment. The MPH/SPH/DSR format is generally not used for product distribution to end users, for this the CEOS Superstructure Format is used. Note, the format only specifies the structure of the data packaging; it is not concerned with the syntax or semantics of the individual data records. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ESA | | | | | | | | |
| **Version** | | | | | | | | |
| Envisat product specification  <http://earth.esa.int/pub/ESA_DOC/ENVISAT/Vol15_Sciamachy_3k.pdf> | | | | | | | | |
| **Further Information** | | | | | | | | |
| The document below contains useful information on the MPH/SPH/DHR  [Guidelines on Standard Formats and Data Description Languages](http://www.google.co.uk/url?sa=t&source=web&cd=1&ved=0CBUQFjAA&url=http%3A%2F%2Fwgiss.ceos.org%2Farchive%2Farchive.doc%2FFormat%2520Guidelines.doc&rct=j&q=ceos%20superstructure%20format&ei=qL97TNHfDtW6jAflws2XBg&usg=AFQjCNGHb9F_FYiWeqjIs05W9v0n32c9VA&sig2=jfpIqARgCBz9sDG1g-W05g) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| HDF may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| Spatial data Transfer standard | | | | | | | | |
| **Description** | | | | | | | | |
| The Spatial Data Transfer Standard, or SDTS, is a robust way of transferring earth-referenced spatial data between dissimilar computer systems with the potential for no information loss. It is a transfer standard that embraces the philosophy of self-contained transfers, i.e. spatial data attribute, georeferencing, data quality report, data dictionary, and other supporting metadata all included in the transfer. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ANSI | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| US Geological Survey | | | | | | | | |
| **Version** | | | | | | | | |
| ANSI NCITS 320-1998.  <http://mcmcweb.er.usgs.gov/sdts/standard.html> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://mcmcweb.er.usgs.gov/sdts/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| Spatial data transfer standards may be useful format for transfer under suitable scenarios | | | | | | | | |

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| Flexible image transport system (FITS) | | | | | | | | |
| **Description** | | | | | | | | |
| The Flexible Image Transport System (FITS) evolved out of the recognition that a standard format was needed for transferring astronomical data from one installation to another. The original form, or Basic FITS, was designed for the transfer of images and consisted of a binary array, usually multidimensional, preceded by an ASCII text header with information describing the organization and contents of the array. The FITS concept was later expanded to accommodate more complex data formats. A new format for image transfer, random groups, was defined in which the data would consist of a series of arrays, with each array accompanied by a set of associated parameters. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NASA with formats formally endorsed by the International Astronomical Union (IAU) | | | | | | | | |
| **Version** | | | | | | | | |
| Version :March 29, 1999  [FITS Standard document](http://archive.stsci.edu/fits/fits_standard/) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://fits.gsfc.nasa.gov/fits_documentation.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| FITS may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| Graphics Interchange Format (GIF) | | | | | | | | |
| **Description** | | | | | | | | |
| The Graphics Interchange Format defines a protocol intended for the on-line transmission and interchange of raster graphic data in a way that is independent of the hardware used in their creation or display.  The Graphics Interchange Format is defined in terms of blocks and sub-blocks which contain relevant parameters and data used in the reproduction of a graphic. A GIF Data Stream is a sequence of protocol blocks and sub-blocks representing a collection of graphics. In general, the graphics in a Data Stream are assumed to be related to some degree, and to share some control information; it is recommended that encoders attempt to group together related  graphics in order to minimize hardware changes during processing and to minimize control information overhead. For the same reason, unrelated graphics or graphics which require resetting hardware parameters should be encoded separately to the extent possible.  A Data Stream may originate locally, as when read from a file, or it may originate remotely, as when transmitted over a data communications line. The Format is defined with the assumption that an error-free Transport Level Protocol is used for communications; the Format makes no provisions for error-detection and error-correction.  The GIF Data Stream must be interpreted in context, that is, the application program must rely on information external to the Data Stream to invoke the decoder process. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Compuserve | | | | | | | | |
| **Version** | | | | | | | | |
| Version 89a  <http://www.w3.org/Graphics/GIF/spec-gif89a.txt> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.cis.udel.edu/~amer/CISC651/lzw.and.gif.explained.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| Gif may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| Binary Universal Form for the Representation of meteorological data (BUFR) | | | | | | | | |
| **Description** | | | | | | | | |
| BUFR was created, circa 1989, with the goal of replacing the WMO's dozens of character-based, position-driven meteorological codes, such as SYNOP (surface observations), TEMP (upper air soundings) and CLIMAT (monthly climatologically data). BUFR was designed to be portable, compact, and universal. Any kind of data can be represented, along with its specific spatial/temporal context and any other associated metadata. In the WMO terminology, BUFR belongs to the category of *table-driven code forms*, where the meaning of data elements is determined by referring to a set of tables that are kept and maintained separately from the message itself. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| WMO | | | | | | | | |
| **Version** | | | | | | | | |
| |  |  |  |  | | --- | --- | --- | --- | | FM 94  BUFR edition 4 | Current  version 14 | Version 13 |  | | **BUFR Table A** - Data category | [doc](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableA_Mar2010.doc) / [pdf](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableA_Mar2010.pdf) |  |  | | **BUFR/CREX Table B** - Classification of elements | [doc](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableB_Jun2010.doc) / [pdf](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableB_Jun2010.pdf) | [doc](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableB_112007.doc) / [pdf](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableB_112007.pdf) |  | | **BUFR Table C** - Data description operators | [doc](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableC_Mar2010.doc) / [pdf](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableC_Mar2010.pdf) |  |  | | **BUFR Table D** - List of common sequences | [doc](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableD_Jun2010.doc) / [pdf](http://www.wmo.int/pages/prog/www/WMOCodes/BUFRTableD_Jun2010.pdf) |  |  | | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.wmo.int/pages/prog/www/WMOCodes.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| BUFR may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| GEOTiff | | | | | | | | |
| **Description** | | | | | | | | |
| GeoTIFF is a public domain metadata standard which allows georeferencing information to be embedded within a TIFF file. The potential additional information includes map projection, coordinate systems, ellipsoids, datums, and everything else necessary to establish the exact spatial reference for the file. The GeoTIFF format is fully compliant with TIFF 6.0, so software incapable of reading and interpreting the specialized metadata will still be able to open a GeoTIFF format file. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| The GeoTIFF format is completely open, public domain, non-proprietary. It was produced by Dr. Niles Ritter, while at NASA-JPL (Jet Propulsion Laboratory) | | | | | | | | |
| **Version** | | | | | | | | |
| Revision 1.0  http://www.remotesensing.org/geotiff/spec/geotiffhome.html | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://trac.osgeo.org/geotiff/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| BUFR may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| GRIB | | | | | | | | |
| **Description** | | | | | | | | |
| **GRIB** (**GRIdded Binary**) is a mathematically concise data format commonly used in meteorology to store historical and forecast weather data. It is standardized by the World Meteorological Organization's Commission for Basic Systems, known under number GRIB FM 92-IX, described in WMO Manual on Codes No.306. Currently there are three versions of GRIB. Version 0 was used to a limited extent by projects such as TOGA, and is no longer in operational use. The first edition (current sub-version is 2) is used operationally worldwide by most meteorological centers, for Numerical Weather Prediction output (NWP). A newer generation has been introduced, known as GRIB second edition, and data is slowly changing over to this format. Some of the second-generation GRIB are used for derived product distributed in Eumetcast of Meteosat Second Generation. Another example is the NAM (North American Mesoscale) mode | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| World Meteorological Organization's Commission for Basic Systems | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2  http://www.wmo.int/pages/prog/www/DPS/FM92-GRIB2-11-2003.pdf | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.nco.ncep.noaa.gov/pmb/docs/on388/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| GRIB may be useful format which could be adopted by some suitable data sets | | | | | | | | |

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| Post Processing Format (PP) | | | | | | | | |
| **Description** | | | | | | | | |
| The **PP-format** (Post Processing Format) is a Met Office proprietary file format for meteorological data. Simulations of the weather are performed by the Met Office's Unified Model, which can be used for Numerical Weather Prediction or Climatology, and data is collected. The nature of this data is usually meteorological in nature and may include averaged data for things like global surface temperatures or accumulations of rainfall for locations inside the model, though the Unified Model is capable of outputting many sophisticated diagnostics to PP-format. These files are binary streams, structured in a proprietary file format which can then be processed and transformed into other, more portable, formats. The main reason for using such a format is to increase the rate at which data can be written from the model to disk which is a major consideration when running a simulation that must be timely and efficient. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Met Office (UK) | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 <http://ncas-cms.nerc.ac.uk/index.php/um-documentation/ncas-user-guides/35-pp-format-data> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://badc.nerc.ac.uk/help/formats/pp-format/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  | 2 |  |
| PP may be useful format to consider when reprocessing data | | | | | | | | |

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| EAST Specification | | | | | | | | |
| **Description** | | | | | | | | |
| EAST is a data description language that supplies complete and non-ambiguous information about the format of the described data. An intrinsic need when describing data is the need to specify the representation of the interchanged data, including the logical structure of the data and the physical representation of the individual data items. When allowing for the wide diversity of variables such as the operating systems and the machine representations for numeric’s, a full understanding of data can only be reached by using a rigorous notation/language that provides a complete, non-ambiguous logical and physical description. EAST is used for this purpose  This update to the original Data Description Language EAST Recommendation extends EAST ability to handle repeated data items where repetition is terminated by a marker. The previous specification allowed this only at the first level of data hierarchy. These updates allow it at any level in the data hierarchy. This document has been reconfirmed by the CCSDS management Council through March 2011. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS, ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Curent Version Nov. 2010: <http://public.ccsds.org/publications/archive/644x0b2.pdf> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://nssdc.gsfc.nasa.gov/nssdc_news/mar02/EAST.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| EAST is highly relevant for creating format descriptions | | | | | | | | |

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| Data Format Description Language | | | | | | | | |
| **Description** | | | | | | | | |
| DFDL is a language for describing data formats. A DFDL description allows data to be read from its native format and to be presented as an instance of an information set or indeed converted to the corresponding XML document. DFDL also allows data to be taken from an instance of an information set and written out to its native format.  DFDL achieves this by leveraging W3C XML Schema Definition Language (XSDL) 1.0. [XSDLV1] An XML Schema is written for the logical model of the data. The schema is augmented with special DFDL annotations. These annotations are used to describe the native representation of the data. This is an established approach that is already being used today in commercial systems such as IBM’s WebSphere Message Broker and Microsoft’s BizTalk flat file | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OGF | | | | | | | | |
| **Version** | | | | | | | | |
| Curent Version V1.0 : <http://www.ogf.org/Public_Comment_Docs/Documents/2010-03/draft-gwdrp-dfdl-core-v1.0.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| DFDL is highly relevant for creating format descriptions | | | | | | | | |

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| DRB | | | | | | | | |
| **Description** | | | | | | | | |
| The Data Request Broker - DRB API® is an Open Source Java application programming interface for reading, writing and processing heterogeneous data . DRB API® is a software abstraction layer that helps developers in programming applications independently from the way data are encoded within files. Indeed, DRB API® is based on a unified data model that makes the handling of supported data formats much easier | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| GAEL (proprietary) | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2-3-rc-2  [GAEL-P243-DOC-001-01-01\_DRB\_API\_handbook.pdf](http://www.gael.fr/drb/doc/GAEL-P243-DOC-001-01-01_DRB_API_handbook.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.gael.fr/drb/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| DFDL is highly relevant for creating format descriptions | | | | | | | | |

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| XIF | | | | | | | | |
| **Description** | | | | | | | | |
| The XML Internal Format (XIF) is a format that supports two historical CCSDS stantards : EAST and DEDSL - This format supplies complete and non-ambiguous information about the format of the described data as well as semantic information relative to the described data.  Thanks to an extension mechanism, the format is able to address different domains : e.g. Monitoring & Control or Satellite Data Base.  XIF is used as an exchange format between different tools, mainly the BEST suite that provides a graphical editor dedicated to XIF, a data simulator, a data interpreter, a data checker, an API to access the XIF itself and an API to read and write data according to the XIF description.  The BEST suite is available as a **free software** distributed under Eclipse Public License, version 1.0. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CNES | | | | | | | | |
| **Version** | | | | | | | | |
| Version 3.1  <http://logiciels.cnes.fr/BEST/EN/best.htm> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://logiciels/BEST/FR/best_fichiers/EAST-IF-110-30038-CSSI-FormatXIF3.1.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| XIF is highly  relevant for creating format descriptions | | | | | | | | |

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| Common satelite data formats | | | | | | | | |
| **Description** | | | | | | | | |
| |  |  |  | | --- | --- | --- | | * ADS * ASAR Data * AATSR Data * *MERIS* * PRISM / PRISM * RPC * AVNIR-2 * PALSAR * ASTER Data * ATSR Data * AVHRR Data * AVIRIS Data * CARTOSAT-1 Data * DMSP Data * ECW Format * EOSAT FAST * NLAPS * ACRES CCRS * MRLS | * ESA CEOS * LPGS * LAS Lidar Format * ASTER * MISR * MODIS * EROS A level 1a and 1b Data * ESRI GRID Format * ESRI Layers FORMOSAT-2 * NITF/RPC * Hymap Data * NITF 2.0, 2.1 (with license) * NSIF 1.0 * ADRG, CADRG * CIB * TFRD * MERIS Data | * MIVIS Data * (MAS-50 HDF) Data * RADARSAT * ASAR * PALSAR * AIRSAR * SIR-C/X-SAR * TOPSAR * ERS * JERS * Pleiades * SPOT 5 (DIMAP) and level 1 metadata * SPOT 1A, 1B, 2A, CAP * ACRES * HDF Vegetation * GeoSPOT | | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |
| Common satellites formats from ATSR, ALOS, EOS GEOEye, Landsat, Quickbird, Orbview, Worldview, Pleiades, SPOT, SAR instruments & Military Data | | | | | | | | |

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| DPPDB Elevationa Data | | | | | | | | |
| **Description** | | | | | | | | |
| |  | | --- | | * USGS * DEM * USGS * SDTS * DEM * DTED * FORMOSAT-2 * RPC * SRTM | | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |
| Digital Point positioning elevation data formats may have relevance for some satellite data products | | | | | | | | |

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| Image Formats | | | | | | | | |
| **Description** | | | | | | | | |
| |  | | --- | | * JPEG2000 * ECW * GeoJ2K * MrSID * PDS * PICT * SRF * XWD | | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |
| These are important common image formats in use with the Earth observation community. It should be noted that there may be some issue with representation information due to their proprietary nature. | | | | | | | | |

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| Image Processing Software Formats | | | | | | | | |
| **Description** | | | | | | | | |
| |  |  |  | | --- | --- | --- | |  | * ArcView (.bil) * ECW * ENVI (raster and classification) * ERDAS (.lan, .img, .ige) * ER Mapper * MrSID (up to and including 3.0) * RemoteView RSET (with NITF license) * PCI (.pix) |  | | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |
| These are important common image processing formats in use with the Earth observation community. It should be noted that there may be some issue with representation information due to their proprietary nature. | | | | | | | | |

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| Vector Formats | | | | | | | | |
| **Description** | | | | | | | | |
| |  | | --- | | * ARC Interchange Format (Uncompressed) * ESRI Geodatabase feature class * ESRI Shape (.shp) with attributes * ENVI (.evf) * AutoCAD DXF * USGS DLG * USGS SDTS * MapInfo * Microstation .DGN | | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |
| These are important common vector formats in use with the Earth observation community. It should be noted that there may be some issue with representation information as not everything is readily available in the public domain | | | | | | | | |

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| DIMAP | | | | | | | | |
| **Description** | | | | | | | | |
| **The DIMAP format is the format for SPOT products, introduced for the SPOT 5 launch in May 2002 and developed with CNES. The DIMAP format is a public format for describing geographic data. Although it was specially designed for image data, it can also handle vector data. SPOT products in DIMAP format now consist of two parts, one for the image and the other for a description of the image.**  **Image**  By default it is described in **GeoTIFF format**, consisting of:   * **A TIFF part**, as TIFF is the most widely used image format in the world, recognised by all software on the market and easily integrated. * **And a Geo part**, recognised by all geographic information processing software. It adds geo referencing information for the image file (coordinates in the upper left-hand corner of the image and pixel size) to the basic TIFF file and may also describe the map projection used and its corresponding geographic system.  Metadata This is written in XML. XML, similar to HTML, is more highly structured and allows users to create their own keywords with their corresponding values. It can be read directly by standard Internet browsers and can be linked to an XSL style sheet which sorts and does the HTML layout of the information contained in the XML file. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CNES | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1 <http://www.astrium-geo.com/files/pmedia/public/r455_9_formatdimap_eng_sept2010.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |
| This is an option for adding key metadata higher level data files | | | | | | | | |

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| POLDER/PARASOL Products | | | | | | | | |
| **Description** | | | | | | | | |
| There are four types of POLDER/PARASOL products:   * The Level-1 products are derived from the raw measurements. The so-called Level-1 processing includes calibration, radiometric and geometric processing. All parameters are given at a spatial resolution close to 6 km x 6 km at nadir. The parameters are given on a pixel basis in binary format. * The Level-2 products are derived from a single Level-1 orbit. All parameters are given at a spatial resolution close to 18.5 km x 18.5 km (1/6 deg. x 1/6 deg., i.e. 3 x 3 pixels of the Level-1 grid). The parameters are given on a pixel basis in binary format. * The Level-3 products include monthly composites from level-2 products. All parameters are given at a spatial resolution close to 18.5 km x 18.5 km (1/6 deg. x 1/6 deg., i.e. 3 x 3 pixels of the Level-1 grid). The parameters are given on a pixel basis in binary format. * The Gridded atmospheric product includes a reprojected version of all Level-2 and Level-3 parameters in a Plate-Carrée (i.e. equi-rectangular) projection grid at 1/6 deg. (18.5 km) resolution in HDF-EOS format.   The POLDER/PARASOL scientific products are the Level-2/Level-3 and the Gridded atmospheric products. There are separated in two thematic product suites: "Earth Radiation Budget, Water Vapor and Clouds" and "Aerosols". The list of scientific product parameters and a description of the algorithms used by the operational processing code are available on the Products/Parameter Description rubric and the Products/Algorithm Description rubric. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CNES | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1 product descriptions  ([POLDER\_Level-1\_format.pdf](http://www.icare.univ-lille1.fr/products/download/POLDER_Level-1_format.pdf) , [PARASOL\_Level-1\_format.pdf](http://www.icare.univ-lille1.fr/products/download/Parasol_Level-1_format.pdf) )  ([POLDER/PARASOL\_Level-2\_format.pdf](http://www.icare.univ-lille1.fr/products/download/Parasol_Level-2_format.pdf) )  ([POLDER/PARASOL\_Level-3\_format.pdf](http://www.icare.univ-lille1.fr/products/download/Parasol_Level-3_format.pdf))  ([POLDER/PARASOL Gridded Atmosphere Product](http://www.icare.univ-lille1.fr/parasol/docs/POLDER_HDF_atmosphere_product.pdf)) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
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| XTCE | | | | | | | | |
| **Description** | | | | | | | | |
| XML Telemetric and Command Exchange (XTCE).  This specification is an information model for spacecraft telemetry and commanding data. For a given mission there are a number of lifecycle phases that are supported by a variety of systems and organizations. Additionally, many of these organizations support multiple heterogeneous missions using a common ground segment infrastructure. Telemetry and command definitions must be exchanged among all of these phases, systems, and organizations. This is made difficult and costly because there is no standard method for exchanging this information. The lack of standardization currently requires custom ingestion of the telemetry and commanding information. This customization is inherently error-prone, resulting in the need to revalidate at each step in the lifecycle.  A typical example of this process is between the spacecraft manufacturer and spacecraft-operating agency. The spacecraft manufacturer defines the telemetry and command data in a format that is much different than the one used in the ground segment. This creates the need for database translation, increased testing, software customization, and increased probability of error. Standardization of the command and telemetry data definition format will streamline the process allowing dissimilar systems to communicate without the need for the development of mission specific database import/export tools.Ideally, a spacecraft operator should be able to transition from one ground system to another by simply moving an already existing command and telemetry database compliant with this command and telemetry database specification. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS | | | | | | | | |
| **Version** | | | | | | | | |
| **Blue Book.** [**CCSDS 660.0-B-1**](http://public.ccsds.org/publications/archive/660x0b1.pdf)**Issue 1. October 2007.** <http://public.ccsds.org/publications/BlueBooks.aspx> | | | | | | | | |
| **Further Information** | | | | | | | | |
| [**http://www.omg.org/space/xtce/**](http://www.omg.org/space/xtce/) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |
| The XTCE data specification provides an information model and data exchange format for telemetry and commanding definitions (operational database) in all phases of the a spacecraft, payload, and ground segment life cycle: system design, development, test, validation, and mission operations. | | | | | | | | |

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| PNG | | | | | | | | |
| **Description** | | | | | | | | |
| PNG is an extensible file format for the lossless, portable, well-compressed storage of raster images. PNG provides a patent-free replacement for GIF and can also replace many common uses of TIFF. Indexed-color, grayscale, and truecolor images are supported, plus an optional alpha channel for transparency. Sample depths range from 1 to 16 bits per component (up to 48bit images for RGB, or 64bit for RGBA). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO and W3C | | | | | | | | |
| **Version** | | | | | | | | |
| **International Standard 15948:2003:**  http://www.libpng.org/pub/png/spec/iso/ | | | | | | | | |
| **Further Reading** | | | | | | | | |
| <http://www.libpng.org/pub/png/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |

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| SVG | | | | | | | | |
| **Description** | | | | | | | | |
| This specification defines the features and syntax for [Scalable Vector Graphics (SVG)](http://www.w3.org/Graphics/SVG/).  SVG is a language for describing two-dimensional graphics in XML [[XML10](http://www.w3.org/TR/2008/REC-xml-20081126/)]. SVG allows for three types of graphic objects: vector graphic shapes (e.g., paths consisting of straight lines and curves), images and text. Graphical objects can be grouped, styled, transformed and composited into previously rendered objects. The feature set includes nested transformations, clipping paths, alpha masks, filter effects and template objects.  SVG drawings can be [interactive](http://www.w3.org/TR/SVG/interact.html) and [dynamic](http://www.w3.org/TR/SVG/animate.html). [Animations](http://www.w3.org/TR/SVG/animate.html) can be defined and triggered either declaratively (i.e., by embedding SVG animation elements in SVG content) or via scripting.  Sophisticated applications of SVG are possible by use of a supplemental scripting language which accesses [SVG Document Object Model (DOM)](http://www.w3.org/TR/SVG/svgdom.html), which provides complete access to all elements, attributes and properties. A rich set of [event handlers](http://www.w3.org/TR/SVG/interact.html#SVGEvents) such as [‘onmouseover’](http://www.w3.org/TR/SVG/script.html#OnMouseOverEventAttribute) and [‘onclick’](http://www.w3.org/TR/SVG/script.html#OnClickEventAttribute) can be assigned to any SVG graphical object. Because of its [compatibility and leveraging of other Web standards](http://www.w3.org/TR/SVG/intro.html#W3CCompatibility), features like [scripting](http://www.w3.org/TR/SVG/script.html) can be done on XHTML and SVG elements simultaneously within the same Web page.  SVG is a language for rich graphical content. For accessibility reasons, if there is an original source document containing higher-level structure and semantics, it is recommended that the higher-level information be made available somehow, either by making the original source document available, or making an alternative version available in an alternative format which conveys the higher-level information, or by using SVG's facilities to include the higher-level information within the SVG content. For suggested techniques in achieving greater accessibility, see [Accessibility](http://www.w3.org/TR/SVG/access.html). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| SVG 1.1 is a modularization of SVG 1.0 [[SVG10](http://www.w3.org/TR/SVG/refs.html#ref-SVG10)]. See the [Document Type Definition](http://www.w3.org/TR/SVG/svgdtd.html) appendix for details on how the DTD is structured to allow profiling and composition with other XML languages. | | | | | | | | |
| **Further Reading** | | | | | | | | |
| <http://www.w3.org/TR/SVG/intro.html#AboutSVG> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |

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| TIFF | | | | | | | | |
| **Description** | | | | | | | | |
| TIFF (originally standing for Tagged Image File Format) is a file format for storing [images](http://en.wikipedia.org/wiki/Raster_graphics), popular among graphic artists, the publishing industry, and both amateur and professional photographers in general. As of 2009, it is under the control of [Adobe Systems](http://en.wikipedia.org/wiki/Adobe_Systems). Originally created by the company [Aldus](http://en.wikipedia.org/wiki/Aldus) for use with "[desktop publishing](http://en.wikipedia.org/wiki/Desktop_publishing)", the TIFF format is widely supported by image-manipulation applications, by publishing and page layout applications, by [scanning](http://en.wikipedia.org/wiki/Image_scanner), [faxing](http://en.wikipedia.org/wiki/FAX), [word processing](http://en.wikipedia.org/wiki/Word_processor), [optical character recognition](http://en.wikipedia.org/wiki/Optical_character_recognition) and other applications.[]](http://en.wikipedia.org/wiki/Tagged_Image_File_Format#cite_note-3) Adobe Systems, which acquired Aldus, now holds the copyright to the TIFF specification. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| TIFF has not had a major update since 1992, though several Aldus/Adobe technical notes have been published with minor extensions to the format, and several specifications, including [TIFF/EP](http://en.wikipedia.org/wiki/Tag_Image_File_Format_/_Electronic_Photography) (ISO 12234-2), TIFF/IT (ISO 12639),TIFF-F ([RFC 2306](http://tools.ietf.org/html/rfc2306)) and TIFF-FX ([RFC 3949](http://tools.ietf.org/html/rfc3949)) have been based on the TIFF 6.0 specification. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |

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| UNICODE | | | | | | | | |
| **Description** | | | | | | | | |
| The Unicode Standard is the universal character encoding standard for written characters and text. It defines a consistent way of encoding multilingual text that enables the exchange of text data internationally and creates the foundation for global software. As the default encoding of HTML and XML, the Unicode Standard provides the underpinning for the World Wide Web and the global business environments of today. Required in new Internet protocols and implemented in all modern operating systems and computer languages such as Java and C#, Unicode is the basis of software that must function all around the world | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Unicode Consortium | | | | | | | | |
| **Version** | | | | | | | | |
| Latest version UNICODE 6.2 : <http://www.unicode.org/versions/Unicode6.2.0/> | | | | | | | | |
| **Further Reading** | | | | | | | | |
| <http://www.unicode.org/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |

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| ASCII | | | | | | | | |
| **Description** | | | | | | | | |
| ISO-8859-1 is the default character set in most browsers.  The first 128 characters of ISO-8859-1 is the original ASCII character-set (the numbers from 0-9, the uppercase and lowercase English alphabet, and some special characters).  The higher part of ISO-8859-1 (codes from 160-255) contains the characters used in Western European countries and some commonly used special characters.  Entities are used to implement reserved characters or to express characters that cannot easily be entered with the keyboard. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 8859-1 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **3** |  |  |  |  |  |  |  |

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| Computer Graphics metafile | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 8632:1992 is a graphics data interchange standard which defines a neutral computer interpretable representation of 2D graphical (pictorial) information in a manner that is independent from any particular application or system. The purpose of the standard is to facilitate the storage and retrieval of graphical information between applications, software systems, and/or devices. A CGM can contain:   * vector graphics (e.g., polylines, ellipses, NURBS), * raster graphics (e.g., tile array), and * text.   The CGM standard defines 3 upward compatible versions. Version 1 provides a basic drawing and picture interchange capability. The Version 1 metafile definition includes about 90 elements (i.e., individual function or entity). Version 1 metafiles are essentially the same as the 'old standard', CGM:1987. The Version 2 metafile definition contain approximately 30 additional elements. (All Version 1 metafile elements are allowed in Version 2 metafiles). The most significant new capability of Version 2, is the graphical segment. A segment is a group of primitives that is saved once and named, and then may be used repeatedly in the metafile. Version 3 metafiles represent a major increase in graphical expressive power. Version 3 metafiles contain about 40 new elements above the Version 2 capabilities. Version 3 metafile functionality includes: the capability to represent compressed tiled images, define external symbol libraries, and greater control of drawing aspects for graphics arts, presentation graphics, and electronic publishing | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| The International Standard - [ISO 8632:1992](http://www.itl.nist.gov/div897/ctg/graphics/cgm_std.htm#ISO8632) consists of 4 parts and 2 amendments.   * ISO/IEC 8632.1:1992 ---- Part 1: Functional specification * ISO/IEC 8632.2:1992 ---- Part 2: Character encoding * ISO/IEC 8632.3:1992 ---- Part 3: Binary encoding * ISO/IEC 8632.4:1992 ---- Part 4: Clear text encoding * ISO/IEC 8632:1992/Amd.1:[1994] - [Amendment 1](http://www.itl.nist.gov/div897/ctg/graphics/cgm_std.htm#amd1): Rules for profiles (parts 1-4) * ISO/IEC 8632:1992/Amd.2 - [Amendment 2](http://www.itl.nist.gov/div897/ctg/graphics/cgm_std.htm#amd2): Application structuring extensions (parts 1-4) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | **2** |  |  |  |  |  |  |  |

## Identifier Standards

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| Archival Resource Key | | | | | | | | |
| **Description** | | | | | | | | |
| An Archival Resource Key (ARK) persistently identifies, and enables long-term access to, digital objects through the creation of a stable URL which will not be affected by changes in the protocols, or host sites which allow access to the objects. ARK persistent identifiers can be used for any type of digital object. The methodology can also be used to persistently identify physical and intangible objects. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Bibliographic development department , British Library | | | | | | | | |
| **Version** | | | | | | | | |
| [2008 - Ark Identifier Scheme](http://www.cdlib.org/inside/diglib/ark/arkspec.html) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [ARK (Archival Resource Key)](http://www.cdlib.org/inside/diglib/ark/) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  | 3 |  |  |

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| Syntax for the Digital Object Identifier | | | | | | | | |
| **Description** | | | | | | | | |
| A Digital Object Identifier (DOI) is an interoperable digital persistent identifier for a piece of intellectual property which is actionable on a digital network. Unlike a url it identifies the actual object, not just the location where it can be found. DOIs can be assigned at different levels of granularity eg a book, a chapter or a page.  DOI is an implementation of the Handle System technology developed by the Corporation for National Research Initiatives (CNRI). DOIs are available from a DOI Registration Agency and there is usually an associated fee. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version : [2005 - Z39.84 ANSI/NISO Z39.84 - Syntax for the Digital Object Identifier](http://www.niso.org/kst/reports/standards?step=2&gid=None&project_key%3Austring%3Aiso-8859-1=a83b89410e67c2d7f6c7f43a6183d3f18e8c3195) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [The DOI System](http://www.doi.org/) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  | 3 |  |  |

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| ISO/IEC 9834-8: Universally Unique Identifiers (UUIDs) | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/IEC 9834-8: Information Technology - Open Systems Interconnection - Procedures for the Operation of Registration Authorities: Generation and Registration of Universally Unique Identifiers (UUIDs) and Their Use as ASN.1 Object Identifier Components  ISO/IEC 9834-8 specifies the format and rules for the generation of 16 octet (128 bit) identifiers suitable for use as either transient or persistent Universally Unique Identifiers (UUIDs). Also known as Globally Unique Identifiers (GUIDs), these are guaranteed to be unique, or extremely likely to be different, depending on the generation method chosen. The standard identifies procedures for a Web-based registration authority for universally unique identifiers and specifies how to use them as a URN or an ASN.1 Object Identifier (OID). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO, ITU | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [2005 - ISO/IEC 9834-8: Information Technology - Open Systems Interconnection - Procedures for the Operation of OSI Registration Authorities: Generation and Registration of Universally Unique Identifiers (UUIDs) and Their Use as Abstract Syntax Notation One](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=36775) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for *Universally Unique Identifier*](http://en.wikipedia.org/wiki/Universally_Unique_Identifier)  [Wikipedia entry for *Globally Unique Identifier*](http://en.wikipedia.org/wiki/Globally_Unique_Identifier)  [Wikipedia entry for *Abstract Syntax Notation One (ASN.1)*](http://en.wikipedia.org/wiki/Abstract_Syntax_Notation_One) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  | 3 |  |  |

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| Procedures for item registration | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19135:2005 specifies procedures to be followed in establishing, maintaining and publishing registers of unique, unambiguous and permanent identifiers, and meanings that are assigned to items of geographic information. In order to accomplish this purpose, ISO 19135:2005 specifies elements of information that are necessary to provide identification and meaning to the registered items and to manage the registration of these items. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19135:2005:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32553> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  | 3 |  |  |

## Imaging Standards

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| ISO/TR 15801: Electronic Imaging - Information Stored Electronically - Recommendations for Trustworthiness and Reliability | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TR 15801 covers the implementation and management of systems for storing digital data to ensure that trustworthiness, reliability, integrity and authenticity are maintained throughout the lifecycle, starting with ingest into a system. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [2004 - ISO/TR 15801: Electronic Imaging - Information Stored Electronically - Recommendations for Trustworthiness and Reliability](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=29093) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.iso.org/iso/pressrelease.htm?refid=Ref923> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  | 1 | 2 |  |  |  |

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| ISO/TS 12033: Electronic Imaging -- Guidance for Selection of Document Image Compression Methods | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TS 12033 provides guidance on choosing the most suitable compression methods for bitmap still digital images to ensure storage and use can be optimized. The report covers compression methods bundled with both hardware and software, to help with the informed selection of computing equipment. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [2001 - ISO/TS 12033: Electronic Imaging - Guidance for Selection of Document Image Compression Methods](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31716) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  | 2 |  |  |  |

## Interoperability Protocols

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| Open Archive Initiative - Protocol for Metadata Harvesting | | | | | | | | |
| **Description** | | | | | | | | |
| The aim of the Open Archives Initiative is to build an interoperability framework for digital archives/institutional repositories in order to encourage scholarly communication.  Within the OAI system each archive is assigned a unique archive identifier, records within the archive are assigned persistent unique record identifiers and so the combination ensures relevant document(s)are identified.  The protocol uses XML to record metadata that distinguishes between data providers who represent the creators, and service providers who meet the requirements of end users. Essentially, the protocol means that OAI databases can interact with each other and other software agents. The metadata formed can be based on the Dublin Core metadata set or alternative forms, for example, MARC library records.  OAI-PMH is HTTP based with XML responses and uses the unqualified Dublin Core set, it is Web-friendly, and therefore firewall friendly. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OAI | | | | | | | | |
| **Version** | | | | | | | | |
| Current version : [14 June 2002 - The Open Archives Initiative Protocol for Metadata Harvesting, version 2.0](http://www.openarchives.org/OAI/openarchivesprotocol.html) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [OAI for Beginners: Overview](http://www.dcc.ac.uk/resources/standards/diffuse/show?standard_id=66&sort=type) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 3 |  |  |

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| Extensible Markup Language (XML) | | | | | | | | |
| **Description** | | | | | | | | |
| Extensible Markup Language (XML) is an open standard recommended by W3C as general purpose markup language. It is a profile of ISO 8879 - Standard Generalized Markup Language (SGML), which was defined to enable data to be shared across multifarious information systems, primarily the Internet.  XML implementations rely on data being validated against a Document Type Definition (DTD) or Schema, which formally define data syntax. These are generally developed, and standardised, within communities of interest and thousands of examples exist *eg* MathML, GML, EAD, METS, SVG.  A wide range of standards which support XML have been published. Exstensible Stylesheet Language (XSL) allows XML to be transformed into a different version of XML, Hyper Text Markup Language (HTML) or another suitable format. A number of extensions allow more complex manipulations of XML data. These include:   * XPath - allows reference to individual parts of an XML document * XQuery - allows and XML document to be queried and return a value * XInclude - allows XML documents or parts of XML documents to be merged * XML Encryption - allows XML documents to be encrypted | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| XML Version 1.1 (second edition) extends XML Version 1 to allow scripts and characters included after version 2.0 of Unicode to be used for attribute and element names. It also allows any Unicode character, whatever the version to be used in data and attribute values. Version 1.1 is not widely used and implementations are only recommended by those who need to use the unique features.  Current Version [26 November 2008 - Extensible Markup Language (XML) 1.0 (Fifth Edition)](http://www.w3.org/TR/xml/) | | | | | | | | |
| **Further Information** | | | | | | | | |
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| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 3 |  |  |

## Metadata Content Standards and Cataloguing

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| Catalogue Services Standard 2.0 Extension Package for ebRIM Application Profile: Earth Observation Products | | | | | | | | |
| **Description** | | | | | | | | |
| This standard describes the mapping of Earth Observation Products – defined in the OGC® GML 3.1.1 Application schema for Earth Observation products [OGC 06-080r4] (version 0.9.3) – to an ebRIM structure within an OGC® Catalogue 2.0.2 (Corrigendum 2 Release) [OGC 07-006r1] implementing the CSW-ebRIM Registry Service – part 1: ebRIM profile of CSW [OGC 07-110r4]. This standard defines the way Earth Observation products metadata resources are organized and implemented in the Catalogue for discovery, retrieval and management. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ERDAS (was Ionic Software s.a.)  Spacebel s.a.  European Space Agency | | | | | | | | |
| **Version** | | | | | | | | |
| [OGC® Catalogue Services Standard 2.0 Extension Package for ebRIM Application Profile: Earth Observation Products](http://portal.opengeospatial.org/files/?artifact_id=35528)  [GML 3.1.1 Application Schema for EO products (1.0.0)](http://portal.opengeospatial.org/files/?artifact_id=31065) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/cat2eoext4ebrim> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 3 |  |

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| OpenGIS® Catalogue Services Specification | | | | | | | | |
| **Description** | | | | | | | | |
| This specification explains how Catalogue Services version 2.0 are organised and implemented for the discovery and retrieval of spatial data and services metadata. The prior public version of this specification was 1.1.1. Catalogue Services version 2.0 supersedes and deprecates version 1.1.1.  This revision of this document has been significantly improved, largely based on the comments on document 04-021 received by the Revision Working Group. The changes made in this second corrigendum are summarized in the Corrigendum description document [OGC 07-010]. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| BAE SYSTEMS Mission Solutions (formerly Marconi Integrated Systems, Inc.)  Blue Angel Technologies, Inc.  Environmental Systems Research Institute (ESRI)  Geomatics Canada (Canada Centre for Remote Sensing (CCRS)  Intergraph Corporation  MITRE  Oracle Corporation  U.S. Federal Geographic Data Committee (FGDC)  U.S. National Aeronautics and Space Administration (NASA)  U.S. National Imagery and Mapping Agency (NIMA) | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2 [OpenGIS Catalogue Service Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=20555)  with dependencies on the following  [OGC Cataloguing of ISO Metadata (CIM) using the ebRIM profile of CS-W (0.1.7)](http://portal.opengeospatial.org/files/?artifact_id=20596)  [OGC® Catalogue Services – OWL Application Profile of CSW (0.3.0)](http://portal.opengeospatial.org/files/?artifact_id=32620)  [Revision Notes for Corrigendum for OpenGIS 07-006: Catalogue Services, Version 2.0.2 (1.0)](http://portal.opengeospatial.org/files/?artifact_id=20561)  [CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW (1.0.1)](http://portal.opengeospatial.org/files/?artifact_id=31137)  [CSW-ebRIM Registry Service – Part 2: Basic extension package (1.0.1)](http://portal.opengeospatial.org/files/?artifact_id=31138)  [CSW-ebRIM Registry Service – Part 3: Abstract Test Suite (1.0.1)](http://portal.opengeospatial.org/files/?artifact_id=31139)  [CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW (1.0.0)](http://portal.opengeospatial.org/files/?artifact_id=27092)  [CSW-ebRIM Registry Service – Part 2: Basic extension package (1.0.0)](http://portal.opengeospatial.org/files/?artifact_id=27093)  [OpenGIS Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile (1.0.0)](http://portal.opengeospatial.org/files/?artifact_id=21460)  [EO Products Extension Package for ebRIM (ISO/TS 15000-3) Profile of CSW 2.0 (0.1.9)](http://portal.opengeospatial.org/files/?artifact_id=28152) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/specifications/catalog | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 3 |  |

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| Anglo-American Cataloguing Rules | | | | | | | | |
| **Description** | | | | | | | | |
| Anglo-American Cataloguing Rules (AACR) provides content rules for the construction of catalogues and other lists in general libraries of all sizes. The rules cover the description of library materials, and the provision of access points, and enable catalogue information to be readily exchanged between libraries. It is mostly used in conjunction with the mark-up standard MARC 21 (MAchine-Readable Cataloguing). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ALA, CILIP | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [1978 - Anglo-American Cataloguing Rules, 2nd Edition (AACR2)](http://desktop.loc.gov/) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Homepage of the Anglo-American Cataloguing Rules](http://www.aacr2.org/index.html) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 2 |  |
| This standard may be useful to support the interoperability of catalogues at diverse institutions | | | | | | | | |

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| IETF Matching of Language Tags | | | | | | | | |
| **Description** | | | | | | | | |
| IETF Matching of Language Tags describes a syntax, for matching language tags to a user„s preference list. It defines two matching methodologies; filtering and lookup. Implementations include language negotiation or content selection. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| IETF | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [September 2006 - IETF RFC 4647: Matching of Language Tags](http://tools.ietf.org/html/rfc4647) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry on *IETF Language Tags*](http://en.wikipedia.org/wiki/Language_tags) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |
| This may prove useful if there are language issues relating to document which support data reuse | | | | | | | | |

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| IETF Tags for Identifying Languages | | | | | | | | |
| **Description** | | | | | | | | |
| IETF Tags for Identifying Languages describes the structure, content, construction, and semantics of language tags for identifying the language used in an information object. It describes how to register language tag values and how to create extensions. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| IETF | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [September 2006 - IETF RFC 4646: Tags for Identifying Languages](http://tools.ietf.org/html/rfc4646) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry on *IETF Language Tags*](http://en.wikipedia.org/wiki/Language_tags) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |
| This may prove useful if there are language issues relating to document which support data reuse | | | | | | | | |

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| MAchine-Readable Cataloguing | | | | | | | | |
| **Description** | | | | | | | | |
| MARC is a standard for the representation and communication of bibliographic information in computer-readable form. It is widely accepted as the standard format for the interchange of bibliographic records and is used by 69% of European library systems. There are several different versions being used in different countries, of which MARC 21 is one.  ISO 2709 defines the tape exchange format that MARC records conform to ISO 2709 files start with a fixed length record label followed by variable length records containing a directory map, a record identifier, MARC reserved fields and MARC bibliographic fields. The ISO 4873 IS2 and IS3 codes are used as field and record terminators respectively.  MARC 21 consists of five specifications, namely: -   * Format for Bibliographic Data * Format of Authority Data * Format of Classification Data * Format of Community Information * Format of Holdings Data   An XML Schema for the management of MARC21 records (MARCXML) was published in 2002. An alternative [Metadata Object Description Schema (MODS)](http://www.loc.gov/standards/mods/) identifies a subset of MARC that can be expressed in XML using language-based rather than numeric tags. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO, British Library, MARC Standards office , Library of Congress | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [17 July 2009 - MARC 21 Format 2009](http://www.loc.gov/marc/marc.html) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [MARC Standards](http://www.dcc.ac.uk/resources/standards/diffuse/show?standard_id=36&sort=type)  [MARCXML](http://www.dcc.ac.uk/resources/standards/diffuse/l) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |
| This may prove useful if there are diverse types of document which support data reuse which require cataloguing | | | | | | | | |

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| Rules for Archival Description | | | | | | | | |
| **Description** | | | | | | | | |
| Rules for Archival Description specify rules for describing archives, which will ensure that: the content, context and structure of archival material are explained; that authenticity is documented; and that access is maintained through retrievable descriptions. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Bureau of Canadian Archivists | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [July 2008 - Rules for Archival Description, Revised Version](http://www.cdncouncilarchives.ca/RAD/RADComplete_July2008.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.cdncouncilarchives.ca/archdesrules.html | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |
| This may prove useful if there are diverse types of document which support data reuse which require cataloguing | | | | | | | | |

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| GCMD DIF | | | | | | | | |
| **Description** | | | | | | | | |
| The Directory Interchange Format, the DIF, was the product of an Earth Science and Applications Data Systems Workshop (ESADS) held February 24-26, 1987 on catalog interoperability (CI). The workshop recommended that a "...first step towards data system interoperability, Catalog Interoperability (CI), the ability to find information about data held at other sites...", be made  The ISO 19115/TC211 geospatial metadata standard was adopted June 2004. Required elements and appropriate modifications were approved by the CEOS IDN Interoperability group and incorporated into the DIF to achieve full ISO compatibility.  The DIF does not compete with other metadata standards. It is simply the "container" for the metadata elements that are maintained in the IDN database, where validation for mandatory fields, keywords, personnel, etc. takes place.  The DIF is used to create directory entries which describe a group of data. A DIF consists of a collection of fields which detail specific information about the data. Eight fields are required in the DIF; the others expand upon and clarify the information. Some of the fields are text fields, others require the use of controlled keywords (sometimes known as "valids").  The DIF allows users of data to understand the contents of a data set and contains those fields which are necessary for users to decide whether a particular data set would be useful for their needs. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CEOS | | | | | | | | |
| **Version** | | | | | | | | |
| The [DIFGuide](http://gcmd.nasa.gov/User/difguide/difman.html) document provides information about each field of the DIF, including its syntax, specifications, recommendations, and examples. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | **3** |  |
| This is an important for data system interoperability | | | | | | | | |

## Metadata Description Standards

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ANSI/NISO Z39.87 - Data Dictionary - Technical Metadata for Digital Still Images | | | | | | | | |
| **Description** | | | | | | | | |
| ANSI/NISO Z39.87 - Data Dictionary - Technical Metadata for Digital Still Images defines a technical metadata set for raster still images. It is designed to support access and preservation over the long-term, while enabling interoperability across systems, software and services and facilitating the exchange and interpretation of digital still images. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NISO and ANSI | | | | | | | | |
| **Version** | | | | | | | | |
| [2006 - ANSI/NISO Z39.87 - Data Dictionary - Technical Metadata for Digital Still Images](http://www.niso.org/kst/reports/standards?step=2&gid=None&project_key%3Austring%3Aiso-8859-1=b897b0cf3e2ee526252d9f830207b3cc9f3b6c2c) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for Z39.87 Data Dictionary -Technical Metadata for Digital Still Images (MIX)](http://en.wikipedia.org/wiki/Z39.87)  [MIX: NISO Metadata for Images in XML Schema](http://www.loc.gov/standards/mix/)XML Schema for expressing Z39.87 compliant metadata. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |
| This may prove useful if there are raster images to store in connection with data sets | | | | | | | | |

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| Data Entity Specifcation Language | | | | | | | | |
| **Description** | | | | | | | | |
| The Recommendation for DEDSL—PVL Syntax (CCSDS 647.2-B-1) provides a standard method to represent the attributes and their values, as defined by the Recommendation for DEDSL—Abstract Syntax, using the Parameter Value Language for the construction and interchange of data entity dictionaries.  This Data Entity Dictionary Specification Language (DEDSL) Recommendation provides the Parameter Value Language (PVL) (CCSDS 641.0-B-2) implementation for the DEDSL—Abstract Syntax Recommendation (CCSDS 647.1-B-1) in order to provide a standardized computer processable expression of the semantic information which to be carried with data. The Recommendation for PVL Syntax provides a standard method to represent the attributes and their values, as defined by the Recommendation for Abstract Syntax, using the Parameter Value Language for the construction and interchange of data entity dictionaries. This document has been reconfirmed by the CCSDS management Council through March 201  This Recommendation provides a standard method to represent attributes and their values, as has been defined by the Abstract Syntax of the Data Entity Dictionary Specification Language (DEDSL) (CCSDS 647.1-B-1), using the Extensible Markup Language (XML) 1.0 Document Type Declaration (DTD) for the construction and interchange of data entity dictionaries. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS | | | | | | | | |
| **Version** | | | | | | | | |
| **PVL Syntax:** [**http://public.ccsds.org/publications/archive/647x2b1.pdf**](http://public.ccsds.org/publications/archive/647x2b1.pdf)  **Abstract Syntax:** [**http://public.ccsds.org/publications/archive/647x1b1.pdf**](http://public.ccsds.org/publications/archive/647x1b1.pdf)  XML version : <http://public.ccsds.org/publications/archive/647x3b1.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| This is highly relevant for creating data dictionaries necessary for preserving semantic information | | | | | | | | |

## Metadata and Packaging Standards

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| Metadata Encoding and Transmission Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The Metadata Encoding and Transmission Standard (METS) is an XML (Extensible Mark-up Language) schema for encoding descriptive, administrative, and structural metadata needed to manage and exchange digital library objects. It is able to describe the complex links between objects and their metadata while associating behaviours or services to a digital object.  A METS document can be structured to be compliant with the Submission Information Package (SIP), Archival Information Package (AIP), or Dissemination Information Package (DIP) requirements of the Open Archival Information System (OAIS) Reference Model. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| MARC Standards office, Digital Library Federation | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [April 2009 - METS, version 1.8](http://www.loc.gov/standards/mets/version18/mets.xsd) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Metadata Encoding and Transmission Standard Official Web Site](http://www.loc.gov/standards/mets/)  [METS Primer](http://www.loc.gov/standards/mets/METS%20Documentation%20final%20070930%20msw.pdf)  [Wikipedia entry for *METS*](http://en.wikipedia.org/wiki/METS) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 2 |  |

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| XML FORMATTED DATA UNIT (XFDU) STRUCTURE AND CONSTRUCTION RULES | | | | | | | | |
| **Description** | | | | | | | | |
| This Recommended Standard defines a technique for the packaging of data and metadata, including software, into a single package (e.g., file or message) to facilitate information transfer and archiving. It provides a detailed specification of core packaging structures and mechanisms that meet current CCSDS agency requirements and that augment the current CCSDS packaging and language Recommended Standards to accommodate the current computing environment and meet evolving requirements. This Recommended Standards leverages the wide community acceptance and usage of XML technologies by making the packaging manifest an XML document defined by the XML Schema specified in the document. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS and ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: Blue Book Sept 2008 | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://public.ccsds.org/publications/archive/661x0b1.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 3 |  |  |  |  |  |  |  |
| SAFE may provide a better specialisation of this | | | | | | | | |

## Metadata Structure Standards

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| Dublin Core Metadata Element Set |
| **Description** |
| The Dublin Core Metadata Element Set is a basic standard which can be easily understood and implemented, and as such is one of the best known metadata standards. It was originally developed, in 1995, as a core set of elements for describing the content of web pages and enabling their search and retrieval. The Dublin Core Metadata Element Set consists of 15 elements which address the most basic descriptive, administrative and technical elements required to uniquely identify a digital resource. The emphasis is now on supporting resource discovery across domains.  Most resource discovery metadata standards can be mapped to the Dublin Core Metadata Element Set, enabling basic federated searching across metadata, created using a number of different standards, without detracting from richer metadata held elsewhere. A draft specification for expressing Dublin Core in XML is available from the Dublin Core Metadata Initiative (DCMI).  DCMI develops and maintains a suite of inter-related Standards. It coordinates a number of working groups who collaborate to develop a metadata registry which supports extended and qualified profiles of Dublin Core, tailored to the needs of a number of different communities or functions. These include Dublin Core Collection Description Application Profile (for describing whole collections) and Dublin Core Library Application Profile (for describing published library holdings). |
| **Standards Developing Organisations** |
| DCMI |
| **Standards Accrediting Organisations** |
| NISO and ANSI |
| **Version** |
| Version: [2009 - ISO 15836:2009, Information and Documentation -The Dublin Core Metadata Element Set](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52142) |

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| **Further Information** | | | | | | | | |
| [Dublin Core Metadata Initiative](http://dublincore.org/)Dublin Core Metadata Initiative homepage. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 2 |  |
| Dublin core may provide a simple easy to use way to catalogue support materials to enhance exploitation of the data | | | | | | | | |

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| General International Standard Archival Description | | | | | | | | |
| **Description** | | | | | | | | |
| A set of general rules for archival description intended to:   * Ensure the creation of consistent, appropriate and self explanatory descriptions * Facilitate the retrieval and exchange of information about archival material * Enable the sharing of authority data * Make possible the integration of descriptions from different repositories into a unified information system   As general rules, they are intended to be broadly applicable to descriptions of archives regardless of their nature or the extent of the unit of description. The rules guide the formulation of information in each of twenty-six (26) elements, divided between 7 sections that may be combined to constitute the description of an archival entity. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| International Council on Archives | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [2000 - ISAD(G): General International Standard Archival Description, 2nd edition](http://www.icacds.org.uk/eng/ISAD%28G%29.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.ica.org/en/node/30000> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 2 |  |

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| Metadata Object Description Schema | | | | | | | | |
| **Description** | | | | | | | | |
| Metadata Object Description Schema is an XML description schema, primarily for bibliographic records. It is designed as a half-way house between the richness of records created using the MARC 21 Format for Bibliographic Data, and the simplicity of Dublin Core. Records created using MARC 21 can be converted to MODS but not vice versa. The standard can be used to provide descriptive metadata within an implementation of METS (Metadata Encoding Transmission Standard). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| MARC standards office | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [15 January 2008 - Metadata Object Description Schema, version 3.3](http://www.loc.gov/standards/mods/v3/mods-3-3.xsd) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.loc.gov/standards/mods/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 2 |  |

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| PREMIS Data Dictionary for Metadata Preservation | | | | | | | | |
| **Description** | | | | | | | | |
| The PREMIS Data Dictionary defines a core set of *semantic units* that repositories should know in order to perform their preservation functions. Preservation functions can vary from one repository to another, but will generally include actions to ensure that digital objects remain viable (i.e., can be read from media) and renderable (i.e., can be displayed, played or otherwise interpreted by application software), as well as to ensure that digital objects in the repository are not inadvertently altered, and that legitimate changes to objects are documented.  The Data Dictionary is not intended to define all possible preservation metadata elements, only those that most repositories will need to know most of the time.  Several categories of metadata are excluded as out of scope, including:  Format-specific metadata, i.e., metadata that pertains to only one file format or class of formats such as audio, video or vector graphics.  • Implementation-specific metadata and business rules, i.e., metadata that  describes the policies or practices of an individual repository, such as how it  provides access to materials.  • Descriptive metadata. Although resource description is obviously relevant to  preservation, many independent standards can be used for this purpose, such as  MARC21, MODS, and Dublin Core.  • Detailed information about media or hardware. Again, although clearly relevant to preservation, this metadata was left to other communities to define.  • Information about agents (people, organizations or software) other than the minimum needed for identification.  • Information about rights and permissions, except those that directly affect preservation functions. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OCLC | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version [PREMIS: Data Dictionary for Preservation Metadata, version 2.0: March 2008](http://www.loc.gov/standards/premis/v2/premis-2-0.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.oclc.org/research/activities/past/orprojects/pmwg/default.htm> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 2 |  |  |  |  |  |  |  |
| Premis could be considered for describing relationship of AIP content | | | | | | | | |

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| Unstructured Information Management Architecture | | | | | | | | |
| **Description** | | | | | | | | |
| The UIMA specification defines platform-independent data representations and interfaces for text and multi-modal analytics. The principal objective of the UIMA specification is to support interoperability among *analytics*. This objective is subdivided into the following four design goals:  Data Representation. Support the common representation of artifacts and artifact metadata independently of artifact modality and domain model and in a way that is independent of the original representation of the artifact.  Data Modeling and Interchange. Support the platform-independent interchange of analysis data (artifact and its metadata) in a form that facilitates a formal modeling approach and alignment with existing programming systems and standards.  Discovery, Reuse and Composition. Support the discovery, reuse and composition of independently-developed analytics.  Service-Level Interoperability. Support concrete interoperability of independently developed analytics based on a common service description and associated SOAP bindings. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version V1.0: http://docs.oasis-open.org/uima/v1.0/os/uima-spec-os.pdf | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://wiki.oasis-open.org/uima | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 1 |  |

## Query Languages

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| Contextual Query language | | | | | | | | |
| **Description** | | | | | | | | |
| CQL, the *Contextual Query Language*, is a formal language for representing queries to information retrieval systems such as web indexes, bibliographic catalogs and museum collection information. The design objective is that queries be human readable and writable, and that the language be intuitive while maintaining the expressiveness of more complex languages.  Traditionally, query languages have fallen into two camps: Powerful, expressive languages, not easily readable nor writable by non-experts (e.g. SQL, PQF, and XQuery);or simple and intuitive languages not powerful enough to express complex concepts (e.g. CCL and google). CQL tries to combine simplicity and intuitiveness of expression for simple, every day queries, with the richness of more expressive languages to accommodate complex concepts when necessary. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS, Library of Congress | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version(Draft): [22 July 2009 - CQL 2.0:The Contextual Query Language Draft](http://www.dcc.ac.uk/resources/standards/diffuse/www.oasis-open.org/committees/download.php/33497/cql-2-0-draft.doc) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.loc.gov/standards/sru/specs/cql.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 3 |  |  |

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| SPARQL Query Langugae for RDF | | | | | | | | |
| **Description** | | | | | | | | |
| RDF is a directed, labeled graph data format for representing information in the Web. This specification defines the syntax and semantics of the SPARQL query language for RDF. SPARQL can be used to express queries across diverse data sources, whether the data is stored natively as RDF or viewed as RDF via middleware. SPARQL contains capabilities for querying required and optional graph patterns along with their conjunctions and disjunctions. SPARQL also supports extensible value testing and constraining queries by source RDF graph. The results of SPARQL queries can be results sets or RDF graphs. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| Latest version: <http://www.w3.org/TR/rdf-sparql-query/> | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.w3.org/TR/rdf-sparql-query/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | 3 |  |

## Reference Models and Frameworks

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Functional Requirements for Bibliographic Records | | | | | | | | |
| **Description** | | | | | | | | |
| Functional Requirements for Bibliographic Records is an entity relationship model which analyses the attributes and relationships found in the elements of a bibliographic record, along with the needs of users, to enable effective resource discovery. Although designed by library professionals, for application to bibliographic records, the model can be applied to any metadata standard describing any media or format | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Library of Congress | | | | | | | | |
| **Version** | | | | | | | | |
| [1998 - Functional Requirements for Bibliographic Records](http://www.ifla.org/VII/s13/frbr/frbr.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.loc.gov/cds/FRBR.html | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 2 |  |  |

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| OAIS | | | | | | | |
| **Description** | | | | | | | |
| An OAIS is an Archive, consisting of an organization, which may be part of a larger  organization, of people and systems that has accepted the responsibility to preserve  information and make it available for a Designated Community.  The OAIS reference model:  – provides a framework for the understanding and increased awareness of archival  concepts needed for Long Term digital information preservation and access;  – provides the concepts needed by non-archival organizations to be effective  participants in the preservation process;  – provides a framework, including terminology and concepts, for describing and  comparing architectures and operations of existing and future Archives;  – provides a framework for describing and comparing different Long Term  Preservation strategies and techniques;  – provides a basis for comparing the data models of digital information preserved by  Archives and for discussing how data models and the underlying information may  change over time;  – provides a framework that may be expanded by other efforts to cover Long Term  Preservation of information that is NOT in digital form (e.g., physical media and  physical samples);  – expands consensus on the elements and processes for Long Term digital information  preservation and access, and promotes a larger market which vendors can support;  – guides the identification and production of OAIS-related standards.    The reference model addresses a full range of archival information preservation functions  including ingest, archival storage, data management, access, and dissemination. It also  addresses the migration of digital information to new media and forms, the data models used  to represent the information, the role of software in information preservation, and the  exchange of digital information among Archives. It identifies both internal and external  interfaces to the Archive functions, and it identifies a number of high-level services at these  interfaces. It provides various illustrative examples and some ‘best practice’  recommendations. It defines a minimal set of responsibilities for an Archive to be called an  OAIS, and it also defines a maximal Archive to provide a broad set of useful terms and  concepts.    Using the OAIS Reference Model, as a template for information preservation, demonstrates a long-term commitment to ensuring that relevant workflows and architectures are in place for information to remain available to those who need to use it (the Designated Community). | | | | | | | |
| **Standards Developing Organisations** | | | | | | | |
| CCSDS, ISO | | | | | | | |
| **Version** | | | | | | | |
| The **magenta** book version: <http://public.ccsds.org/publications/MagentaBooks.aspx> : [**CCSDS 650.0-M-**](http://public.ccsds.org/publications/archive/650x0m2.pdf)2 | | | | | | | |
| **Further Information** | | | | | | | |
| <http://en.wikipedia.org/wiki/Open_Archival_Information_System> | | | | | | | |
| **Relevance to LTDP** | | | | | | | |
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| Relevance | 3 | 3 | 3 | 3 | 3 | 3 |  |  |

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| ISO 20652: Space Data and Information Transfer Systems - Producer-Archive Interface - Methodology Abstract Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The purpose of this Recommendation is to identify, define and provide structure to the relationships and interactions between an information Producer and an Archive. This Recommendation defines the methodology for the structure of actions that are required from the initial time of contact between the Producer and the Archive until the objects of information are received and validated by the Archive. These actions cover the first stage of the Ingest Process as defined in the Open Archival Information System (OAIS) Reference Model]. This Recommendation describes parts of the functional entities Administration (‘Negotiate Submission Agreement’) and Ingest (‘Receive Submission’ and ‘Quality Assurance’).  This Recommendation accomplishes the following:  – identifies the different phases in the process of transferring information between a Producer and an Archive;  – defines the objective of each of these phases, the actions that must be carried out during these phases, and the expected results (e.g., administrative, technical, contractual) at the end of a phase;  – forms a general methodological framework, which should be able to be applied and reused in those processes that relate to the Producer-OAIS Archive interface (this general framework should also provide sufficient flexibility for each particular case);  – forms a basis for the identification and/or development of standards and implementation guides in the community in question;  – forms a basis for identification and/or development of a set of software tools that will assist the development, operation and checking of the different stages in the process of information transfer between the Producer and the Archive. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS and ISO | | | | | | | | |
| **Version** | | | | | | | | |
| The **magenta** book version <http://public.ccsds.org/publications/MagentaBooks.aspx> : [**CCSDS 651.0-M-1**](http://public.ccsds.org/publications/archive/651x0m1.pdf) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Earth System Modelling Framework | | | | | | | | |
| **Description** | | | | | | | | |
| The Earth System Modelling Framework (ESMF) collaboration is building high-performance, flexible software infrastructure to increase ease of use, performance portability, interoperability, and reuse in climate, numerical weather prediction, data assimilation, and other Earth science applications. The ESMF defines architecture for composing complex, coupled modelling systems and includes data structures and utilities for developing individual models.  The basic idea behind ESMF is that complicated applications should be broken up into smaller pieces, or components. A component is a unit of software composition that has a coherent function, and a standard calling interface and behaviour. Components can be assembled to create multiple applications, and different implementations of a component may be available. In ESMF, a component may be a physical domain, or a function such as a coupler or I/O system.  ESMF also includes toolkits for building components and applications, such as regridding software, calendar management, logging and error handling, and parallel communications.  ESMF offers multiple ways to build and couple models. This flexibility allows many different kinds of systems to be constructed, but additional constraints, in the form of usage and content conventions, are needed to achieve interoperability. The main conventions that are used in or with ESMF   * The National Unified Operational Prediction Capability (NUOPC) Layer is a work in progress, although some software is already available. It includes generic code to simplify development of Gridded and Coupler Components, and a compliance checker that helps to guide code development. * Climate and Forecast (CF) conventions define standard names for physical fields. * The Common Information Model describes the component structure, technical, and scientific properties of a model or simulation. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ESMF is sponsored by the Department of Defense, NASA, the National Science Foundation, and NOAA | | | | | | | | |
| **Version** | | | | | | | | |
| <http://www.earthsystemmodeling.org/components/chart_1204_componentlist.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| This modelling framework has the potential to contribute to interoperability | | | | | | | | |

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| CIDOC CRM | | | | | | | | |
| **Description** | | | | | | | | |
| The **CIDOC Conceptual Reference Model (CRM)** provides definitions and a formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation.  The **CIDOC CRM** is intended to promote a shared understanding of cultural heritage information by providing a common and extensible semantic framework that any cultural heritage information can be mapped to. It is intended to be a common language for domain experts and implementers to formulate requirements for information systems and to serve as a guide for good practice of conceptual modelling. In this way, it can provide the "semantic glue" needed to mediate between different sources of cultural heritage information, such as that published by museums, libraries and archives. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CIDOC Documentation Standards Working Group (DSWG) | | | | | | | | |
| **Version** | | | | | | | | |
| Latest version 5.04 all version can be found here:  <http://www.cidoc-crm.org/official_release_cidoc.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Currently being used on SCIDIP project to harmonise Earth Science metadata | | | | | | | | |

## Earth Observation/ Geographic data standards and Ontologies

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| GEO RIGHTS MANAGEMENT (GEORM) | | | | | | | | |
| **Description** | | | | | | | | |
| A great deal of work has been done in the area of data ownership and rights management. This work is of interest to the Geospatial community in that many geospatial data providers need to manage or control who has access to their data and how it is used. The lack of a Geospatial Rights Management (GeoRM) capability is a major barrier to broader adoption of Web based geospatial technologies. The mission of the GeoRM Working Group is to coordinate and mature the development and validation of work being done on digital rights management for the geospatial community.  The GeoRM WG has developed the Geospatial Digital Rights Management Reference Model (GeoDRM RM), an abstract specification for the management of digital rights in the area of geospatial data and services. This document has been approved by the OGC membership, who will use the GeoDRM RM in developing OpenGIS Implementation Specifications for open interfaces and encodings that will enable SDI and diverse systems to participate in transactions involving data, services and intellectual property protection. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OGC | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version March 2007: [Geospatial Digital Rights Management Reference Model](http://portal.opengeospatial.org/files/?artifact_id=14085)  [(GeoDRM RM) (06-004r3)](http://portal.opengeospatial.org/files/?artifact_id=14085) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/as/geodrmrm> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic information -- Spatial referencing by geographic identifiers | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19912:2003 defines the conceptual schema for spatial references based on geographic identifiers. It establishes a general model for spatial referencing using geographic identifiers, defines the components of a spatial reference system and defines the essential components of a gazetteer. Spatial referencing by coordinates is not addressed in this document; however, a mechanism for recording complementary coordinate references is included.  ISO 19912:2003 assists users in understanding the spatial references used in datasets. It enables gazetteers to be constructed in a consistent manner and supports the development of other standards in the field of geographic information. It is applicable to digital geographic data, and its principles may be extended to other forms of geographic data such as maps, charts and textual documents. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26017> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26017> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OGC KML | | | | | | | | |
| **Description** | | | | | | | | |
| OGC KML is an XML grammar used to encode and transport representations of geographic data for display in an earth browser. Put simply: KML encodes what to show in an earth browser, and how to show it. Geographic visualization includes not only the presentation of graphical data on the globe, but also the control of the user's navigation in the sense of where to go and where to look.  KML is focused on geographic visualization, including annotation of maps and images. Geographic visualization includes not only the presentation of graphical data on the globe, but also the control of the user's navigation in the sense of where to go and where to look. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OGC | | | | | | | | |
| **Version** | | | | | | | | |
| Official Schema: <http://schemas.opengis.net/kml/> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/kml> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geography Markup Language | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Geography Markup Language (GML) Encoding Implementation Standard is an XML grammar to express geographical features. GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. The GML information model is based on the ISO 19100 series of International Standards and the OGC Abstract Specification. In addition, GML provides XML encodings for additional concepts not yet modeled in the ISO 19100 series of International Standards or the OpenGIS Abstract Specification, for example, dynamic features, simple observations or value objects.  GML defines the XML Schema syntax, mechanisms and conventions that:   * Provide an open, vendor-neutral framework for the description of geospatial application schemas for the transport and storage of geographic information in XML; * Allow profiles that support proper subsets of GML framework descriptive capabilities; * Support the description of geospatial application schemas for specialized domains and information communities; * Enable the creation and maintenance of linked geographic application schemas and datasets; * Support the storage and transport of geospatial application schemas and datasets; * Increase the ability of organizations to share geographic application schemas and the information they describe. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO, OGC | | | | | | | | |
| **Version** | | | | | | | | |
| <http://www.opengeospatial.org/standards/gml> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/gml> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| sensorML | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Sensor Model Language Encoding Standard (SensorML) specifies models and XML encoding that provide a framework within which the geometric, dynamic, and observational characteristics of sensors and sensor systems can be defined. There are many different sensor types, from simple visual thermometers to complex electron microscopes and earth observing satellites. These can all be supported through the definition of atomic process models and process chains. Within SensorML, all processes and components are encoded as application schema of the Feature model in the Geographic Markup Language (GML) | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO, OGC | | | | | | | | |
| **Version** | | | | | | | | |
| Current version: [OpenGIS Sensor Model Language (SensorML)](http://portal.opengeospatial.org/files/?artifact_id=12606) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/sensorml> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information reference Model | | | | | | | | |
| **Description** | | | | | | | | |
| This International Standard defines the framework for standardization in the field of geographic information and sets forth the basic principles by which this standardization takes place.  This framework identifies the scope of the standardization activity being undertaken and the context in which it takes place. The framework provides the method by which what is to be standardized can be determined and describes how the contents of the standards are related.  Although structured in the context of information technology and information technology standards, this International Standard is independent of any application development method or technology implementation approach. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version : <http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=26002>  New version pending | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Standard Represesenation of geographic point location by coordinates | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 6709:2008 is applicable to the interchange of coordinates describing geographic point location. It specifies the representation of coordinates, including latitude and longitude, to be used in data interchange. It additionally specifies representation of horizontal point location using coordinate types other than latitude and longitude. It also specifies the representation of height and depth that can be associated with horizontal coordinates. Representation includes units of measure and coordinate order.  ISO 6709:2008 is not applicable to the representation of information held within computer memories during processing and in their use in registers of geodetic codes and parameters.  ISO 6709:2008 supports point location representation through the eXtensible Markup Language (XML) and, recognizing the need for compatibility with the previous version of this International Standard, ISO 6709:1983, allows for the use of a single alpha-numeric string to describe point locations.  For computer data interchange of latitude and longitude, ISO 6709:2008 generally suggests that decimal degrees be used. It allows the use of sexagesimal notations: degrees, minutes and decimal minutes or degrees, minutes, seconds and decimal seconds.  ISO 6709:2008 does not require special internal procedures, file-organization techniques, storage medium, languages, etc., to be used in its implementation | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version : <http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=39242>  This supersedes ISO 6709-1983 Standard representation of latitude, longitude and altitude for point locations | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| GeographiC Information Profiles | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19106:2004 is intended to define the concept of a profile of the ISO geographic information standards developed by ISO/TC 211 and to provide guidance for the creation of such profiles. Only those components of specifications that meet the definition of a profile contained herein can be established and managed through the mechanisms described in this International Standard. These profiles can be standardized internationally using the ISO standardization process. This document also provides guidance for establishing, managing, and standardizing at the national level (or in some other forum). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Curent Version: <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26011> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information – Spatial Schema | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19107:2003 specifies conceptual schemas for describing the spatial characteristics of geographic features, and a set of spatial operations consistent with these schemas. It treats vector geometry and topology up to three dimensions. It defines standard spatial operations for use in access, query, management, processing, and data exchange of geographic information for spatial (geometric and topological) objects of up to three topological dimensions embedded in coordinate spaces of up to three axes. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26012> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information – TemporaL Schema | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19108:2002 defines concepts for describing temporal characteristics of geographic information. It depends upon existing information technology standards for the interchange of temporal information. It provides a basis for defining temporal feature attributes, feature operations, and feature associations, and for defining the temporal aspects of metadata about geographic information. Since this International Standard is concerned with the temporal characteristics of geographic information as they are abstracted from the real world, it emphasizes valid time rather than transaction time | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: <http://www.iso.org/iso/catalogue_detail.htm?csnumber=26013> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic information – metadata and XML Schema ImplementaTion | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19115:2003 defines the schema required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data. It is applicable to:   * the cataloguing of datasets, clearinghouse activities, and the full description of datasets; * geographic datasets, dataset series, and individual geographic features and feature properties.   ISO 19115:2003 defines:   * mandatory and conditional metadata sections, metadata entities, and metadata elements; * the minimum set of metadata required to serve the full range of metadata applications (data discovery, determining data fitness for use, data access, data transfer, and use of digital data); * optional metadata elements - to allow for a more extensive standard description of geographic data, if required; * a method for extending metadata to fit specialized needs.   Though ISO 19115:2003 is applicable to digital data, its principles can be extended to many other forms of geographic data such as maps, charts, and textual documents as well as non-geographic data.  ISO/TS 19139:2007 defines Geographic MetaData XML (gmd) encoding, an XML Schema implementation derived from ISO 19115. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Geographic Metadata Model : <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26020>  XML Schema Implementation: <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32557> | | | | | | | | |
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| Geographic information - Geodetic codes and parameters | | | | | | | | |
| **Description** | | | | | | | | |
| ISO TS 19127:2005 defines rules for the population and maintenance of registers of geodetic codes and parameters and identifies the data elements, in compliance with ISO 19135 and ISO 19111, required within these registers. Recommendations for the use of the registers, the legal aspects, the applicability to historic data, the completeness of the registers, and a mechanism for maintenance are specified by the registers themselves. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: <http://www.iso.org/iso/catalogue_detail.htm?csnumber=41784> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Positioning Services | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19116:2004 specifies the data structure and content of an interface that permits communication between position-providing device(s) and position-using device(s) so that the position-using device(s) can obtain and unambiguously interpret position information and determine whether the results meet the requirements of the use. A standardized interface of geographic information with position allows the integration of positional information from a variety of positioning technologies into a variety of geographic information applications, such as surveying, navigation and intelligent transportation systems. ISO 19116:2004 will benefit a wide range of applications for which positional information is important | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19116:2004:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37805> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Metadata – Part 2 : Extensions for imagery and gridded data | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19115-2:2009 extends the existing geographic metadata standard by defining the schema required for describing imagery and gridded data. It provides information about the properties of the measuring equipment used to acquire the data, the geometry of the measuring process employed by the equipment, and the production process used to digitize the raw data. This extension deals with metadata needed to describe the derivation of geographic information from raw data, including the properties of the measuring system, and the numerical methods and computational procedures used in the derivation. The metadata required to address coverage data in general is addressed sufficiently in the general part of ISO 19115. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19115-2:2009:  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=39229 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Geographic Information Services | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19119:2005 identifies and defines the architecture patterns for service interfaces used for geographic information, defines its relationship to the Open Systems Environment model, presents a geographic services taxonomy and a list of example geographic services placed in the services taxonomy. It also prescribes how to create a platform-neutral service specification, how to derive conformant platform-specific service specifications, and provides guidelines for the selection and specification of geographic services from both platform-neutral and platform-specific perspectives. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19119:2005:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39890> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Rules for application schema | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19109:2005(E) defines rules for creating and documenting application schemas, including principles for the definition of features. Its scope includes the following:   * conceptual modelling of features and their properties from a universe of discourse; * definition of application schemas; * use of the conceptual schema language for application schemas; * transition from the concepts in the conceptual model to the data types in the application schema; * Integration of standardized schemas from other ISO geographic information standards with the application schema.   The following are outside the scope:   * choice of one particular conceptual schema language for application schemas; * definition of any particular application schema; * representation of feature types and their properties in a feature catalogue; * representation of metadata; * rules for mapping one application schema to another; * implementation of the application schema in a computer environment; * computer system and application software design; * programming. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19109:2005(E): <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39891> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Reference model – Part 2: Imagery | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19101 defines a reference model for standardization in the field of geographic imagery processing. This reference model identifies the scope of the standardization activity being undertaken and the context in which it takes place. The reference model includes gridded data with an emphasis on imagery. Although structured in the context of information technology and information technology standards, ISO/TS 19101-2:2008 is independent of any application development method or technology implementation approach. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19101  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39983> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information Portrayal | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19117:2005 defines a schema describing the portrayal of geographic information in a form understandable by humans. It includes the methodology for describing symbols and mapping of the schema to an application schema. It does not include standardization of cartographic symbols, and their geometric and functional description. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19117:2005  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=40395 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Location based service reference Model | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19132:2007 defines a reference model and a conceptual framework for location-based services (LBS), and describes the basic principles by which LBS applications may interoperate. This framework references or contains an ontology, a taxonomy, a set of design patterns and a core set of LBS service abstract specifications in UML. ISO 19132:2007 further specifies the framework's relationship to other frameworks, applications and services for geographic information and to client applications.  ISO 19132:2007 addresses, for an LBS system, the first three basic viewpoints as defined in the Reference Model for Open Distributed Processing (RM-ODP, see ISO/IEC 10746-1). These viewpoints are the Enterprise Viewpoint – detailing the purpose, scope, and policies of the system; Information Viewpoint – detailing the semantics of information and processing within the system; Computational Viewpoint – detailing the functional decomposition of the system.  The fourth and fifth viewpoints are addressed only in requirements or examples. These are the Engineering Viewpoint – detailing the infrastructure for distribution; Technology Viewpoint – detailing the technology for implementation;  Reference models and frameworks can be defined at a variety of levels, from conceptual design to software documentation. ISO 19132:2007 defines the conceptual framework for and the type of applications included within LBS, establishes general principles for LBS for both mobile and fixed clients, specifies the interface for data access while roaming, defines the architectural relationship with other ISO geographic information standards, and identifies areas in which further standards for LBS are required.  ISO 19132:2007 does not address rules by which LBS are developed, nor general principles for roaming agreements for mobile clients and tracking targets. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19132:2007:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40601> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Spatial Referencing by co-ordinates | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19111:2007 defines the conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatio-temporal referencing. It describes the minimum data required to define one-, two- and three-dimensional spatial coordinate reference systems with an extension to merged spatial-temporal reference systems. It allows additional descriptive information to be provided. It also describes the information required to change coordinates from one coordinate reference system to another.  In ISO 19111:2007, a coordinate reference system does not change with time. For coordinate reference systems defined on moving platforms such as cars, ships, aircraft and spacecraft, the transformation to an Earth-fixed coordinate reference system can include a time element.  ISO 19111:2007 is applicable to producers and users of geographic information. Although it is applicable to digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and text documents.  The schema described can be applied to the combination of horizontal position with a third non-spatial parameter which varies monotonically with height or depth. This extension to non-spatial data is beyond the scope of ISO 19111:2007 but can be implemented through profiles. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19111:2007:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=41126> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic information terminology | | | | | | | | |
| **Description** | | | | | | | | |
| ISO TS 19104:2008 is applicable to international communication in the field of geographic information.  It provides the guidelines for collection and maintenance of terminology in the field of geographic information. It establishes criteria for selection of concepts to be included in other standards concerning geographic information, which are developed by ISO/TC 211, specifies the structure of the terminological record, and describes the principles for definition writing.  ISO TS 19104:2008 also lays down the guidelines for maintenance of a Terminology Repository. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO TS 19104:2008:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=45020> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| A reference to a terminology repository could be considered as part of the preserved data set composition | | | | | | | | |

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| Imagery Sensor models for geopositioning | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TS 19130:2010 identifies the information required to determine the relationship between the position of a remotely sensed pixel in image coordinates and its geoposition. It supports exploitation of remotely sensed images. It defines the metadata to be distributed with the image to enable user determination of geographic position from the observations.  ISO/TS 19130:2010 specifies several ways in which information in support of geopositioning may be provided.   1. It may be provided as a sensor description with the associated physical and geometric information necessary to rigorously construct a Physical Sensor Model. For the case where precise geoposition information is needed, ISO/TS 19130:2010 identifies the mathematical formulae for rigorously constructing Physical Sensor Models that relate two-dimensional image space to three-dimensional ground space and the calculation of the associated propagated errors. ISO/TS 19130:2010 provides detailed information for three types of passive electro-optical/infrared (IR) sensors (frame, pushbroom and whiskbroom) and for an active microwave sensing system [Synthetic Aperture Radar (SAR)]. It provides a framework by which these sensor models can be extended to other sensor types. 2. It may be provided as a True Replacement Model, using functions whose coefficients are based on a Physical Sensor Model so that they provide information for precise geopositioning, including the calculation of errors, as precisely as the Physical Sensor Model they replace. 3. It may be provided as a Correspondence Model that provides a functional fitting based on observed relationships between the geopositions of a set of ground control points and their image coordinates. 4. It may be provided as a set of ground control points that can be used to develop a Correspondence Model or to refine a Physical Sensor Model or True Replacement Model.   ISO/TS 19130:2010 does not specify either how users derive geoposition data or the format or content of the data the users generate. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/TS 19130:2010  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51789> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Intelligent transport systems – Geographic data file (GDF) – Overall specification | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 14825:2004 specifies the conceptual and logical data model and the exchange format for geographic data bases for Intelligent Transportation System (ITS) applications. It includes a specification of potential contents of such data bases (features, attributes and relationships), a specification of how these contents shall be represented, and of how relevant information about the database itself can be specified (metadata).  The focus of this International Standard is on ITS applications and it emphasizes road and road-related information. ITS applications, however, also require information in addition to road and road-related information.  EXAMPLE 1 ITS applications need information about addressing systems in order to specify locations and/or destinations. Consequently, information about the administrative and postal subdivisions of an area is essential.  EXAMPLE 2 Map display is an important component of ITS applications. For proper map display, the inclusion of contextual information such as land and water cover is essential.  EXAMPLE 3 Point-of-Interest (POI) or service information is a key feature of traveler information. It adds value to end-user ITS applications. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 14825:2004:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=30763> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 1 |  |  |  |  |  |  |  |

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| SQL multimedia and application packages – Part 3 Spatial | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/IEC 13249-3:2006 defines spatial user-defined types, routines and schemas for generic spatial data handling. It addresses the need to store, manage and retrieve information based on aspects of spatial data such as geometry, location and topology.  Implementations of ISO/IEC 13249-3:2006 may exist in environments that also support geographic information, decision support, data mining, and data warehousing systems. Application areas addressed by implementations of ISO/IEC 13249-3:2006 include, but are not restricted to, automated mapping, desktop mapping, facilities management, geoengineering, graphics, location based services, multimedia, and resource management applications. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/IEC 13249-3:2006  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=38651 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Standard representation of gepgraphic poinht location by co-ordinates | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 6709:2008 is applicable to the interchange of coordinates describing geographic point location. It specifies the representation of coordinates, including latitude and longitude, to be used in data interchange. It additionally specifies representation of horizontal point location using coordinate types other than latitude and longitude. It also specifies the representation of height and depth that can be associated with horizontal coordinates. Representation includes units of measure and coordinate order.  ISO 6709:2008 is not applicable to the representation of information held within computer memories during processing and in their use in registers of geodetic codes and parameters.  ISO 6709:2008 supports point location representation through the eXtensible Markup Language (XML) and, recognizing the need for compatibility with the previous version of this International Standard, ISO 6709:1983, allows for the use of a single alpha-numeric string to describe point locations.  For computer data interchange of latitude and longitude, ISO 6709:2008 generally suggests that decimal degrees be used. It allows the use of sexagesimal notations: degrees, minutes and decimal minutes or degrees, minutes, seconds and decimal seconds.  ISO 6709:2008 does not require special internal procedures, file-organization techniques, storage medium, languages, etc., to be used in its implementation. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 6709:2008  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39242> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Conformance and testing | | | | | | | | |
| **Description** | | | | | | | | |
| This International Standard specifies the framework, concepts and methodology for testing and criteria to be achieved to claim conformance to the family of ISO geographic information standards. It provides a framework for specifying abstract test suites (ATS) and for defining the procedures to be followed during conformance testing. Conformance may be claimed for data or software products or services or by specifications including any profile or functional standard.  Standardization of test methods and criteria for conformance to geographic information standards will allow verification of conformance to those standards. Verifiable conformance is important to geographic information users, in order to achieve data transfer and sharing.  This International Standard is applicable to all the phases of conformance and testing. These phases are characterized by the following major activities:   * the definition of ATS for conformance to the ISO geographic information standards; * the definition of test methods for conformance to the ISO geographic information standards; * the conformance assessment process carried out by a testing laboratory for a client, culminating in the production of a conformance test report.   This International Standard specifies the requirements for, and gives guidance on, the procedures to be followed in conformance testing for the ISO geographic information standards. It includes only such information as is necessary to meet the following objectives:   * to achieve confidence in the tests as a measure of conformance; * to achieve comparability between the results of corresponding tests applied in different places at different times; * to facilitate communication between the parties responsible for the activities described in 1) and 2).   This International Standard provides a framework for certification (an administrative procedure which may follow conformance testing) in informative annex B. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19105:2000  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=26010 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Functional standards | | | | | | | | |
| **Description** | | | | | | | | |
| Project to develop a taxonomy, in the form of a type 3 report, of recognized functional standards in the field of geographic information/geomatics developed in other international or multi-national standardization forums. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/TR 19120:2001  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=28928 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Data Quality Measures | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TS 19138:2006 define a set of data quality measures. These can be used when reporting data quality for the data quality sub elements identified in ISO 19113. Multiple measures are defined for each data quality sub element, and the choice of which to use will depend on the type of data and its intended purpose.  The data quality measures are structured so that they can be maintained in a register established in conformance with ISO 19135.  ISO/TS 19138:2006 does not attempt to describe every possible data quality measure, only a set of commonly used ones. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/TS 19138:2006  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=32556 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Data Product Specification | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19131:2007 specifies requirements for the specification of geographic data products, based upon the concepts of other ISO 19100 International Standards. It also provides help in the creation of data product specifications, so that they are easily understood and fit for their intended purpose. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19131:2007  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=36760> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information - Encoding | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19118:2005 specifies the requirements for defining encoding rules to be used for interchange of geographic data within the ISO 19100 series of International Standards.  ISO 19118:2005 specifies   * requirements for creating encoding rules based on UML schemas, * requirements for creating encoding services, * an informative XML based encoding rule for neutral interchange of geographic data.   ISO 19118:2005 does not specify any digital media, it does not define any transfer services or transfer protocols, nor does it specify how to encode inline large images. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19118:2005  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=37796 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Methodology for feature Cataloguing | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19110:2005 defines the methodology for cataloguing feature types and specifies how the classification of feature types is organized into a feature catalogue and presented to the users of a set of geographic data. ISO 19110:2005 is applicable to creating catalogues of feature types in previously uncatalogued domains and to revising existing feature catalogues to comply with standard practice. ISO 19110:2005 applies to the cataloguing of feature types that are represented in digital form. Its principles can be extended to the cataloguing of other forms of geographic data.  ISO 19110:2005 is applicable to the definition of geographic features at the type level. ISO 19110:2005 is not applicable to the representation of individual instances of each type and excludes spatial, temporal, and portrayal schemas as specified in ISO 19107, ISO 19108, and the future ISO 19117, respectively. It also excludes collection criteria for feature instances.  ISO 19910:2005 may be used as a basis for defining the universe of discourse being modelled in a particular application, or to standardize general aspects of real world features being modelled in more than one application | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19110:2005  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=39965 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Schema coverage geometry and functions | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19123:2005 defines a conceptual schema for the spatial characteristics of coverages. Coverages support mapping from a spatial, temporal or spatiotemporal domain to feature attribute values where feature attribute types are common to all geographic positions within the domain. A coverage domain consists of a collection of direct positions in a coordinate space that may be defined in terms of up to three spatial dimensions as well as a temporal dimension. Examples of coverages include rasters, triangulated irregular networks, point coverages and polygon coverages. Coverages are the prevailing data structures in a number of application areas, such as remote sensing, meteorology and mapping of bathymetry, elevation, soil and vegetation.  ISO 19123:2005 defines the relationship between the domain of a coverage and an associated attribute range. The characteristics of the spatial domain are defined whereas the characteristics of the attribute range are not part of ISO 19123:2005. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19123:2005  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=40121 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Schema for moving features | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19141:2008 defines a method to describe the geometry of a feature that moves as a rigid body. Such movement has the following characteristics.   * The feature moves within any domain composed of spatial objects as specified in ISO 19107. * The feature may move along a planned route, but it may deviate from the planned route. * Motion may be influenced by physical forces, such as orbital, gravitational, or inertial forces. * Motion of a feature may influence or be influenced by other features, for example:   + The moving feature might follow a predefined route (e.g. road), perhaps part of a network, and might change routes at known points (e.g. bus stops, waypoints).   + Two or more moving features may be “pulled” together or pushed apart (e.g. an airplane will be refuelled during flight, a predator detects and tracks a prey, refugee groups join forces).   + Two or more moving features may be constrained to maintain a given spatial relationship for some period (e.g. tractor and trailer, convoy).   ISO 19141:2008 does not address other types of change to the feature. Examples of changes that are not adressed include the following:   * The deformation of features. * The succession of either features or their associations. * The change of non-spatial attributes of features. * The feature's geometric representation cannot be embedded in a geometric complex that contains the geometric representations of other features, since this would require the other features' representations to be updated as the feature moves.   Because ISO 19141:2008 is concerned with the geometric description of feature movement, it does not specify a mechanism for describing feature motion in terms of geographic identifiers. This is done, in part, in ISO 19133. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19141:2008  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=41445> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Image, griided and coverage data framework | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TS 19129:2009 defines the framework for imagery, gridded and coverage data. This framework defines a content model for the content type imagery and for other specific content types that can be represented as coverage data. These content models are represented as a set of generic UML patterns for application schemas. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/TS 19129:2009  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=43041 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Spatial Referencing by cordinates | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19111-2:2009 specifies the conceptual schema for the description of spatial referencing using parametric values or functions. It applies the schema of ISO 19111 to combine a position referenced by coordinates with a parametric value to form a spatio‑parametric coordinate reference system (CRS). The spatio‑parametric CRS can optionally be extended to include time.  The intended users of ISO 19111-2:2009 are producers and users of environmental information.  Parameters which are attributes of spatial locations or features, but which are not involved in their spatial referencing, are not addressed by ISO 19111-2:2009 | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19111-2:2009  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=44075> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Feature concept dictionaries and registers | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19123:2009 specifies a schema for feature concept dictionaries to be established and managed as registers. It does not specify schemas for feature catalogues or for the management of feature catalogues as registers. However, because feature catalogue are often derived from feature concept dictionaries, ISO 19123:2009 does specify a schema for a hierarchical register of feature concept dictionaries and feature catalogues. These registers are in accordance with ISO 19135. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19123:2009  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=44875> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Classification Systems – part1: Classifciation systems structure | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19144-1:2009 establishes the structure of a geographic information classification system, together with the mechanism for defining and registering the classifiers for such a system. It specifies the use of discrete coverages to represent the result of applying the classification system to a particular area and defines the technical structure of a register of classifiers in accordance with ISO 19135. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19144-1:2009  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32562> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geographic Information Quality Principals | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19113:2002 establishes the principles for describing the quality of geographic data and specifies components for reporting quality information. It also provides an approach to organizing information about data quality.  ISO 19113:2002 is applicable to data producers providing quality information to describe and assess how well a dataset meets its mapping of the universe of discourse as specified in the product specification, formal or implied, and to data users attempting to determine whether or not specific geographic data is of sufficient quality for their particular application. This International Standard should be considered by organizations involved in data acquisition and purchase, in such a way that it makes it possible to fulfil the intentions of the product specification. It can additionally be used for defining application schemas and describing quality requirements.  As well as being applicable to digital geographic data, the principles of ISO 19113:2002 can be extended to identify, collect and report the quality information for a geographic dataset, its principles can be extended and used to identify, collect and report quality information for a dataset series or smaller groupings of data that are a subset of a dataset. Although ISO 19113:2002 is applicable to digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and textual documents.  ISO 19113:2002 does not attempt to define a minimum acceptable level of quality for geographic data. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=26018 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OGC Abstract Specification | | | | | | | | |
| **Description** | | | | | | | | |
| The Open Geospatial Consortium maintains the OGC Abstract Specification as a number of Topic Volumes. This Topic is an overview of the OpenGIS. Abstract Specification. Each  Topic Volume addresses a specific set of abstract models, such as for metadata or geometry, required as a foundation unit upon which to build OGC interoperability standards. The complete set of Topic Volumes collectively forms the OpenGIS. Abstract Specification [2].  The purpose of the Abstract Specification is to create and document a conceptual model sufficient enough to allow for the creation of Implementation Specifications.  The purpose of the Abstract Specification is:   * To relate software and system design to real world situations. * To capture and precisely state requirements and domain knowledge so that all stakeholders may understand and agree on them. * To think about the design of the system. * To capture design decisions in a mutable form separate from the requirements. * To generate usable work products (such as prototypes and proof of concept implementations). * To organize, find, filter, retrieve, examine and edit information about large systems. * To explore multiple solutions economically. * To master complexity.   The Abstract Specification, and specifically the Abstract Model, is used in all these capacities.  Additionally, it provides an implementation neutral, but technically completes language. To discuss issues of interoperability. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Version** | | | | | | | | |
| [Topic 0 - Overview](http://portal.opengeospatial.org/files/?artifact_id=7560)  **Topic 1 - Feature Geometry (**ISO 19107, available at <http://www.iso.org>. )  [Topic 2: Spatial refererencing by coordinates](http://portal.opengeospatial.org/files/?artifact_id=39049)  [Topic 3 - Locational Geometry Structures](http://portal.opengeospatial.org/files/?artifact_id=886)  [Topic 4 - Stored Functions and Interpolation](http://portal.opengeospatial.org/files/?artifact_id=887" \t "_blank)  [Topic 5 - Features](http://portal.opengeospatial.org/files/?artifact_id=29536" \t "_blank)  [Topic 6 - Schema for coverage geometry and functions](http://portal.opengeospatial.org/files/?artifact_id=19820" \t "_blank) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/as> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Quality evaluation procedures | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19114:2003 provides a framework of procedures for determining and evaluating quality that is applicable to digital geographic datasets, consistent with the data quality principles defined in ISO 19113. It also establishes a framework for evaluating and reporting data quality results, either as part of data quality metadata only, or also as a quality evaluation report.  ISO 19114:2003 is applicable to data producers when providing quality information on how well a dataset conforms to the product specification, and to data users attempting to determine whether or not the dataset contains data of sufficient quality to be fit for use in their particular applications.  Although ISO 19114:2003 is applicable to all types of digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and textual documents. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19114:2003 <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26019> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| CityGML | | | | | | | | |
| **Description** | | | | | | | | |
| This standard is an OpenGIS® Encoding Standard for the representation, storage and exchange of virtual 3D city and landscape models. CityGML is implemented as an application schema of the Geography Markup Language version 3.1.1 (GML3). CityGML models both complex and georeferenced 3D vector data along with the semantics associated with the data. In contrast to other 3D vector formats, CityGML is based on a rich, general purpose information model in addition to geometry and appearance information. For specific domain areas, CityGML also provides an extension mechanism to enrich the data with identifiable features under preservation of semantic interoperability. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Autodesk, Inc. (primary submitter)  Bentley Systems, Inc. (primary submitter)  Technical University Berlin (submitter of technology)  Ordnance Survey, UK  University of Bonn, Germany  Hasso-Plattner-Institute for IT Systems Engineering, University of Potsdam | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 [OpenGIS® City Geography Markup Language (CityGML) Encoding Standard](http://portal.opengeospatial.org/files/?artifact_id=28802) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.citygml.org> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Coordinate Transformation Service | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Coordinate Transformation Service Standard (CT) provides a standard way for software to specify and access coordinate transformation services for use on specified spatial data. This standard addresses a key requirement for overlaying views of geodata (“maps”) from diverse sources: the ability to perform coordinate transformation in such a way that all spatial data are defined relative to the same spatial reference system. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Computer Aided Development Corporation (Cadcorp) Ltd. | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 [OpenGIS Coordinate Transformation Service Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=999) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/ct> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Filter Encoding Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Filter Encoding Standard (FES) defines an XML encoding for filter expressions. A filter expression logically combines constraints on the properties of a feature in order to identify a particular subset of features to be operated upon. For example, a subset of features might be identified to render them in a particular color or convert them into a user-specified format. Constraints can be specified on values of spatial, temporal and scalar properties. An example of a filter is: Find all the properties in Omstead County owned by Peter Vretanos. This standard is used by a number of OGC Web Services, including   * the Web Feature Service [http://www.opengeospatial.org/standards/wfs] * the Catalogue Service [http://www.opengeospatial.org/standards/cat] * the Styled Layer Descriptor Standard [http://www.opengeospatial.org/standards/sld] | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CubeWerx Inc.  Intergraph Corp.  IONIC Software  Laser-Scan Ltd. | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.1 [OpenGIS Filter Encoding Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=8340)  Version  1.0 [Filter Encoding](http://portal.opengeospatial.org/files/?artifact_id=1171) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/filter> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| GML in JPEG 2000 for Geographic Imagery encoding | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® GML in JPEG 2000 for Geographic Imagery Encoding Standard defines the means by which the OpenGIS® Geography Markup Language (GML) Standard [http://www.opengeospatial.org/standards/gml] is used within JPEG 2000 [www.jpeg.org/jpeg2000/] images for geographic imagery. The standard also provides packaging mechanisms for including GML within JPEG 2000 data files and specific GML application schemas to support the encoding of images within JPEG 2000 data files. JPEG 2000 is a wavelet-based image compression standard that provides the ability to include XML data for description of the image within the JPEG 2000 data file. See also the GML pages on OGC Network: http://www.ogcnetwork.net/gml . | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Galdos Systems Inc.  LizardTech, A Celartem Company  European Union Satellite Centre (EUSC)  DM Solutions Group Inc (DMSG)  US Geological Survey (USGS) National Mapping Division | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0.0 [OpenGIS GML in JPEG 2000 for Geographic Imagery Encoding Specification](http://portal.opengeospatial.org/files/?artifact_id=13252) Version 0.3.0 [GML in JPEG 2000 for Geographic Imagery](http://portal.opengeospatial.org/files/?artifact_id=11418) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/gmljp2> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance | 1 |  |  |  |  | 1 |  |  |

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| OpenGIS Geographic Implementation Specification | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Geographic Objects Interface Standard (GOS) provides an open set of common, lightweight, language-independent abstractions for describing, managing, rendering, and manipulating geometric and geographic objects within an application programming environment. It provides both an abstract object standard (in UML) and a programming-language-specific profile (in Java). The language-specific bindings serve as an open Application Program Interface (API). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| SYS Technologies  Northrop Grumman Information Technology  Pennsylvania State University | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0.0 [OpenGIS Geographic Objects Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=10378) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/go> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Geospatial eXtensible Access Control Markup Language (GeoXACML) | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Geospatial eXtensible Access Control Markup Language Encoding Standard (GeoXACML) defines a geospatial extension to the OASIS standard “eXtensible Access Control Markup Language (XACML)” [www.oasis-open.org/committees/xacml/]. This extension incorporates spatial data types and spatial authorization decision functions based on the OGC Simple Features[http://www.opengeospatial.org/standards/sfa] and GML[http://www.opengeospatial.org/standards/gml] standards. GeoXACML is a policy language that supports the declaration and enforcement of access rights across jurisdictions and can be used to implement interoperable access control systems for geospatial applications such as Spatial Data Infrastructures. GeoXACML is not designed to be a rights expression language and is therefore not an extension of the OGC GeoDRM Reference Model (Topic 18 in the OpenGIS® Abstract Specification [http://www.opengeospatial.org/standards/as]). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Universität der Bundeswehr  Galdos Systems Inc | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 [Geospatial eXtensible Access Control Markup Language (GeoXACML)](http://portal.opengeospatial.org/files/?artifact_id=25218) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/geoxacml> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| Open Location Services Interface Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Open Location Services Interface Standard (OpenLS) specifies interfaces that enable companies in the Location Based Services (LBS) value chain to “hook up” and provide their pieces of applications such as emergency response (E-911, for example), personal navigator, traffic information service, proximity service, location recall, mobile field service, travel directions, restaurant finder, corporate asset locator, concierge, routing, vector map portrayal and interaction, friend finder, and geography voice-graphics. These applications are enabled by interfaces that implement OpenLS services such as a Directory Service, Gateway Service, Geocoder Service, Presentation (Map Portrayal) Service and others  . | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Autodesk, Canada ESRI, USA  Image Matters, USA  Intergraph, IntelliWhere  Australia MapInfo, USA  Navigation Technologies, USA  Oracle, USA  Sun Microsystems, USA  Webraska, France  Tele Atlas,USA  Telcontar, USA | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.2 [OpenGIS Location Service (OpenLS) Implementation Specification: Core Services](http://portal.opengeospatial.org/files/?artifact_id=22122) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/ols | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Implementation Standard for Geographic information - Simple feature access - Part 1: Common architecture | | | | | | | | |
| **Description** | | | | | | | | |
| This part of OpenGIS® Simple Features Access (SFA), also called ISO 19125, describes the common architecture for simple feature geometry. The simple feature geometry object model is Distributed Computing Platform neutral and uses UML notation. The base Geometry class has subclasses for Point, Curve, Surface and GeometryCollection. Each geometric object is associated with a Spatial Reference System, which describes the coordinate space in which the geometric object is defined.  This part of OGC Simple Feature Access implements a profile of the spatial schema described in ISO 19107:2003, *Geographic information*  *Spatial schema*. Annex A provides a detailed mapping of the schema in this part of SFA with the schema described in ISO 19107:2003.This standard consists of the following parts, under the general title Geographic information  Simple feature access:  — Part 1: Common architecture  — Part 2: SQL option  This version supersedes all previous versions of OpenGIS® Simple Features Implementation Standard for SQL, including portions of OGC 99-049 "OpenGIS Simple Features Standard for SQL Rev 1.1", OGC 99-050 "OpenGIS Simple Features Standard For OLE/COM Rev 1.1", OGC 99-054 “OpenGIS Simple Features Standard For CORBA Revision 1.1.”, and OGC 05-126 “OpenGIS Implementation Standard for Geographic information - Simple feature access - Part 1: Common architecture”. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.2.1 [OpenGIS Implementation Specification for Geographic information - Simple feature access - Part 1: Common architecture](http://portal.opengeospatial.org/files/?artifact_id=25355)   Version 1.2.1 [OpenGIS Implementation Specification for Geographic information - Simple feature access - Part 2: SQL option](http://portal.opengeospatial.org/files/?artifact_id=25354) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/sfa | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| OpenGIS Simple feature Implementation for CORBA | | | | | | | | |
| **Description** | | | | | | | | |
| The three OpenGIS® Simple Features Implementation Specifications CORBAdefine interfaces that enable transparent access to geographic data held in heterogeneous processing systems on distributed computing platforms. The Simple Feature Specification application programming interfaces (APIs) provide for publishing, storage, access, and simple operations on Simple Features (point, line, polygon, multi-point, etc). The purpose of these specifications is to describe interfaces to allow GIS software engineers to develop applications that expose functionality required to access and manipulate geospatial information comprising features with 'simple' geometry using different technologies. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Bentley Systems, Inc.  Environmental Systems Research Institute (ESRI)  Genasys II, Inc.  Oracle Corporation  Sun Microsystems, Inc  University of California at Los Angeles (UCLA) | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 [OpenGIS Simple Features Implementation Specification for CORBA](http://portal.opengeospatial.org/files/?artifact_id=834) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 2 |  |  |

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| Simple Features Implementation for OLE/COM | | | | | | | | |
| **Description** | | | | | | | | |
| The Simple Features Implementation Specifications OLE/COMdefine interfaces that enable transparent access to geographic data held in heterogeneous processing systems on distributed computing platforms. The Simple Feature Specification application programming interfaces (APIs) provide for publishing, storage, access, and simple operations on Simple Features (point, line, polygon, multi-point, etc). The purpose of these specifications is to describe interfaces to allow GIS software engineers to develop applications that expose functionality required to access and manipulate geospatial information comprising features with 'simple' geometry using different technologies. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Camber Corporation  Environmental Systems Research Institute (ESRI)  Intergraph Corporation  Laser-Scan, Ltd.  MapInfo Corporation  Smallworldwide, plc. | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.1 [OpenGIS Simple Features Implementation Specification for OLE/COM](http://portal.opengeospatial.org/files/?artifact_id=830) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/sfo | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Geomatics – Qualification and certification of personnel | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/TR 19122:2004 is applicable to the following aspects of the field of Geographic Information/Geomatics:   * To develop a Type 3 report, which describes a system for the qualification and certification, by a central independent body, of personnel in the field of Geographic Information/Geomatics? * To define the boundaries between Geographic Information/ Geomatics and other related disciplines and professions. * To specify technologies and tasks pertaining to Geographic Information/Geomatics. * To establish skill sets and competency levels for technologists, professional staff and management in the field. * To research the relationship between this initiative and other similar certification processes performed by existing professional associations. * To develop a plan for the accreditation of candidate institutions and programs, for the certification of individuals in the workforce, and for collaboration with other professional bodies. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/TR 19122:2004:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31088> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| ISO 14000 environmental management standards | | | | | | | | |
| **Description** | | | | | | | | |
| The ISO 14000 environmental management standards exist to help organisations ensure that their operations do not have a negative impact on the environment, that they comply with applicable laws, regulations, and other environmental requirements, and that they continually improve on these. ISO 14000 is similar to the [ISO 9000](http://www.lennoxhill.co.uk/what-is-iso-9000.html) quality management in that it also concerns itself with how the product is produced, in other words the process, rather than the product itself. It was revised in May 2004 with the updated standard called ISO 14000:2004.  ISO 14001:2004 is the requirement standard of the ISO 14000 series. It specifies a framework for an Environmental Management System against which an organisation can be certified by a third party.  The standard applies to all types and sizes of organisations and while it does not establish absolute requirements for environmental performance, it does require a commitment to continual improvement and compliance with applicable legislation and regulations. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 14001:2004  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31807> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| CEOS WGISS Interoperability Handbook | | | | | | | | |
| **Description** | | | | | | | | |
| The CEOS (Community on Earth Observation Satellites) Interoperability handbook provides recommendations for the implementation of interoperable systems drawn from the CEOS Working Group on Information Systems and Services (WGISS) 10 year experience. It is a handbook, not an academic essay devoted to the Final Fantasy theory of interoperability. It is for immediate use by anyone willing to implement interoperable services in a way that preserves their interoperability.  While a stand-alone system is usually built for a community with several needs, an interoperable system is built as part of a broader system for different communities sharing similar needs. Interoperable systems are actually systems of systems, with each of their components providing at least one part of the full answers expected by their users.  An interoperable system cannot be implemented in the same way as a stand-alone system because it must be built upon the same underlying concepts as are the other interoperable systems with which it will interact. Thus, implementing an interoperable system requires to follow particular guidelines.  These guidelines applied to Earth observation systems are shown in this handbook as recommendations. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CEOS working group | | | | | | | | |
| **Version** | | | | | | | | |
| [CEOS Interoperability Handbook (version 1.1)](http://www.ceos.org/images/WGISS/Documents/Handbook.pdf) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.ceos.org/index.php?option=com_content&view=category&layout=blog&id=77&Itemid=199> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Ordering Services for Earth Observation Products | | | | | | | | |
| **Description** | | | | | | | | |
| The candidate standard is currently an OGC “Best Practices” document. The proposed candidate standard is the result of several years of activities in the ESA Heterogeneous Mission Accessibility – Interoperability (HMA–I) project and further updated in the frame of ESA DAIL (Data Access Integration Layer) Implementation Project. The purpose of above projects was to define and then to implement the protocols for allowing a smooth integration between the ESA Ground Segment and the other partners Space Agencies.  The scope of the candidate standard is to define the interfaces for implementing Web Services allowing the clients to issue order for archived, planned and future potential Earth Observation products.  In the frame of this SWG’s activities, the candidate standard will be reviewed and commented by the OGC members and the public and the gathered comments will be processed in order to further improve the candidate standard. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Version** | | | | | | | | |
| Reference number of this OGC® project document: **06-141r2**  [Ordering Services for Earth Observation Products](http://portal.opengeospatial.org/files/?artifact_id=22114) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/projects/groups/order-eo1.0.swg> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| User management interfaces for Earth observation services | | | | | | | | |
| **Description** | | | | | | | | |
| This specification is complementary to a set of specifications that describe services for managing Earth Observation (EO) data products. These services include collection level, and product level catalogues, online-ordering for existing and future products, on-line access etc. and are put into context in an overall document.  The intent of this specification is to describe a federated identity management interface that can be supported by many data providers (satellite operators, data distributors …), most of whom have existing (and relatively complex) facilities for the management of their data and users. The strategy is to specify a platform and provider independent interface using existing standards. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Spacebel s.a.  ESA – European Space Agency  Oracle | | | | | | | | |
| **Version** | | | | | | | | |
| Version 0.0.2  <http://services.eoportal.org/portal/documents/07-118r1_User_Management_Interfaces_for_Earth_Observation_0.0.2.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| A Quality assurance framwork for Earth Oservation |
| **Description** |
| QA4EO has been endorsed by CEOS as a contribution to facilitate the GEO vision for a Global Earth Observation System of Systems (GEOSS). The aim of GEOSS is to deliver comprehensiveand timely knowledge / information products worldwide to meet the needs of its nine “societal benefit areas”. This can only be achieved through the synergistic use of data derived from a variety of sources (satellite, airborne and in situ) and the coordination of the resources and efforts of the GEO members.  To accomplish this vision, starting from a system of disparate systems that were built for a multitude of applications, requires the establishment of an internationally coordinated operational framework to facilitate interoperability and harmonisation. The success of this framework, in terms of data, is dependent upon the successful implementation of two key principles: 1. Accessibility / Availability and 2. Suitability / Reliability. Success also requires effective communication of these principles to all stakeholders.  To implement these principles in a harmonised manner, CEOS (the space arm of GEO), through discussion with calibration and validation experts from around the world, established QA4EO to facilitate interoperability of GEO systems. QA4EO is based on the adoption of guiding principles, which are implemented through a set of key operational guidelines derived from best practices, for implementation by the GEO community. Although these guidelines were originally developed to meet the needs of the space community, they have been written with the aid of national metrology institutes of the UK and the USA and, where appropriate, are based on best practices of the wider non-EO community. They should therefore be readily adoptable by all GEO communities as a top-level framework that can subsequently be translated and implemented to serve each specialist need. |
| **Standards Accrediting Organisations** |
| CEOS |

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| **Version** | | | | | | | | |
| The [QA4EO PRINCIPLES](http://qa4eo.org/docs/QA4EO_Principles_v4.0.pdf) provides the background to QA4EO and introduces the key guidelines:   |  |  | | --- | --- | | [QA4EO-QAEO-GEN-DQK-001](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-001_v4.0.pdf) | [A guide to establish a Quality Indicator on a satellite sensor derived data product](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-001_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-002](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-002_v4.0.pdf) | [A guide to content of a documentary procedure to meet the Quality Assurance requirements of CEOS](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-002_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-003](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-003_v4.0.pdf) | [A guide to “reference standards” in support of Quality Assurance requirements of QA4EO](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-003_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-004](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-004_v4.0.pdf) | [A guide to comparisons – organisation, operation and analysis to establish measurement equivalence to underpin the Quality Assurance requirements of QA4EO](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-004_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-005](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-005_v4.0.pdf) | [A guide to establishing validated models, algorithms and software to underpin the Quality Assurance requirements of QA4EO](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-005_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-006](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-006_v4.0.pdf) | [A guide to expression of uncertainty of measurements](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-006_v4.0.pdf) | | [QA4EO-QAEO-GEN-DQK-007](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-007_v4.0.pdf) | [A guide to establishing quantitative evidence of traceability to underpin the Quality Assurance requirements of QA4EO](http://qa4eo.org/docs/QA4EO-QAEO-GEN-DQK-007_v4.0.pdf) | | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://qa4eo.org/background.html | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| ECHO DATA Model | | | | | | | | |
| **Description** | | | | | | | | |
| ECHO's metadata model provides a definition of metadata exchange for NASA's EO community.  ECHO's metadata model was derived from the ECS metadata model with some extensions. ECS data model in turn was developed in parallel to the FGDC model. Metadata conformant with ECS or generally with FGDC can be mapped to ECHO.  ECHO’s metadata model is also being mapped to the core elements of the ISO 19115 standards for ingesting science metadata into the ECHO system and for representing query results produced by the ECHO system. A draft version of the query mapping is available. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NASA | | | | | | | | |
| **Version** | | | | | | | | |
| A draft version of the query mapping is available. The final mappings of both will be complete within the 1st quarter of CY2010. | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.echo.nasa.gov/dataPartnersMetadata.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Content Standard for digital Geospatial Metadata | | | | | | | | |
| **Description** | | | | | | | | |
| The objectives of the standard are to provide a common set of terminology and definitions for the documentation of digital geospatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements.The major uses of metadata are:   * To maintain an organization's internal investment in geospatial data, * To provide information about an organization's data holdings to data catalogues, clearinghouses, and brokerages * To provide information needed to process and interpret data to be received through a transfer from an external source.   The information included in the standard was selected based on four roles that metadata play:   * Availability -- data needed to determine the sets of data that exist for a geographic location. * Fitness for use -- data needed to determine if a set of data meets a specific need. * Access -- data needed to acquire an identified set of data. * Transfer -- data needed to process and use a set of data.   These roles form a continuum in which a user cascades through a pyramid of choices to determine what data are available, to evaluate the fitness of the data for use, to access the data, and to transfer and process the data. The exact order in which data elements are evaluated, and the relative importance of data elements, will not be the same for all users. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Federal Geographic Data Committee | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/metadata/base-metadata/v2_0698.pdf> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.fgdc.gov/metadata/csdgm> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| SWEET | | | | | | | | |
| **Description** | | | | | | | | |
| |  | | --- | | Semantic Web for Earth and Environmental Terminology (SWEET) |   Ontologies are represented in the Ontology Web Language for Earth Realms, Numeric’s, Phenomena (any transient feature), Physical Properties, Space, Physical Substances, Time, Units, and Dataset Properties. The ontologies include some class-subclass relationships between terms as well as other restrictions (e.g., disjoint from).  The ontologies are not very specific. Crosswalks have been created to the Global Change Master Directory keywords and the NetCDF COARDS Climate and Forecast (CF) Conventions. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NASA | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2.2 http://sweet.jpl.nasa.gov/2.2/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **3** |  |  |
| This ontology is a key one in the field in terms of interoperability | | | | | | | | |

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| Common Data Index | | | | | | | | |
| **Description** | | | | | | | | |
| The Common Data Index (CDI) service gives users a highly detailed insight in the availability and geographical spreading of marine data sets that are managed by the SeaDataNet data centres. Moreover it provides a unique interface for requesting access, and if granted, for downloading data sets from the distributed data centres across Europe.  The CDI Version 1 has been launched as pilot in 2008 and very good progress has been made with its population by all SeaDataNet data centres. In June 2010 a further upgrade has taken place to CDI Version 2 which has been achieved in cooperation between SeaDataNet and the Geo-Seas project. The CDI V2 now also supports detailed tracks and polygons which are relevant for describing e.g. bathymetric surveys and seismic surveys.  The aim is to connect all SeaDataNet data centres that are managing a wide range of marine and oceanographic data sets as well as the complimentary Geo-Seas data centres that are managing geological and geophysical data sets. The **CDI metadata format** has been harmonised with the other SeaDataNet directories and makes use of common vocabularies. Moreover the CDI service has a major functionality: by means of a data shopping, tracking and download service mechanism users are provided with a unique and harmonised access to the data sets that are managed at the distributed data centres. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| SeaDataNet | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2: <http://seadatanet.maris2.nl/v_cdi_v2/browse_step.asp> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| This index of standards and common vocabularies is important for interoperability with data in the marine and oceanographic domains | | | | | | | | |

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| DLR Ontology | | | | | | | | |
| **Description** | | | | | | | | |
| The DLR ontology comprises the following two major classification schemes:  The *product classification scheme*, which consists of all the different product related concepts included in the dataset, specifically, the concept of an image, the concept of a patch, the concept of a label, the concept of a feature vector, and the concept for a product itself.  The *land cover/use classification scheme* for annotating image patches. This scheme was constructed according to the classification scheme proposed by DLR, and was extended where needed. The decision was made not to employ “full blown” land cover/use ontology (e.g., Europe CORINE), because the an-notation of image patches currently being carried returns simple labels. The classification scheme only provides the basic structure for annotating patches. It can be further enriched either by the system during the evaluation and the semantic annotation of patches, as more data are handled and annotated, or by the user. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| DLR | | | | | | | | |
| **Version** | | | | | | | | |
| <http://www.earthobservatory.eu/ontologies/dlrOntology-v2.owl>. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| This ontology is of importance for data exploitation and access | | | | | | | | |

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| WONDERWEB Foundational Ontologies Library | | | | | | | | |
| **Description** | | | | | | | | |
| The main goals of the WONDERWEB Foundational Ontologies Library (WFOL are to serve as:  • a starting point for building new ontologies. One of the most important and critical questions when starting a new ontology is determining what things there are in the  domain to be modelled. Adopting a high level view provides an enormous jump  start in answering this question;  • a reference point for easy and rigorous comparisons among different ontological  approaches;  • a common framework for analyzing, harmonizing and integrating existing ontologies and metadata standards (by manually mapping existing categories into the categories assumed by some module(s) in the library).  In addition, the library intends to be:  • *minimal* – as opposed to other comprehensive ontology efforts, we intend the library to be as general as possible, including only the most reusable and widely applicable upper-level categories;  • *rigorous* – where possible, the ontologies in the libraries will be characterized by  means of rich axiomatisations, and the formal consequences (theorems) of such  characterizations will be explored in detail;  • *Extensively researched* – each module in the library is added only after careful evaluation by experts and consultation with canonical works. The basis for ontological choices is documented and referenced. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Laboratory for Applied Ontology | | | | | | | | |
| **Version** | | | | | | | | |
| The latest version of the **Library of Foundational Ontologies** [(download pdf)](http://wonderweb.semanticweb.org/deliverables/documents/D18.pdf).  **Contents**: three reference modules (DOLCE, OCHRE, BFO) and their philosophical comparison, new extensions of DOLCE (the ontology of Description and Situations, a preliminary Ontology of Plans, an ontology of Web Services), some machine-readable encodings, an example of formal semantic links between modules, a mapping between the extended version of DOLCE and WordNet. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **2** |  |  |
| This library could form the potential basis of new ontologies to support interoperability | | | | | | | | |

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| GCMD | | | | | | | | |
| **Description** | | | | | | | | |
| The GCMD Earth science keywords evolve as new metadata records are added and existing records are modified to meet the changing needs of the Earth science community.   These keywords were first offered to the public on April 24, 1995 as Version 1.0.0.   At that time, they were organized in a hierarchy constructed of TOPICs, TERMs, and VARIABLEs.   Changes at the TOPIC level (top level) required a change in the key version number.   TERM changes were indicated through the second digit, with VARIABLE level changes indicated using the third digit of the version number.   A TOPIC change was made in early 2003 when the new TOPIC, Climate Indicators, was added as Version 4.2.2.   A fourth change was made in July 2004 when the TOPIC name, Radiance/Imagery, was changed to Spectral/Engineering to more accurately describe the data sets behind the TOPIC.   The new version number thus became "GCMD Keywords, Version 5.0.1".   A TERM addition was made in March 2005 when the TERM, Paleoclimate Reconstructions, was added.  New TERMs were added in May 2005 (Sun-Earth Interactions) and in December 2005 (Climate Indicators).   New variables were added in 2006, bringing the version to "GCMD Keywords, Version 5.3.8". | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NASA | | | | | | | | |
| **Version** | | | | | | | | |
| Latest version : <http://gcmd.gsfc.nasa.gov/Resources/valids/archives/keyword_list.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **2** |  |  |
| This standard may be important consider for data interoperability purposes | | | | | | | | |

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| VOID vocabulary | | | | | | | | |
| **Description** | | | | | | | | |
| VoID is an RDF Schema vocabulary for expressing metadata about RDF datasets. It is intended as a bridge between the publishers and users of RDF data, with applications ranging from data discovery to cataloging and archiving of datasets. This document is a detailed guide to the VoID vocabulary. It describes how VoID can be used to express general metadata based on Dublin Core, access metadata, structural metadata, and links between datasets. It also provides deployment advice and discusses the discovery of VoID descriptions. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| **Version: 03 March 2011:** <http://www.w3.org/TR/void/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **3** |  |  |
| This standard could prove useful for dataset discovery | | | | | | | | |

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| Standard for Binary Floating-Point Arithmetic | | | | | | | | |
| **Description** | | | | | | | | |
| This standard generalizes ANSI/IEEE Std 754-1985, IEEE Standard for Binary Floating-Point Arithmetic, to remove dependencies on radix and wordlength. It is believed that, except for a possible conflict with the requirements in 5.6 and 7.2 that unrecognizable decimal input strings signal an exception, and in 6.3 that the sign of zero be preserved in certain conversion operations, any implementation conforming to ANSI/IEEE Std 754-1985 will also conform to this standard. In addition, the definition of logb has been enhanced in the Appendix, and two new functions, conv and nearbyinteger, have been added. This standard defines a family of commercially feasible ways for new systems to perform floating-point arithmetic. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| IEEE | | | | | | | | |
| **Version** | | | | | | | | |
| 854-87 : <http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=27840> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| CCSDS Time Code Formats | | | | | | | | |
| **Description** | | | | | | | | |
| The purpose of this Recommendation is to establish a small number of standardized  Recommended time code formats for use in data interchange applications between Agencies of the CCSDS. This Recommendation does not address timing performance issues such as stability, precision, accuracy, etc.  Time codes are digital representations of time information. Four standard CCSDS-Recommended time codes are described (one "unsegmented" and three "segmented" codes) which use the international standard second as the fundamental unit of time.  An unsegmented time code is a pure binary count of time units and fractional time units from a starting time called the "epoch" A segmented time code is one in which the count of time units and fractional time units is accumulated in two or more cascaded counters which count modulo of various bases and start from the epoch.  The four Recommended time code formats carry both the time data (in the TIME  SPECIFICATION FIELD, or T-FIELD) and, where applicable, additional information (in the TIME CODE PREAMBLE FIELD or P-FIELD) that uniquely identifies a specific time code format. The P-FIELD may be either explicit or implicit (refer to paragraph 2.1.1) | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CCSDS | | | | | | | | |
| **Version** | | | | | | | | |
| Version 301.0-B-3 [***http://public.ccsds.org/publications/archive/301x0b2s.pdf***](http://public.ccsds.org/publications/archive/301x0b2s.pdf) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **3** |  |  |

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| EPSG geodetic parameter dataset | | | | | | | | |
| **Description** | | | | | | | | |
| The EPSG geodetic parameter dataset is a structured repository of data required to   * identify co-ordinates such that those co-ordinates describe position unambiguously. This is through a *co-ordinate reference system* (CRS) definition. * define transformations and conversions that allow coordinates to be changed from one CRS to another CRS. Transformations and conversions are collectively called *co-ordinate operations*.   The geographic coverage of the data is worldwide, but it is stressed that the dataset does not and cannot record all possible geodetic parameters in use around the world. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Geodesy Subcommittee of OGP | | | | | | | | |
| **Version** | | | | | | | | |
| The EPSG Geodetic Parameter Dataset may be used free of charge, but its use is subject to the acceptance of the Terms of Use. The dataset is available as an Online Registry or may be downloaded as a relational dataset distributed in an MS Access 2000 database and as SQL scripts. Polygons representing the boundaries of areas of use of the geodetic entities may be downloaded in GML 3.2.1 or Shapefile formats. | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | **2** |  |  |

## Appraisal and Purge Procedures

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| Data Appraisal Procedure from USGS EROS | | | | | | | | |
| **Description** | | | | | | | | |
| The EROS Scientific Records Appraisal Process was designed to be applied to be applied towards all existing long-term science. The steps in the process designed for USGS include:   1. USGS Program Coordinator, Project Manager, or outside entity proposes to the EROS Archivist a collection for review. 2. Appraisal Team assembled including:    1. Archive staff    2. Science staff    3. Project manager    4. Archivist 3. Archive staff documents what is known about the collection. 4. Science team members review the documentation and provide their comments and opinions. 5. Archive staff documents the collection using the online appraisal tool.    1. <http://eros.usgs.gov/government/RAT/tool.php> 6. Archive staff briefs Archivist and Project Manager 7. Archivist sends recommendation memo to USGS Program Coordinator and EROS Senior Managers for review.    1. Archivist memo recommends:       1. Retain / Accept or       2. Dispose / Reject 8. The USGS Program Coordinator and EROS Senior Managers pass their comments to the EROS Director. 9. EROS Director accepts or rejects the recommendation.    1. EROS Director informs Archivist and Project Manager of his decision via memo.    2. Purge recommendations result in a search for a new home. Destruction is the last resort.   All collections offered to or maintained at EROS are reviewed through the EROS scientific records appraisal process. This process is used to ensure that EROS maintains collections aligning to its mission allowing them to best serve the land remote sensing research community. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| United States Geological Survey | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0 <http://eros.usgs.gov/government/ratool/view_questions.php> | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://eros.usgs.gov/ | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| PURGE ALERT Procedure | | | | | | | | |
| **Description** | | | | | | | | |
| The Committee on Earth Observation Satellites (CEOS), an international framework for coordinating all space borne Earth observation missions, has established a "Purge Alert" service to help to ensure the long-term preservation of valuable Earth observation data. We encourage you to participate in this initiative that enables data archive managers to: 1) advise other archives of Earth observation data holdings scheduled to be destroyed, and 2) offer these data to other archive centers. We realize that it is the responsibility of all agencies holding data to assess the relative value of their holdings and their requirements for long-term maintenance of those holdings. Sometimes an agency must make the decision to purge data that could be important to help meet the mission requirements of another agency. The CEOS Working Group on Information Systems and Services [(WGISS)](http://wgiss.ceos.org/) finds that in this continuing process of assessment, it is helpful to share our information and findings with other data managers before data are purged. Thus, as a community, we can make wiser decisions about purging and transferring archival data. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CEOS | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://wgiss.ceos.org/purgealert/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  |  | 3 |

## Thesauri and Word Lists

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| WFMC-TC-1011, Workflow Management Coalition Terminology and Glossary | | | | | | | | |
| **Description** | | | | | | | | |
| The Workflow Management Coalition, Terminology and Glossary defines the preferred technical terms used to describe the concepts, structure, functional components and interfaces of a workflow management system, throughout the publications from the Workflow Management Coalition. It is a companion document to the Workflow Reference Model. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Workflow management coalition | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [1999 - WFMC-TC-1011, Issue 3: Workflow Management Coalition, Terminology and Glossary](http://www.wfmc.org/index.php?option=com_docman&task=cat_view&gid=35&Itemid=72) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.wfmc.org/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| ISO 2788, Guidelines for the Establishment and Development of Monolingual Thesauri | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 2788:1986 consists of recommendations for the establishment and development of consistent indexing practice within an organisation or a consortium. The standard assumes that indexing is being done by humans using natural language to select indexing terms. It is most suitable for cataloguing and descriptive metadata. The standard only deals with monolingual thesauri and is based on the use of *preferred terms* or indexing terms and *non-preferred terms* or synonyms.  ISO 2788 chapters cover vocabulary control, indexing terms, use of compound terms, basic relationships within a thesaurus, display of terms and their relationships and management of thesaurus construction. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current version [1986 - ISO 2788: Documentation - Guidelines for the Establishment and Development of Monolingual Thesauri](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7776) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for *ISO 2788*](http://en.wikipedia.org/wiki/ISO_2788) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| ISO 5964, Documentation - Guidelines for the Establishment and Development of Multilingual Thesauri | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 5964 extends the scope of ISO 2788 to cover particular considerations for multilingual thesauri development for the establishment of consistent indexing practice within an organisation or consortium. Like ISO 2788, the standard assumes that indexing is being done by humans using normal language, and is based on the concept of *preferred terms* or indexing terms and *non-preferred terms* or synonyms.  The standard covers general problems, language problems and management decisions required when establishing a multilingual thesaurus. It considers the issues of vocabulary control, establishing equivalent terms across different languages, relationship between terms, display of terms and relationships, form and contents and organisation of work. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version : [1985 - ISO 5964: Documentation - Guidelines for the Establishment and Development of Multilingual Thesauri](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=12159) | | | | | | | | |
| **Further Information** | | | | | | | | |
| [Wikipedia entry for *ISO 5964*](http://en.wikipedia.org/wiki/ISO_5964) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| GEMET | | | | | | | | |
| **Description** | | | | | | | | |
| GEMET, the GEneral Multilingual Environmental Thesaurus, has been developed as an indexing, retrieval and control tool for the European Topic Centre on Catalogue of Data Sources (ETC/CDS) and the European Environment Agency (EEA), Copenhagen. The work has been carried out through a contract between the EEA and the ETC/CDS which is led by the Ministry of the Environment of Lower Saxony, includes members of Germany, Austria, Italy, Sweden and benefits of the collaboration of other member countries of the European Union (EU), as well as of UNEP Infoterra.  The basic idea for the development of GEMET was to use the best of the presently available excellent multilingual thesauri, in order to save time, energy and funds. GEMET was conceived as a “general” thesaurus, aimed to define a common general language, a core of general terminology for the environment. Specific thesauri and descriptor systems (e.g. on Nature Conservation, on Wastes, on Energy, etc.) have been excluded from the first step of development of the thesaurus and have been taken into account only for their structure and upper level terminology | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| European Environment Agency | | | | | | | | |
| **Version** | | | | | | | | |
| This version of GEMET is an extension of the 2001 version of GEMET. It includes the Czech, Estonian and Polish translations as national contributions and the entire content is embedded in a modern Internet application. Definitions are available in English and the Bulgarian, Russian and Slovenian translations are added. <http://www.eionet.europa.eu/gemet/about> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 3 |  |  |
| Important for access when dealing with multilingual issues | | | | | | | | |

## XML DTD Schema and Mark Up Languages

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| Encoded Archival Description | | | | | | | | |
| **Description** | | | | | | | | |
| This standard defines principles and criteria for designing, developing and maintaining an encoding scheme for archive and library finding aids. The standard accommodates hierarchical registers and inventories of any length describing the full range of archival holdings, including textual and electronic documents, visual materials and sound recordings.  The encoding scheme originally used an XML document type definition (DTD) which consisted of two parts: an XML-compliant DTD and a detailed tag library. EAD, version 1 was originally published as an SGML compliant DTD in 1998, along with application guidelines containing extensive examples of encoded finding aids. This was superseded by the XML compliant DTD EAD, Version 2002. The XML schema for EAD, Version 2002 was released in February 2007.  Although the term *finding aid* traditionally encompasses a wide variety of tools to describe, control and provide access to archives and manuscript collections, this encoding standard is primarily for inventories and registers. Its design, however, does not preclude further development to accommodate other types of finding aids, such as repository guides. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| MARC standards office | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version: [2002 - Encoded Archival Description, version 2002](http://www.loc.gov/ead/tglib/index.html) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.loc.gov/ead/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| RDF/XML SYTAX SPECIFICATION | | | | | | | | |
| **Description** | | | | | | | | |
| Resource Description Framework (RDF) is a language for representing metadata, about Web resources or identifying things in the World Wide Web. It is a machine processable interoperable language, enabling data to be modelled so that information can be readily exchanged between applications. Designed as a metadata model, it is usually expressed in XML, and is a major component of the developing semantic web, where the meaning of information and services on the web is defined. An RDF statement is based on triples so that the relationships between things being described are defined through 3 properties: the subject, the predicate and the object. This enables searches on the Web to be more meaningfully fulfilled. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| W3C Recommendation 10 February 2004 Latest version:<http://www.w3.org/TR/rdf-syntax-grammar/> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.w3.org/TR/rdf-syntax-grammar/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Climate Science modelling language | | | | | | | | |
| **Description** | | | | | | | | |
| CSML is a standards-based data model and GML (Geography Markup Language) [application schema](http://csml.badc.rl.ac.uk/index.php?view=article&catid=37%3Amodels&id=59%3Axmlschemas&option=com_content&Itemid=55) for atmospheric and oceanographic data with associated software tools developed at the Rutherford Appleton Laboratory.   The key subcomponents of CSML are:   * Feature Type Definitions: A set of [UML conceptual models](http://csml.badc.rl.ac.uk/index.php?view=article&catid=37%3Amodels&id=58%3Aumlmodel&option=com_content&Itemid=55) ('feature types') for a range of atmospheric and oceanographic data types relevant to key NDG Data Providers, based on the framework and components provided by ISO standards for geospatial information modelling. See the CSML [user guide](http://csml.badc.rl.ac.uk/index.php?view=article&catid=34%3Adocuments&id=53%3Auserguide&option=com_content&Itemid=55) for further information about features. * [CSML](http://csml.badc.rl.ac.uk/index.php?view=article&catid=37%3Amodels&id=59%3Axmlschemas&option=com_content&Itemid=55) itself (an application schema of GML), built around these feature types providing a standards-based reference encoding for NDG datasets. * CSML Tools:   + A CSML 'scanner' to facilitate the production of CSML markup for some existing data file formats   + A CSML 'parser' to demarshall a CSML document into corresponding object instances * CSML Services including:   + COWS (Ceda OGC Web Service) framework.   CSML was an outcome of the NERC DataGrid Projects [NDG1](http://gotw.nerc.ac.uk/list_full.asp?pcode=NER%2FT%2FS%2F2002%2F00091&classtype=) and [NDG2](http://gotw.nerc.ac.uk/list_full.asp?pcode=NE%2FC001508%2F1&classtype=) and current financial support is via the NERC [C-SEKT](http://gotw.nerc.ac.uk/list_full.asp?pcode=NE%2FF009445%2F1&classtype=) project. . | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| NERC | | | | | | | | |
| **Version** | | | | | | | | |
| Current version last updated 2008:  CSML is a standards-based data model and GML (Geography Markup Language) [application schema](http://csml.badc.rl.ac.uk/index.php?view=article&catid=37%3Amodels&id=59%3Axmlschemas&option=com_content&Itemid=55) for atmospheric and oceanographic data with associated software tools developed at the Rutherford Appleton Laboratory. | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://csml.badc.rl.ac.uk/index.php?option=com_content&view=frontpage&Itemid=63> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| unstructured Operation MarkUP LanGUAGE | | | | | | | | |
| **Description** | | | | | | | | |
| UOML is interface standard to process unstructured document; it plays the similar role as SQL (Structured Query Language) to structured data. UOML is expressed with standard XML, featuring compatibility and openness  UOML deals with layout-based document and its related information (such as metadata, rights, etc.) Layout-based document is two dimensional, static paging information i.e. information can be recorded on traditional paper. The software which implements the UOML defined function, is called DCMS, applications can process the document by sending UOML instructions to DCMS.  UOML  UOML first defines abstract document model, then operations to the model. Those operations include read/write, edit, display/print, query, security control; it covers the operations which required by all different kinds of application software to process documents. UOML is based on XML description, and is platform-independent, application-independent, programming language-independent, and vendor | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version V1.0 : <http://docs.oasis-open.org/uoml-x/v1.0/os/uoml-part1-v1.0-os.pdf> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Simple Knowledge organization systems reference | | | | | | | | |
| **Description** | | | | | | | | |
| Simple Knowledge Organization System (SKOS), a common data model for sharing and linking knowledge organization systems via the Semantic Web.  Many knowledge organization systems, such as thesauri, taxonomies, classification schemes and subject heading systems, share a similar structure, and are used in similar applications. SKOS captures much of this similarity and makes it explicit, to enable data and technology sharing across diverse applications.  The SKOS data model provides a standard, low-cost migration path for porting existing knowledge organization systems to the Semantic Web. SKOS also provides a light weight, intuitive language for developing and sharing new knowledge organization systems. It may be used on its own, or in combination with formal knowledge representation languages such as the Web Ontology language (OWL). | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| Working Draft Jan 2008: <http://www.w3.org/TR/2008/WD-skos-reference-20080125/> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.w3.org/2009/07/skos-pr.html> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OWL Web Ontology Language reference | | | | | | | | |
| **Description** | | | | | | | | |
| The Web Ontology Language OWL is a semantic markup language for publishing and sharing ontologies on the World Wide Web. OWL is developed as a vocabulary extension of RDF (the Resource Description Framework) and is derived from the DAML+OIL Web Ontology Language. This document contains a structured informal description of the full set of OWL language constructs and is meant to serve as a reference for OWL users who want to construct OWL | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| W3C | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version Feb 2004: <http://www.w3.org/TR/owl-ref/> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.w3.org/TR/2004/REC-owl-ref-20040210/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| ebXML | | | | | | | | |
| **Description** | | | | | | | | |
| An ebXML Registry is an information system that securely manages any content type and the  standardized metadata that describes it. The ebXML Registry provides a set of services that enable sharing of content and metadata between organizational entities in a federated environment. This document defines the types of metadata and content that can be stored in an ebXML Registry. A separate document, ebXML Registry: Services and Protocols [ebRS], defines the services provided by an ebXML Registry and the protocols used by clients of the registry to interact with these services. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| OASIS | | | | | | | | |
| **Version** | | | | | | | | |
| Current Version V3.0 : <http://docs.oasis-open.org/regrep/v3.0/specs/regrep-rim-3.0-os.pdf> | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.ebxml.org/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  | 3 |  |  |

## Web Services

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| Location based services - tracking and navigation | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19133:2005 describes the data types, and operations associated with those types, for the implementation of tracking and navigation services. It is designed to specify web services that can be made available to wireless devices through web-resident proxy applications, but is not restricted to that environment. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19133:2005  http://www.iso.org/iso/iso\_catalogue/catalogue\_tc/catalogue\_detail.htm?csnumber=32551 | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Web map server Interface | | | | | | | | |
| **Description** | | | | | | | | |
| ISO 19128:2005 specifies the behaviour of a service that produces spatially referenced maps dynamically from geographic information. It specifies operations to retrieve a description of the maps offered by a server, to retrieve a map, and to query a server about features displayed on a map. ISO 19128:2005 is applicable to pictorial renderings of maps in a graphical format; it is not applicable to retrieval of actual feature data or coverage data value | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO 19128:2005:  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32546> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Styled Layer Descriptor (SLD) Profile of the OpenGIS® Web Map Service (WMS) Encoding Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Styled Layer Descriptor (SLD) Profile of the OpenGIS® Web Map Service (WMS) Encoding Standard [http://www.opengeospatial.org/standards/wms] defines an encoding that extends the WMS standard to allow user-defined symbolization and coloring of geographic feature[http://www.opengeospatial.org/ogc/glossary/f]  and coverage [http://www.opengeospatial.org/ogc/glossary/c] data. SLD addresses the need for users and software to be able to control the visual portrayal of the geospatial data. The ability to define styling rules requires a styling language that the client and server can both understand. The OpenGIS® Symbology Encoding Standard (SE)  [http://www.opengeospatial.org/standards/symbol] provides this language, while the SLD profile of WMS enables application of SE to WMS layers using extensions of WMS operations. Additionally, SLD defines an operation for standardized access to legend symbols. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CubeWerx Inc.  lat/lon GmbH (Editor)  Pennsylvania State University.  Syncline  Ionic Software s.a. | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.1.0 [OpenGIS Styled Layer Descriptor Profile of the Web Map Service Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=22364) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/sld | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Symbology encoding implementation specification | | | | | | | | |
| **Description** | | | | | | | | |
| The current OGC Web Map Service (WMS) specification supports the ability for an information provider to specify very basic styling options by advertising a preset collection of visual portrayals for each available data set. However, while a WMS currently can provide the user with a choice of style options, the WMS can only tell the user the name of each style. It cannot tell the user what portrayal will look like on the map. More importantly, the user has no way of defining their own styling rules. The ability for a human or machine client to define these rules requires a styling language that the client and server can both understand. Defining this language, called the *Symbology Encoding (SE)* is the focus of this specification. This language can be used to portray the output of Web Map Servers, Web Feature Servers and Web Coverage Servers.This Specification defines Symbology Encoding, an XML language for styling information that can be applied to digital Feature and Coverage data.  The document below together with the Styled Layer Descriptor Profile for the Web Map Service Implementation Specification is the direct follow-up of Styled Layer Descriptor Implementation Specification 1.0.0. The old specification document was split up into two documents to allow the parts that are not specific to WMS to be reused by other service specifications. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CubeWerx Inc.  lat/lon GmbH (Editor)  Pennsylvania State University.  Syncline  Ionic Software s.a. | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.1.0 [OpenGIS Symbology Encoding Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=16700) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/symbol> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Transducer Markup Language Encoding Standard (TML) | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Transducer Markup Language Encoding Standard (TML) is an application and presentation layer communication protocol for exchanging live streaming or archived data to (i.e. control data) and/or sensor data from any sensor system. A sensor system can be one or more sensors, receivers, actuators, transmitters, and processes. A TML client can be capable of handling any TML enabled sensor system without prior knowledge of that system. The protocol contains descriptions of both the sensor data and the sensor system itself. It is scalable, consistent, unambiguous, and usable with any sensor system incorporating any number sensors and actuators. It supports the precise spatial and temporal alignment of each data element. It also supports the registration, discovery and understanding of sensor systems and data, enabling users to ignore irrelevant data. It can adapt to highly dynamic and distributed environments in distributed net-centric operations. The sensor system descriptions use common models and metadata and they describe the physical and semantic relationships of components, thus enabling sensor fusion. This is one of the OGC Sensor Web Enablement (SWE) [http://www.opengeospatial.org/ogc/markets-technologies/swe] suite of standards | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| 3eTI  Intergraph  Innovative Research Ideas & Services Corporation  National Geospatial-intelligence Agency  Oak Ridge National Laboratory  Radiance, Inc.  SeiCorp, Inc.  York University | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.0  [OpenGIS Transducer Markup Language](http://portal.opengeospatial.org/files/?artifact_id=19371) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/tml | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| Web Coverage Service Interface Standard (WCS) | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Web Coverage Service Interface Standard (WCS) defines a protocol-independent language for the extraction, processing, and analysis of multi-dimensional gridded coverages (see: http://www.opengeospatial.org/ogc/glossary/c ) representing sensor, image, or statistics data. Services implementing this language provide access to original or derived sets of geospatial coverage information, in forms that are useful for client-side rendering, input into scientific models, and other client applications. Further information about WPCS can be found at the WCPS Service page of the OGC Network(see: <http://www.ogcnetwork.net/wcps>). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Jacobs University Bremen | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.0.0 [OpenGIS Web Coverage Processing Service (WCPS) Language Interface Standard](http://portal.opengeospatial.org/files/?artifact_id=32319) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wcps> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| OpenGIS® Web Coverage Service Interface Standard | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Web Coverage Service Interface Standard (WCS) defines a standard interface and operations that enables interoperable access to geospatial "coverages"  [http://www.opengeospatial.org/ogc/glossary/c]. The term "grid coverages" typically refers to content such as satellite images, digital aerial photos, digital elevation data, and other phenomena represented by values at each measurement point. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| BAE SYSTEMS E&IS  Australia Commonwealth Scientific and Industrial Research Organisation (CSIRO)  CubeWerx Inc.  George Mason University  Jacobs University Bremen / rasdaman GmBH  IONIC SOFTWARE s.a.  U.S. National Aeronautics and Space Administration (NASA)  U.S. National Geospatial-Intelligence Agency (NGA)  Oracle Corp.  PCI Geomatics | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.1.2 [Web Coverage Service (WCS) Implementation Standard](http://portal.opengeospatial.org/files/?artifact_id=27297) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wcs> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OGC Web Feature Service (WFS) operations | | | | | | | | |
| **Description** | | | | | | | | |
| This document describes the OGC Web Feature Service (WFS) operations. The WFS operations support INSERT, UPDATE, DELETE, LOCK, QUERY and DISCOVERY operations on geographic features using HTTP as the distributed computing platform. In the context of this document, a transaction is a logical unit of work that is composed of one or more data manipulation operations. Since the manner in which geographic features are persistently stored is not addressed in this document, no transaction semantics, such as atomic failure, are assumed to exist. It is the function of a web feature service, in its interaction with the data storage system used to persistently store features, to ensure that changes to data are consistent. However, the document also acknowledges the fact that many systems do support standard concurrent transaction semantics and so proposes optional operations that will allow a web feature service to take advantage of such systems (e.g. relational database systems based on SQL). | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CubeWerx Inc.  Intergraph Corp.  IONIC Software | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.1.0 [OpenGIS Web Feature Service (WFS) Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=8339) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wfs> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OPenGIS web context Implementation Specification |
| **Description** |
| This is a companion specification to the OGC Web Map Service Interface Implementation Specification version 1.1.1 [4], hereinafter "WMS 1.1.1."  WMS 1.1.1 specifies how individual map servers describe and provide their map content. The present Context specification states how a specific grouping of one or more maps from one or more map servers can be described in a portable, platform-independent format for storage in a repository or for transmission between clients. This description is known as a "Web Map Context Document," or simply a "Context." Presently, context documents are primarily designed for WMS bindings. However, extensibility is envisioned for binding to other services.  A Context document includes information about the server(s) providing layer(s) in the overall map, the bounding box and map projection shared by all the maps, sufficient operational metadata for Client software to reproduce the map, and ancillary metadata used to annotate or describe the maps and their provenance for the benefit of human viewers.  A Context document is structured using eXtensible Markup Language (XML). Annex A of this specification contains the XML Schema against which Context XML can be validated.  There are several possible uses for Context documents:   * The Context document can provide default startup views for particular classes of user. Such a document would have a long lifetime and public accessibility. * The Context document can save the state of a viewer client as the user navigates and modifies map layers. * The Context document can store not only the current settings but also additional information about each layer (e.g., available styles, formats, SRS, etc.) to avoid having to query the map server again once the user has selected a layer. * The Context document could be saved from one client session and transferred to a different client application to start up with the same context.   Contexts could be catalogued and discovered, thus providing a level of granularity broader than individual layers. |
| **Standards Accrediting Organisations** |
| Open Geospatial Consortium |

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| **Standards Developing Organisations** | | | | | | | | |
| IONIC Software sa  NASA Goddard Space Flight Center  International Interfaces  GeoConnections / Natural Resources Canada (Environment Canada)  Social Change Online  DM Solutions Group  Computer Aided Development Corporation (Cadcorp) Ltd  Syncline, Inc  PCI Geomatics  Centre for Computational Geography, University of Leeds  Galdos, Inc  Autodesk, Inc | | | | | | | | |
| **Version** | | | | | | | | |
| Version 1.1 [OpenGIS Web Map Context Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=8618) | | | | | | | | |
| **Further Information** | | | | | | | | |
| http://www.opengeospatial.org/standards/wmc | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Web Map Service Interface standard and Implementation Specification | | | | | | | | |
| **Description** | | | | | | | | |
| The OpenGIS® Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.  This implementation Standard specifies the behaviour of a service that produces spatially referenced maps dynamically from geographic information. It specifies operations to retrieve a description of the maps offered by a server to retrieve a map, and to query a server about features displayed on a map. This International Standard is applicable to pictorial renderings of maps in a graphical format; it is not applicable to retrieval of actual feature data or coverage data values. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Not Stated | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.3.0 [Web Map Service](http://portal.opengeospatial.org/files/?artifact_id=4756)   Version  1.3.0 [OpenGIS Web Map Service (WMS) Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=14416) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wms> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Web Map Tile Service Implementation Standard | | | | | | | | |
| **Description** | | | | | | | | |
| This Web Map Tile Service (WMTS) Implementation Standard provides a standard based solution to serve digital maps using predefined image tiles. The service advertises the tiles it has available through a standardized declaration in the ServiceMetadata document common to all OGC web services. This declaration defines the tiles available in each layer (*i.e.* each type of content), in each graphical representation style, in each format, in each coordinate reference system, at each scale, and over each geographic fragment of the total covered area. The ServiceMetadata document also declares the communication protocols and encodings through which clients can interact with the server. Clients can interpret the ServiceMetadata document to request specific tiles. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| Autonomous University of Barcelona  CREAF  CubeWerx Inc. | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.0.0 [OpenGIS® Web Map Tile Service Implementation Standard](http://portal.opengeospatial.org/files/?artifact_id=35326) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wmts> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OpenGIS® Web Processing Service | | | | | | | | |
| **Description** | | | | | | | | |
| This standard specifies the interface to a Web Processing Service (WPS). WPS defines a standardized interface that facilitates the publishing of geospatial processes, and the discovery of and binding to those processes by clients. ―Processes‖ include any algorithm, calculation or model that operates on spatially referenced data. ―Publishing‖ means making available machine-readable binding information as well as human-readable metadata that allows service discovery and use. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| GeoConnections / Natural Resources Canada  PCI Geomatics | | | | | | | | |
| **Version** | | | | | | | | |
| Version  1.0.0 [Web Processing Service](http://portal.opengeospatial.org/files/?artifact_id=24151) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.opengeospatial.org/standards/wps> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
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| OGC Web Services Common Standard | | | | | | | | |
| Description | | | | | | | | |
| This standard specifies many of the aspects that are, or should be, common to all or multiple OWS interface Implementation Standards. The common Implementation Specification aspects specified by this document currently include:   * Operation request and response contents, most partial * Parameters and data structures included in operation requests and responses * XML and KVP encoding of operation requests and responses   One use of this document is as a normative reference from future versions of OWS interface Implementation Specifications. Those standards currently include the Web Map Service (WMS), Web Feature Service (WFS), and Web Coverage Service (WCS). Rather than continuing to repeat this material in each such Implementation Specification, each specification should normatively reference each relevant part of this document. | | | | | | | | |
| Standards Accrediting Organisations | | | | | | | | |
| Open Geospatial Consortium | | | | | | | | |
| Version | | | | | | | | |
| Version: 2.0.0  [OGC Web Service Common Implementation Specification](http://portal.opengeospatial.org/files/?artifact_id=38867) | | | | | | | | |
| Further Information | | | | | | | | |
| <http://www.opengeospatial.org/standards/common> | | | | | | | | |
| Relevance to LTDP | | | | | | | | |
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| OASIS Webservices Family of Standards |
| **Description** |
| OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society. The consortium produces more Web services standards than any other organization along with standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. Founded in 1993, OASIS has more than 5,000 participants representing over 600 organizations and individual members in 100 countries.  OASIS is distinguished by its transparent governance and operating procedures. Members themselves set the OASIS technical agenda, using a lightweight process expressly designed to promote industry consensus and unite disparate efforts. Completed work is ratified by open ballot. Governance is accountable and unrestricted. Officers of both the OASIS Board of Directors and Technical Advisory Board are chosen by democratic election to serve two-year terms. Consortium leadership is based on individual merit and is not tied to financial contribution, corporate standing, or special appointment.  The stanadards listed below are the core OASIS webs ervices **OASIS Standards are approved within an OASIS  Committee, submitted for public review,   implemented by at least three organizations,  and finally ratified by the Consortium's  membership at-large.** |
| **Standards Accrediting Organisations** |
| OASIS |
| **Standards Developing Organisations** |
| OASIS |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Version** | | | | | | | | |
|  [Web Services Business Process Execution Language v2.0](http://www.oasis-open.org/specs/#wsbpelv2.0)   [Web Services Context (WS-Context) v1.0](http://www.oasis-open.org/specs/#wscontextv1.0)   [Web Services Distributed Management (WSDM) v1.1](http://www.oasis-open.org/specs/#wsdmv1.1)   [WSDM Management Using Web Services (WSDM-MUWS) v1.0](http://www.oasis-open.org/specs/#wsdm-muwsv1.0)   [WSDM Management Using Web Services (WSDM-MOWS) v1.0](http://www.oasis-open.org/specs/#wsdm-mowsv1.0)   [Web Services Dynamic Discovery (WS-Discovery) v1.1](http://www.oasis-open.org/specs/#ws-discoveryv1.1)   [Web Services Federation Language (WS-Federation) v1.2](http://www.oasis-open.org/specs/#wsfedv1.2)   [Web Services MakeConnection v1.1](http://www.oasis-open.org/specs/#wsmcv1.1)   [Web Services Notification (WSN) v1.3](http://www.oasis-open.org/specs/#wsnv1.3)   [Web Services for Remote Portlets (WSRP) v2.0](http://www.oasis-open.org/specs/#wsrpv2.0)   [Web Services for Remote Portlets (WSRP) v1.0](http://www.oasis-open.org/specs/#wsrpv1.0)   [Web Services Resource Framework (WSRF) v1.2](http://www.oasis-open.org/specs/#wsrfv1.2)   [Web Services Security v1.1](http://www.oasis-open.org/specs/#wssv1.1)   [Web Services Security v1.0 (WS-Security 2004)](http://www.oasis-open.org/specs/#wssv1.0)   [Web Services Security SAML Token Profile v 1.0 and REL Token Profile v1.0](http://www.oasis-open.org/specs/#wssprofilesv1.0)   [Web Services Transaction v1.1](http://www.oasis-open.org/specs/#wstransactionv1.1)   [Web Services ReliableMessaging v1.2](http://www.oasis-open.org/specs/#wsrx-rmv1.2)   [Web Services ReliableMessaging v1.1](http://www.oasis-open.org/specs/#wsrx-rmv1.1)   [Web Services ReliableMessaging Policy v1.2](http://www.oasis-open.org/specs/#wsrx-rmpv1.2)   [WS-AtomicTransaction v1.2](http://www.oasis-open.org/specs/#wstx-wsatv1.2)   [WS-BusinessActivity v1.2](http://www.oasis-open.org/specs/#wstx-wsbav1.2)   [WS-Coordination v1.2](http://www.oasis-open.org/specs/#wstx-wscoorv1.2)   [WS-Reliability (WS-R) v1.1](http://www.oasis-open.org/specs/#wsrv1.1)   [WS-SecureConversation v1.4](http://www.oasis-open.org/specs/#wssecconv1.4)   [WS-SecureConversation v1.3](http://www.oasis-open.org/specs/#wssecconv1.3)   [WS-SecurityPolicy v1.3](http://www.oasis-open.org/specs/#wssecpolv1.3)   [WS-SecurityPolicy v1.2](http://www.oasis-open.org/specs/#wssecpolv1.2)   [WS-Trust v1.4](http://www.oasis-open.org/specs/#wstrustv1.4)   [WS-Trust v1.3](http://www.oasis-open.org/specs/#wstrustv1.3) | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://www.oasis-open.org/specs/> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  | 2 |  |  |

## Security

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Security techniques – code of practice for information security management | | | | | | | | |
| **Description** | | | | | | | | |
| ISO/IEC 27002:2005 comprises ISO/IEC 17799:2005 and ISO/IEC 17799:2005/Cor.1:2007. Its technical content is identical to that of ISO/IEC 17799:2005. ISO/IEC 17799:2005/Cor.1:2007 changes the reference number of the standard from 17799 to 27002.  ISO/IEC 27002:2005 establishes guidelines and general principles for initiating, implementing, maintaining, and improving information security management in an organization. The objectives outlined provide general guidance on the commonly accepted goals of information security management. ISO/IEC 27002:2005 contains best practices of control objectives and controls in the following areas of information security management:   * security policy; * organization of information security; * asset management; * human resources security; * physical and environmental security; * communications and operations management; * access control; * information systems acquisition, development and maintenance; * information security incident management; * business continuity management; * compliance.   The control objectives and controls in ISO/IEC 27002:2005 are intended to be implemented to meet the requirements identified by a risk assessment. ISO/IEC 27002:2005 is intended as a common basis and practical guideline for developing organizational security standards and effective security management practices, and to help build confidence in inter-organizational activities. | | | | | | | | |
| **Standards Accrediting Organisations** | | | | | | | | |
| ISO | | | | | | | | |
| **Version** | | | | | | | | |
| ISO/IEC 27002:2005  <http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50297> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  | 3 |  |  |  |  |  |

## Ingestion

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Producer Archive Interface Specification | | | | | | | | |
| **Description** | | | | | | | | |
| This Recommended Standard aims at overcoming significant difficulties encountered during transactions between information Producers and the Archives.  Regarding the Formal Definition Phase, this Recommended Standard should enable:   * the Producer to share with the Archive a sufficiently precise, unambiguous definition of the different Digital Objects to be produced and transferred, including possibly the order in which they should be transferred; * the Archive to ensure there is sufficient information to process the Digital Objects which will be received, and to build the **Archival Information Packages** which have all of the characteristics defined in the OAIS Reference Model, * the respective Managers of the Producer and the Archive to be fully aware of all details of their commitments in terms of human and financial resources (by the means of a Submission Agreement).     Regarding the Transfer Phase, this recommendation should enable a precise definition of the SIPs to be exchanged, and a high degree of automation and verification of the transfer process (recognize the schedule for the Data Submission Sessions, guarantee that the operation runs well technically, etc).  Regarding the Validation Phase, this Recommended Standard should enable the use of tools for systematically validating that the Digital Objects received are those expected, and that they conform to the level of detail previously agreed. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| CSSDS | | | | | | | | |
| **Version** | | | | | | | | |
| The **red** book version: <http://public.ccsds.org/review/default.aspx> : CCSDS 651.1-R-1 | | | | | | | | |
| **Further Information** | | | | | | | | |
| <http://cwe.ccsds.org/default.aspx> | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  | 3 |  |  |  |  |

## Virtualization Standards

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| OVF | | | | | | | | |
| **Description** | | | | | | | | |
| DMTF’s Open Virtualization Format (OVF) is a packaging standard designed to address the portability and deployment of virtual appliances.  OVF enables simplified and error-free deployment of virtual appliances across multiple virtualization platforms.  OVF is a common packaging format for independent software vendors (ISVs) to package and securely distribute virtual appliances, enabling cross-platform portability. By packaging virtual appliances in OVF, ISVs can create a single, pre-packaged appliance that can run on customers’ virtualization platforms of choice. | | | | | | | | |
| **Standards Developing Organisations** | | | | | | | | |
| DMTF | | | | | | | | |
| **Version** | | | | | | | | |
| Version 2.0 [DSP0243](http://dmtf.org/sites/default/files/standards/documents/DSP0243_2.0.0.pdf) | | | | | | | | |
| **Relevance to LTDP** | | | | | | | | |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Relevance |  |  |  |  |  |  | **3** |  |
| This is an important standard for the maintenance of processing chains using virtualisation techniques | | | | | | | | |

# Conclusions and Recommendations

In this conclusion and recommendations section the listed standards and procedures from section 2 have been individually assessed for relevance to the eight main LTDP “themes” as stated in the ESA LTDP Guidelines document. Within this “Guidelines” document “guiding principle” and a set of “key guidelines” that should be applied to guarantee the preservation of EO space data in the long term ensuring accessibility and usability has been defined. The eight themes are as follows:

Theme 1: Preserved Data Set Composition

Theme 2: Archive Operation and organization

Theme 3: Archive Security

Theme 4: Data Ingestion

Theme 5: Archive Maintenance

Theme 6: Data Access and Interoperability

Theme 7: Data Exploitation and Re-processing

Theme 8: Data Appraisal and Purge Prevention

3

Level 3 represents a high degree of relevance to the LTDP theme. Although it may not fully support all described aspects of the theme it none the less has produced a standard or procedure which may be readily exploited by majority of EO data sets.

2

Level 2 represent a good degree of relevance to the LTDP theme. They may have received a lower grade if the standard may need to be adapted, is relevant to only some datasets or preservation scenarios and architectures.

1

Level 1 represents a standards or procedure which has some potential relevance to an LTDP theme but would only be relevant to a small proportion of dataset or specialized preservation scenarios.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [Community framework for electronic signatures](#_Directive_1999/93/EC_of) |  |  | **3** |  |  |  |  |  |
| [OASIS Digital signature service](#_OASIS_Digital_Signature) |  |  | **3** |  |  |  |  |  |
| [Public key and attribute certificate frameworks](#_ISO/IEC_9594-8:_Information) |  |  | **3** |  |  |  |  |  |
| [Security Assertion markup language](#_Security_Assertion_MarkUP) |  |  | **3** |  |  |  |  |  |
| [Long term Preservation of Electronic document based information](#_ISO/TR_18492:_Long-Term) |  |  |  |  |  | **2** |  |  |
| [SAFE](#_Standard_Archive_Format) | **3** |  |  |  |  |  |  |  |
| [NetCDF](#_NetCDF(network_Common_Data) | **2** |  |  |  |  |  |  |  |
| [OpenDocument](#_Open_document_format) | **2** |  |  |  |  |  |  |  |
| [DocBook](#_DocBook) | **2** |  |  |  |  |  |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [Document Management ISO 19005](#_ISO_19005-1:_Document) | **2** |  |  |  |  |  |  |  |
| [NASA AMES](#_NASA_AMES) | **2** |  |  |  |  |  |  |  |
| [JCAMP - DX](#_JCAMP_-_DX) | **2** |  |  |  |  |  |  |  |
| [HDF](#_HDF) | **2** |  |  |  |  |  |  |  |
| [CEOS Superstructure Format](#_CEOS_Superstructure_format) | **2** |  |  |  |  |  |  |  |
| [MPH/SPH/DHR data formats](#_MPH/SPH/DHR_data_formats) | **2** |  |  |  |  |  |  |  |
| [Spatial data transfer standard](#_Spatial_data_Transfer) | **2** |  |  |  |  |  |  |  |
| [FITS](#_Flexible_image_transport) | **2** |  |  |  |  |  |  |  |
| [GIF](#_Graphics_Interchange_Format) | **2** |  |  |  |  |  |  |  |
| [PDF/A](#_PDFA) | **2** |  |  |  |  |  |  |  |
| [GeoTiff](#_GEOTiff) | **2** |  |  |  |  |  |  |  |
| [GRIB](#_GRIB) | **2** |  |  |  |  |  |  |  |
| [PP](#_PP) | **2** |  |  |  |  |  |  |  |
| [EAST](#_Data_description_EAST) | **2** |  |  |  |  |  |  |  |
| [DFDL](#_Data_Format_Description) | **2** |  |  |  |  |  |  |  |
| [PVL](#_PVL_(Parameter_value) | **2** |  |  |  |  |  |  |  |
| [DRB](#_DRB) | **2** |  |  |  |  |  |  |  |
| [XIF](#_XIF) | **3** |  |  |  |  |  |  |  |
| [Common Satellite Formats](#_Common__satelite) | **3** |  |  |  |  |  |  |  |
| [DPPDB](#_DPPDB_Elevationa_Data) | **2** |  |  |  |  |  |  |  |
| [Image Formats](#_Image_Formats) | **2** |  |  |  |  |  |  |  |
| [Image Processing](#_Image_Processing_Software) | **2** |  |  |  |  |  |  |  |
| [Vector Formats](#_Vector_Formats) | **2** |  |  |  |  |  |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [DIMAP](#_DIMAP) | 2 |  |  |  |  |  |  |  |
| [POLDAR/ PARASOL](#_POLDER/PARASOL_Products) | 2 |  |  |  |  |  |  |  |
| [XTCE](#_XTCE) | 3 |  |  |  |  |  |  |  |
| [PNG](#_PNG) | 3 |  |  |  |  |  |  |  |
| [SVG](#_SVG) | 3 |  |  |  |  |  |  |  |
| [TIFF](#_TIFF) | 3 |  |  |  |  |  |  |  |
| [UNICODE](#_UNICODE) | 3 |  |  |  |  |  |  |  |
| [ASCII](#_ASCII) | 3 |  |  |  |  |  |  |  |
| [CGM](#_Computer_Graphics_metafile) | 2 |  |  |  |  |  |  |  |
| [Archival Resource Key](#_Archival_Resource_Key) |  |  |  | **3** |  | **3** |  |  |
| [DOI](#_Syntax_for_the) |  |  |  | **3** |  | **3** |  |  |
| [UUID](#_ISO/IEC_9834-8:_Universally) |  |  |  | **3** |  | **3** |  |  |
| [Procedures for item registration](#_Procedures_for_item) |  |  |  | **3** |  | **3** |  |  |
| [Electronic imaging trustworthiness and reliability](#_ISO/TR_15801:_Electronic) |  |  |  | **1** | **2** |  |  |  |
| [Electronic imaging – guidance for the selection of compression methods](#_ISO/TS_12033:_Electronic) |  |  |  |  |  | **3** |  |  |
| [Protocol for metadata harvesting](#_Open_Archive_Initiative) |  |  |  |  |  | **3** |  |  |
| [XML](#_Extensible_Markup_Language) |  |  |  |  |  | **3** |  |  |
| [ebRIM Application profile – Earth observation products](#_Catalogue_Services_Standard) |  |  |  |  |  |  | **3** |  |
| [Catalogue services specification](#_OpenGIS®_Catalogue_Services) |  |  |  |  |  |  | **3** |  |
| [Anglo American cataloguing rules](#_Anglo-American_Cataloguing_Rules) |  |  |  |  |  |  | **2** |  |
| [IETF matching language tags](#_IETF_Matching_of) |  |  |  |  |  |  | **1** |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [IETF tags for identifying languages](#_IETF_Tags_for) |  |  |  |  |  |  | **1** |  |
| [MARC cataloguing](#_MAchine-Readable_Cataloguing) |  |  |  |  |  |  | **1** |  |
| [Rules for Archival description](#_Rules_for_Archival) |  |  |  |  |  |  | **1** |  |
| [Technical metadata for digital still images](#_ANSI/NISO_Z39.87_-) |  |  |  |  |  |  | **2** |  |
| [GCMD DIF](#_GCMD_DIF) |  |  |  |  |  |  | **3** |  |
| [Data Entity specification language](#_Data_Entity_Specifcation) | **3** |  |  |  |  |  |  |  |
| [METS](#_Metadata_Encoding_and) |  |  |  |  |  |  | **2** |  |
| [XFDU](#_XML_FORMATTED_DATA) | **3** |  |  |  |  |  |  |  |
| [Dublin Core](#_Dublin_Core_Metadata) |  |  |  |  |  |  | **2** |  |
| [General International Standard Archival Description](#_General_International_Standard) |  |  |  |  |  |  | **2** |  |
| [Metadata object description schema](#_Metadata_Object_Description) |  |  |  |  |  |  | **2** |  |
| [PREMIS](#_PREMIS_Data_Dictionary) | **2** |  |  |  |  |  |  |  |
| [Unstructured Information Management Architecture](#_Unstructured_Information_Management) |  |  |  |  |  |  | **1** |  |
| [Contextual Query Language](#_Contextual_Query_language) |  |  |  |  |  | **2** |  |  |
| [SPARQL](#_SPARQL_Query_Langugae) |  |  |  |  |  | **2** |  |  |
| [Functional requirements for bibliographic records](#_Functional_Requirements_for) |  |  |  |  |  | **2** |  |  |
| [OAIS](#_OAIS) | **3** | **3** | **3** | **3** | **3** | **3** |  |  |
| [PAIMAS](#_ISO_20652:_Space) |  |  |  | **3** |  |  |  |  |
| [Earth System Modeling Framework](#_Earth_System_Modelling) |  |  |  |  |  | **3** |  |  |
| [CIDOC-CRM](#_CIDOC_CRM) |  |  |  |  |  | **3** |  |  |
| [GEORM](#_GEO_RIGHTS_MANAGEMENT) |  |  | **3** |  |  |  |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [Spatial referencing by geographic identifier](#_Geographic_information_--) |  |  |  |  |  | **3** |  |  |
| [OGC KML](#_OGC_KML) |  |  |  |  |  | **2** |  |  |
| [Geography Mark up language](#_Geography_Markup_Language) |  |  |  |  |  | **3** |  |  |
| [SENSORML](#_SENSORML) | **3** |  |  |  |  |  |  |  |
| [Geographic Information Reference Model](#_Geographic_Information_reference) |  |  |  |  |  | **3** |  |  |
| [Geographic point location by co-ordinates](#_Standard_Represesenation_of) |  |  |  |  |  | **3** |  |  |
| [Geographic information profiles](#_GeographiC_Information_Profiles) |  |  |  |  |  | **3** |  |  |
| [Spatial Schema](#_Geographic_Information_–) |  |  |  |  |  | **3** |  |  |
| [Temporal Schema](#_Geographic_Information_–_1) |  |  |  |  |  | **3** |  |  |
| [Metadata and XML schema implementation](#_Geographic_information_–_2) |  |  |  |  |  |  | **3** |  |
| [Geodetic codes and parameters](#_Geographic_information_) |  |  |  |  |  | **3** |  |  |
| [Positioning services](#_Positioning_Services) | **2** |  |  |  |  |  |  |  |
| [Metadata extension for imagery and gridded data](#_Metadata_–_Part) | **2** |  |  |  |  |  |  |  |
| [Rules for application schema](#_Rules_for_application) |  |  |  |  |  | **3** |  |  |
| [Reference Model part 2 - Imagery](#_Reference_model_–) |  |  |  |  |  |  | **3** |  |
| [Geographic Information Portrayal](#_Geographic_Information_Portrayal) |  |  |  |  |  | **3** |  |  |
| [Location based service reference model](#_Location_based_service) |  |  |  |  |  | **3** |  |  |
| [Spatial referencing by co-ordinates](#_Spatial_Referencing_by) |  |  |  |  |  | **3** |  |  |
| [Geographic information terminology](#_Geographic_information_terminology) |  |  |  |  |  | **3** |  |  |
| [Imagery Sensor models for geopositioning](#_Imagery_Sensor_models) |  |  |  |  |  |  | **3** |  |
| [Geographic data file](#_Intelligent_transport_systems) | **1** |  |  |  |  |  |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [SQL multimedia and application packages](#_SQL_multimedia_and) |  |  |  |  |  | **2** |  |  |
| [Representation of geographic point location by co-ordinates](#_Standard_representation_of) |  |  |  |  |  | **2** |  |  |
| [Conformance testing](#_Conformance_and_testing) |  |  |  |  |  | **3** |  |  |
| [Functional standards](#_Functional_stanDards) |  |  |  |  |  | **2** |  |  |
| [Data quality measures](#_Data_QualityMesures) |  |  |  |  |  | **3** |  |  |
| [Data product specification](#_Data_Product_Specification) | **3** |  |  |  |  |  |  |  |
| [Geographic information encoding](#_Geographic_Information_-) |  |  |  |  |  | **3** |  |  |
| [Methodology for feature cataloguing](#_Methodology_for_feature) |  |  |  |  |  | **3** |  |  |
| [Schema coverage geometry and functions](#_Schema_coverage_geometry) |  |  |  |  |  | **2** |  |  |
| [Schema for moving features](#_Schema_for_moving) |  |  |  |  |  | **1** |  |  |
| [Image gridded and coverage data framework](#_Image,_griided_and) |  |  |  |  |  |  | **2** |  |
| [Spatial referencing by co-ordinates](#_Spatial_Referencing_by_1) |  |  |  |  |  | **2** |  |  |
| [Features concept dictionaries and registers](#_Feature_concept_dictionaries) |  |  |  |  |  | **2** |  |  |
| [Classification systems structure](#_Classification_Systems_–) |  |  |  |  |  | **3** |  |  |
| [Geographic information quality principals](#_Geographic_Information_Quality) |  |  |  | **2** |  |  |  |  |
| [OGC Abstract specification](#_OGC_Abstract_Specification) |  |  |  |  |  |  | **3** |  |
| [Quality evaluation procedures](#_Quality_evaluation_procedures) |  |  |  |  |  |  | **3** |  |
| [CityGML](#_CityGML) |  |  |  |  |  | **1** |  |  |
| [Coordinate transformation Service](#_Coordinate_Transformation_Service) |  |  |  |  |  | **3** |  |  |
| [Filter encoding standard](#_Filter_Encoding_Standard) |  |  |  |  |  | **1** |  |  |
| [GML in JPEG 2000](#_GML_in_JPEG) |  |  |  |  |  | **2** |  |  |
| [Geographic Implementation standard](#_OpenGIS_Geographic_Implementation) |  |  |  |  |  |  | **3** |  |
| Theme | 1 | 2 | **3** | 4 | 5 | 6 | 7 | 8 |
| [GeoXCAML](#_Geospatial_eXtensible_Access) |  |  | **2** |  |  | **3** |  |  |
| [Open Location service Interface Standard](#_Open_Location_Services) |  |  |  |  |  | **2** |  |  |
| [Simple features access](#_OpenGIS®_Implementation_Standard) |  |  |  |  |  | **2** |  |  |
| [Feature implementation for CORBA](#_OpenGIS_Simple_feature) |  |  |  |  |  | **2** |  |  |
| [Features implementation for OLE/COM](#_Simple_Features_Implementation) |  |  |  |  |  | **2** |  |  |
| [Geomatics – Qualification and certification of personnel](#_Geomatics_–_Qualification) |  |  |  |  | **3** |  |  |  |
| [Environmental management standards](#_ISO_14000_environmental) |  |  |  |  |  | **3** |  |  |
| [CEOS WGISS Interoperability handbook](#_CEOS_WIGISS_INTEROPERABILITY) |  |  |  |  |  | **3** |  |  |
| [Ordering service for Earth observation products](#_Ordering_Services_for) |  |  |  |  |  | **3** |  |  |
| [User management for Earth Observation services](#_User__management) |  |  |  |  |  | **3** |  |  |
| [Quality Assurance framework for Earth observation](#_A_Quality_assurance) |  |  |  |  |  | **3** |  |  |
| [ECHO data model](#_ECHO_DATA_Model) | **3** |  |  |  |  |  |  |  |
| [Content standard for geospatial metadata](#_Content_Standard_for) | **3** |  |  |  |  |  |  |  |
| [SWEET](#_SWEET) |  |  |  |  |  | **3** |  |  |
| [Common data Index](#_Common_Data_Index) |  |  |  |  |  | **3** |  |  |
| [DLR ontology](#_DLR_Ontology) |  |  |  |  |  | **3** | **3** |  |
| [Wonder Web Library](#_WONDERWEB_Foundational_Ontologies) |  |  |  |  |  | **2** |  |  |
| [GCMD](#_GCMD) |  |  |  |  |  | **2** |  |  |
| [VOID](#_VOID__vocabulary) |  |  |  |  |  | **3** |  |  |
| [Binary floating point arithmetic](#_Standard_for_Binary) |  |  |  |  |  | **2** |  |  |
| [Time Code Formats](#_CCSDS_Time_Code) |  |  |  |  |  | **3** |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [EPSG](#_EPSG_geodetic_parameter) |  |  |  |  |  | **2** |  |  |
| [Data appraisal from USGS EROS](#_Data_Appraisal_Procedure) |  |  |  |  |  |  |  | **3** |
| [Purge Alert Procedure](#_PURGE_ALERT_Procedure) |  |  |  |  |  |  |  | **3** |
| [Workflow management Coalition terminology and glossary](#_WFMC-TC-1011,_Workflow_Management) |  |  |  |  |  |  | **2** |  |
| [Guidelines for Monolingual Thesauri](#_ISO_2788,_Guidelines) |  |  |  |  |  |  | **2** |  |
| [Guidelines for Multilingual Thesauri](#_ISO_5964,_Documentation) |  |  |  |  |  |  | **2** |  |
| [GEMET](#_GEMET) |  |  |  |  |  |  |  |  |
| [RDF/XML syntax specification](#_RDF/XML_SYTAX_SPECIFICATION) |  |  |  |  |  | **3** |  |  |
| [Climate Science Modeling language](#_Climate_Science_Modelling) |  |  |  |  |  | **3** |  |  |
| [Unstructured operation markup language](#_unstructured_Operation_MarkUP) |  |  |  |  |  | **1** |  |  |
| [SKOS](#_Simple_Knowledge_organization) |  |  |  |  |  | **3** |  |  |
| [OWL](#_OWL_Web_Ontology) |  |  |  |  |  | **3** |  |  |
| [ebXML](#_ebXML) |  |  |  |  |  | **3** |  |  |
| [Location based services – tracking and navigation](#_Location_based_services) |  |  |  |  |  | **2** |  |  |
| [Web map server interface](#_Web_map_server) |  |  |  |  |  | **2** |  |  |
| [Styled layer descriptor of the Open GIS web map services](#_OpenGIS®_Styled_Layer) |  |  |  |  |  | **2** |  |  |
| [Transducer Mark up language encoding standard](#_OpenGIS®_Transducer_Markup) |  |  |  |  |  | **2** |  |  |
| [Web coverage service implementation standard](#_Web_Coverage_Service) |  |  |  |  |  | **2** |  |  |
| [Web context implementation specification](#_OPenGIS_web_context) |  |  |  |  |  | **2** |  |  |
| [Web map service interface standard and implementation specification](#_OpenGIS®_Web_Map) |  |  |  |  |  | **2** |  |  |
| Theme | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| [Web map tile service implementation standard](#_OpenGIS®_Web_Map_1) |  |  |  |  |  | **2** |  |  |
| [Web processing service](#_OpenGIS®_Web_Processing) |  |  |  |  |  | **2** |  |  |
| [Web services common standard](#_OGC_Web_Services) |  |  |  |  |  | **2** |  |  |
| [OASIS Web services family of standards](#_OASIS_Webservices_Family) |  |  | **2** |  |  | **2** |  |  |
| [Code of practice for information security management](#_Security_techniques_–) |  |  | **3** |  |  |  |  |  |
| [PAIS](#_Producer_Archive_Interface) |  |  |  | **3** |  |  |  |  |
| [OVF](#_OVF) |  |  |  |  |  |  | **3** |  |

## Theme 1: Preserved data Set Composition

The “preserved data set” composition defines a consistent and complete set of data enabling current and possible future utilization. This theme is related to the composition and description of the data and information needed to preserve knowledge and the capability to generate mission products (Dissemination Information Packages, DIPs) to be delivered to users. Also the relations to rules and standards which can be applied to the “preserved data set” are considered.

The preserved data set composition can be supported by a number of standardized data formats, packaging standards, data format description languages and metadata standards.

## Theme 2: Archive Operation and organization

Archives operations consist of all daily activities which are carried out to run and monitor the archive system (execution and control of the applications, system monitoring, anomaly reporting, error recovery, activity reporting and statistics, etc…).

Archive operation and organizations is supported by the OAIS standard. There are other procedures already covered under the initiatives in the LTDP relevant initiatives document which have yet to standardize under ISO such as the CSSDS RAC initiative.

## Theme 3: Archive Security

This theme encompasses all the activities dedicated to the implementation of security measures for data access and storage in order to guarantee confidentiality, integrity and availability of the archived data.

There are a number of standards which support the long term security of archive they comprise of standards for electronic signature, unique identifiers, mark up languages, right management, web services and policy.

## Theme 4: Data Ingestion

Data Ingestion encompasses the services and functions that, according to OAIS standard accept Submission Information Packages (SIPs) from data producers, prepare Archival Information Packages (AIPs) for storage, and ensure that Archival Information Packages and their supporting Descriptive Information are stored in the archive system.

The OAIS, PAIMAS (produce archive interface methodology abstract standard) and PAIS ( producer archive interface specification) support the data ingestion process.

## Theme 5: Archive Maintenance

Archive maintenance consists of all the activities aimed at guaranteeing the integrity of the archived data. Data integrity assures that the archived data are complete and unaltered through loss, tampering or data corruption. Archive maintenance is based on the storage of media in secured and environment controlled rooms and a set of defined activities to be performed on routine basis like migration to new systems and media, in accordance to the technology and consumer market evolution, data compacting and data format packaging conversion.

There are currently as standards for environmental management and the qualification/certification of personnel in the field of geographic information. The OAIS standard covers many aspects of this theme and the LTDP relevant initiatives document cover the CCSDS RAC and DRAMBORA procedure for ensuring archive maintenance.

## Theme 6: Data Access and Interoperability

Data access corresponds to the services and functions which make the archival information holdings and related services visible to consumers Interoperability is related to the possibility of accessing data in a common and standardized way despite the intrinsic differences between the data sets on one hand and the accessed systems on the other hand.

There are many standards in the area of geographic information, semantic technologies, query languages and web services which support this theme. The relevance of many of these standards is dependent on the type of interoperable data products and service architecture an archive wishes to supply and support in long term.

## Theme 7: Data Exploitation and Re-processing

This theme covers all activities related to the exploitation of archived data by data processing and reprocessing, regeneration or enhancement of the catalogues (e.g. through data mining), integration of new services (e.g. through service work-flow orchestration) and quality assessment of the products and services.

There are many cataloguing standards ranging from simple standards such as Dublin core to the more complex such as MARC or specialist standards involving geographic features cataloguing and language tagging.

## Theme 8: Data Appraisal and Purge Prevention

“Data Purging” and “Data Appraisal” are intended respectively as the suppression of EO data from an archive and as the determination of the value of a set of archived data. This theme defines a set of procedures to be applied with the objective to prevent, or minimize, EO space data loss. This theme is of particular importance when a data owner, for whatever reason, can no longer preserve the data.

No standards were found to support data appraisal and purge prevent during this survey. There are however some initiatives which support this theme in the LTDP relevant initiatives document.