CEOS WGISS Data Management Statement

27 April 2012

We, the assembled participants of the Committee on Earth Observation Satellites (CEOS) Working Group on Information Systems and Services (WGISS), in Tokyo, Japan, on 23-27 April 2012:

Building upon the efforts undertaken by the European Agencies and the Canadian Space Agency through the Long Term Data Preservation coordination actions initiated in 2007 and on the engagement of the CEOS agencies during the WGISS-30 meeting sponsored by the Canadian Space Agency 13-17 September 2011 in Montreal, Canada and subsequent meetings sponsored by the U.S. Geological Survey, and the Hungarian Association for Geo-Information in addition to the wealth of significant results these developments have generated;

Recognizing the major involvement and the commitment of CEOS agencies in the implementation of the data management component of CEOS and how that can provide guidance for the Global Earth Observation System of Systems (GEOSS) Infrastructure Advances in Life-cycle Data Management component (IN-02-C1_1), their individual contributions to the activities of the Group on Earth Observations (GEO), and the need for improved data management of all Earth observation and measurement contributions to the study of the Earth system;

Confirming that, in response to the requirements of the stakeholders, CEOS agencies supporting WGISS are ready to provide data management guidance to ensure comprehensive and sustained information assets,

Declare that:

CEOS Agencies have decided at the recent WGISS meeting in Tokyo to recommend the following data management principles and guidelines to all entities possessing data of long-term value to CEOS and GEO:

Principles

- Adopt and implement a data life cycle model for any science data managed. Such a life cycle should, at a minimum, include the following phases:
    - Data Creation or Acquisition
    - Data Use and Maintenance
    - Data Disposal or Long-Term Archive Transition
- Develop Continuity of Operations Plans to ensure the preservation of science data needed to fulfill missions and obligations.
- Inventory and manage the media electronic data reside on.
- Earth Observation (EO) data are episodic data and cannot be recorded again at some

point in the future. EO data constitute a humankind asset fundamental for the future of science and for the activities of the scientific community and therefore should be preserved. In some cases, entities may be obliged, or might choose, to discontinue the preservation of their data. In these cases, defined and controlled procedures have to be put in place to avoid the loss of any EO data and to allow the handover of responsibility for the preservation of these data to another data centre. The CEOS Purge Alert (http://wgiss.ceos.org/purgealert/) is a tool to publicize plans to discontinue preservation of data allowing other organizations an opportunity to investigate.

Guidelines:

- Preserve the following set of data content associated to a specific Earth Observation space mission or instrument (reference: http://earth.esa.int/gscb/ltdp/LTDP_PDSC_3.pdf)[1]:
    1) Science Data Records: these include raw data[2] and higher-level products[3], browses, auxiliary and ancillary data, calibration and validation data sets[4], including metadata.
    2) Processing software: this includes all algorithms, the software used in the product generation and quality control, and the product visualization tools.
    3) Mission Documentation[5]: this includes among others mission architecture, products specifications, instruments characteristics, algorithms description, calibration/validation procedures, and mission/instruments performance reports.

    More detailed information is available in Appendix A.
- Plan to migrate electronic media every five years.
- Implement a multiple copy strategy of electronic media with at least one copy residing physically removed from the primary storage facility.
- Protect electronic science data through environmental storage management using 18.3 ^{o} degrees Celsius / 65^{o} degrees Fahrenheit and 35% (+/- 5%) Relative Humidity set points. Cooler temperatures are acceptable, but magnetic media should not be stored in an environment lower than 7.7 ^{o} degrees Celsius / 46^{o} degrees Fahrenheit.
- Implement controlled access to facilities, sites and equipment to avoid physical intrusion by unauthorised persons. Allow access to core functions only to identified personnel provided with appropriate security clearances.
- When modifying or building new archival facilities, consider using guidance such as the U.S. National Archives and Records Administration (NARA) Archival Facility Standards.
- Consider adopting the Open Archival Information System (OAIS) reference model for use as an information archiving system. The OAIS model described in ISO 14721:2003 may be applicable to any archive. It is specifically applicable to organizations with the responsibility of making information available for the long term. This includes organizations with other responsibilities, such as processing and distribution in response to programmatic needs.

CEOS agencies supporting WGISS confirm their dedication to continuing the development of data management principles and guidelines.

CEOS plays a vital role in providing data management recommendations to enable decisions for securing a prosperous and sustainable future for mankind.

APPENDIX A

1. Science data records

Science data records are identified as:

1. Raw data [6]
2. L0 data
3. L1 to higher levels mission data products when systematically generated as part of the mission requirements and/or reprocessed.
4. Browses whenever generated
5. Ancillary data (spacecraft ephemeris information, attitude, etc)
6. Auxiliary data required to process the telemetry payload data to generate the nominal mission products
7. Calibration/validation data (needed to calibrate the satellite instruments and monitor data quality)

2. Processing, Visualization and Quality Control Capabilities Environment

Processing, Visualization and Quality control capabilities[7] are identified by:

1. L0 Consolidation Software[8]
2. Data Processing Software
3. Quality Control Software
4. Data Visualization Tools

3. Mission related documentation

Mission, or project related, documentation is identified by:

1. Mission architecture documents describing purpose, scope and performances of the mission and of the on-board instruments, information relevant orbits, platform position, attitude, ground coverage (acquisition footprint), head-roll-pitch.
2. Documents describing data and products formats specification.
3. Documents describing measurement requirements and/or measurement performances (theoretical models). Documents drawing instruments characteristics, performances and instrument description (physical implementations). Documents describing models and/or algorithms needed (used) to obtain mission data and products including specific/special cases, known errors and configuration necessities. In other words, it should be provided documents covering conceptual environment, its implementation and its operations.
4. Reports concerned with measurement trends, failures, changes of performances, and out of service for any reason.
5. Reports and outcomes from events like congresses, studies, communities and investigators concerned with models' review, algorithm changes and calibration/validation changes affecting data processing chains.
6. Documents related to the process of data qualification: precision, numerical representations, formats, uncertainties, errors, and adjustment/correction methods (e.g. calibration/validation documents).

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[1] Long Term Preservation of Earth Observation Space Data European LDTP Common Guidelines (http://earth.esa.int/gscb/ltdp/LTDP_PDSC_3.pdf)

[2] Level 0 data can be preserved instead of the raw data in case a successfully and documented conversion of raw data into Level 0 data has been performed.

[3] when systematically generated as part of the mission requirements and/or reprocessed.

[4] including processing/reference validation data sets

[5] Mission Documentation shall include Representation Information, Packaging Information and Preservation Descriptive Information according to OAIS information model.

[6] Level 0 data can be preserved instead of the raw data in case a successfully and documented conversion of raw data into Level 0 data has been performed

[7] The environment where the different software and tools are running shall also be preserved to allow re-use

[8] Whenever raw data are preserved