

The ESA Earth Observation Long Term Data Preservation (LTDP) Programme

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- Earth Observation data preservation: the starting point and the needs
- The EO European challenge and the ESA EO LTDP strategy
- The European EO LTDP Framework
 - The activities performed
 - The concept
 - The guidelines
- The ESA EO LTDP programme (2009-2011)
 - The ongoing activities
 - The next steps
- Conclusion

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Earth Observation data preservation: the starting point

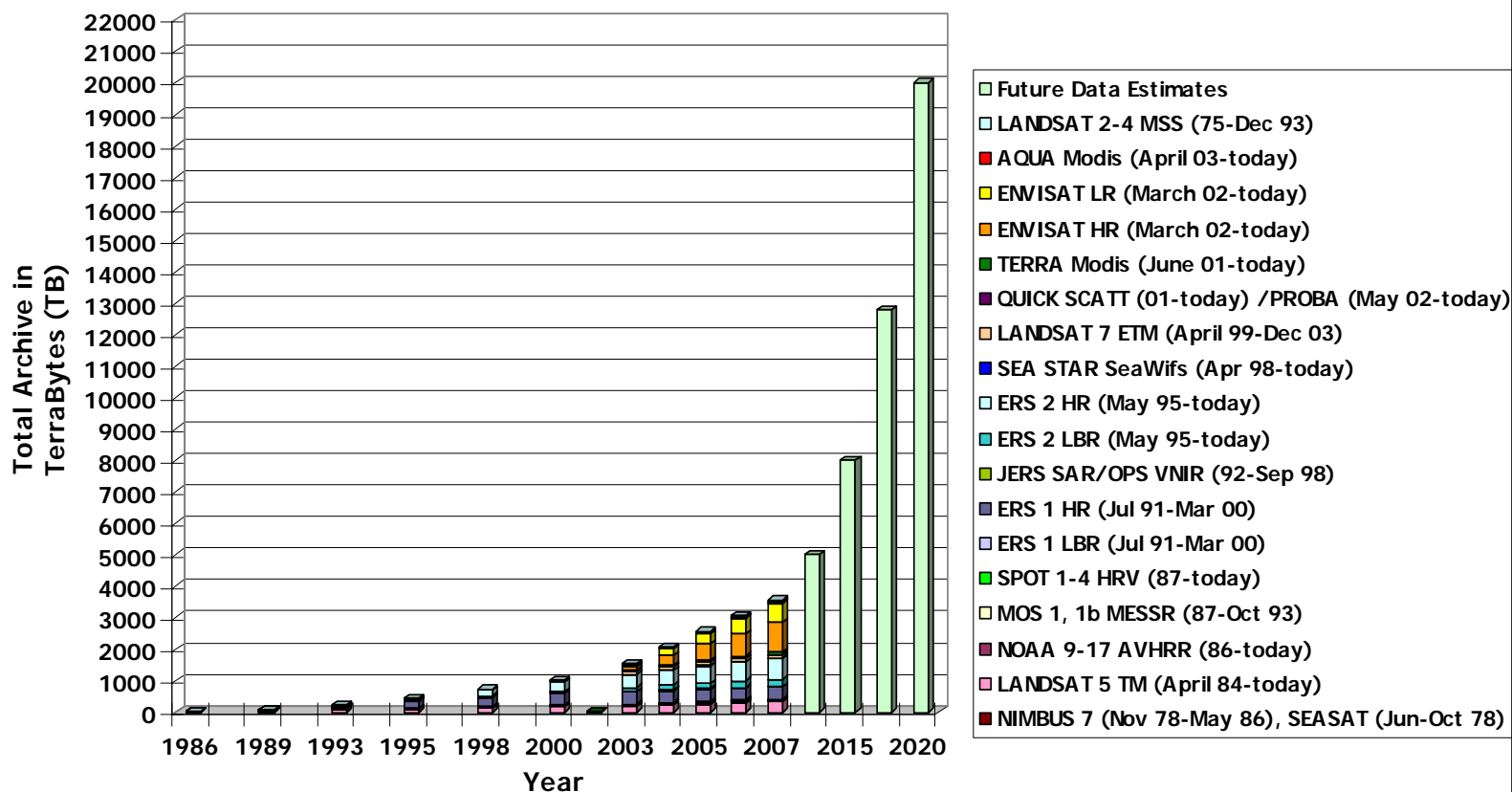


- The preservation of EO space data has to be considered as a long term responsibility and a challenge of the Space Agencies or data owners as they constitute a humankind asset.
- Preservation includes data integrity, data awareness, data access and exploitation
- ESA's EO archives
 - Content of EO data archives is extending from a few years to several decades
 - Very valuable data representing scientific long time-series for a large number of applications
 - ~150 TB archived in early '90s, about 3 PB archived today and over ~30 PB expected in the next 10 years
- Same trend is expected in other European EO Satellites owners archives

EO Archives Data volume expected trend

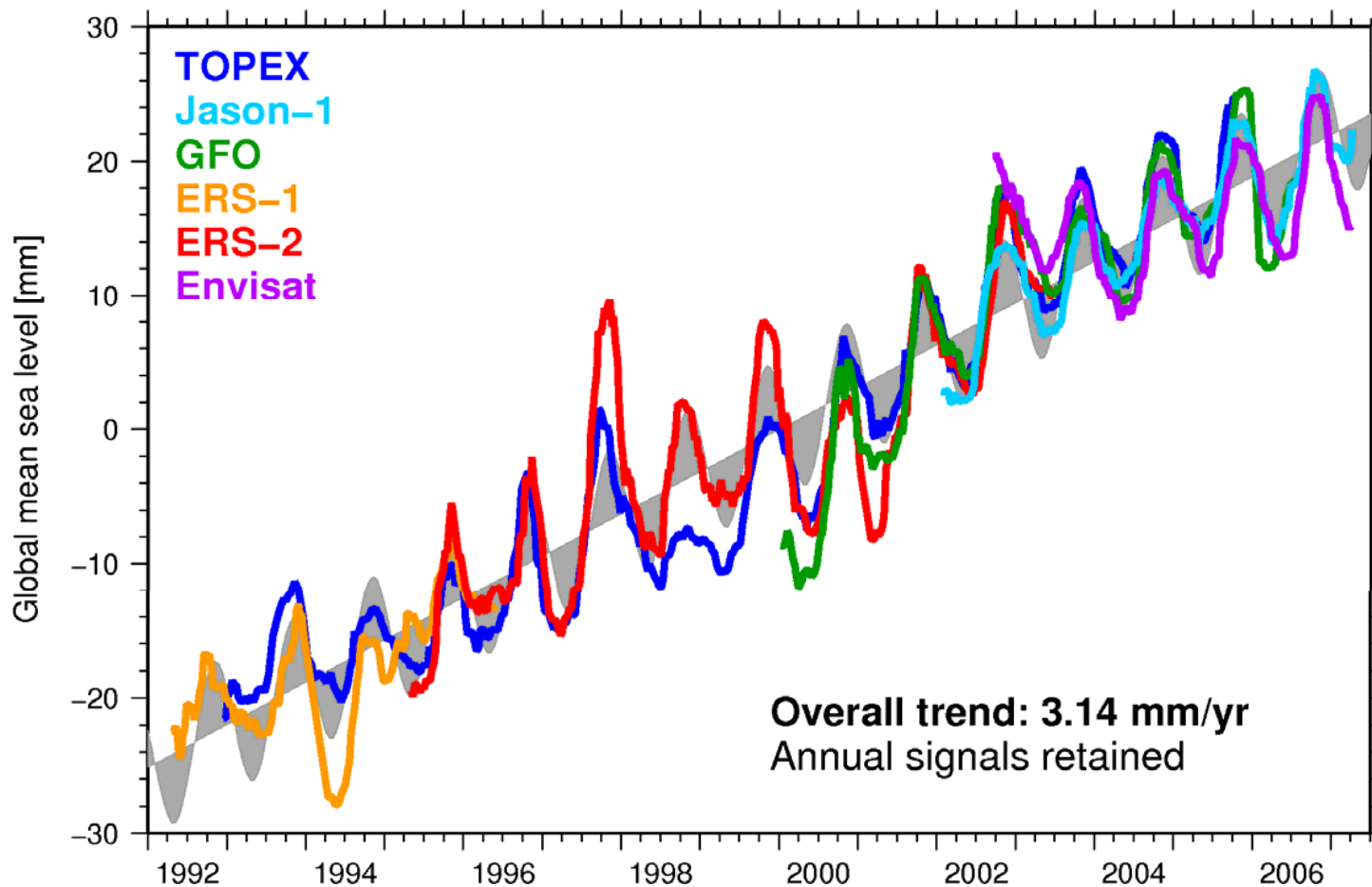


Evolution of ESA's EO Data Archives between 1986-2007 and future estimates (up to 2020)



- In order to satisfy new requirements, the Earth Science community increasingly need access to new missions data and to historical datasets, spanning 30 years and more
- Application examples
 - monitor sea-level & surface temperatures increase, observe seasonal growth of plankton, gauge ocean winds & currents, detect variations in thickness of ice sheets
 - detect changes in land surface, monitor vegetation growth, measure surface temperatures & soil moisture
 - watch out for symptoms of climate change in ice cover
 - changes in cloud cover and other atmospheric features

EO data application example



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- Traditionally in Europe there has been poor cooperation in this field with no common approach for long term preservation and access to EO space data.
- Single organizations have difficulties to afford data preservation in the long term that calls for the need of optimising costs and efforts, identifying commonalities.
- A coordinated and coherent approach (i.e. a European EO LTDP Framework) for a harmonized management of European archives is needed to guarantee the European EO data set preservation.
- ESA, within its mandate for space coordination coordinates and shares a Common Long Term Data Preservation approach among all the stakeholders.

The ESA EO long term data preservation strategy: phase 1



- Phase 1
 - 2009-2011 ESA LTDP funded programme
 - o Enhancement of ESA EO archiving facilities infrastructure
 - o Technology studies, data set definition, archives interoperability, certification, security, etc.
 - o Standardization issues
 - o European and International Organization interfaces/projects
 - o European EO LTDP framework coordination
 - o Common guidelines definition
 - o Detailed LTDP framework Workplan completion
 - o Program proposal for Phase 2 , including funding scheme

The ESA EO long term data preservation strategy: phase 2



- Phase 2
 - 2012-2018: European LTDP Framework
 - Collaborative framework open to all possible members consisting of distributed and heterogeneous components and entities cooperating in several areas to reach an harmonized preservation of the European EO Space Data Set
 - Sustained through a cooperative long term and programmatic funding framework
 - Cooperations areas /activities
 - Policies
 - Technology, methodology and developments
 - Standardisation activities in close link with international bodies (CCSDS, CEOS, OGC, INSPIRE, EU initiatives)
 - Operational solutions
 - Data exploitation

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- Preserve the European* EO space data set for an unlimited time-span
- Ensure and facilitate the accessibility and usability of the preserved European* EO space data set.
- Respect the individual entities applicable data policies
- Implement a cooperative and harmonized collective approach
- Possibly ensure the coherency with the preservation of other non-space based environmental data and international policies.

*including Canada

- Collaborative framework with contribution of European EO Space data owners:
 - consisting of distributed and heterogeneous components and entities
 - cooperating in several areas to reach an harmonized preservation of the European EO Space Data Set
 - through their ideas and possibly their infrastructure and in accordance to commonly agreed LTDP Guidelines
 - Aiming at a multilateral Cooperation with multiple funding sources from at least the European EO data owners
- The existence of an European LTDP Framework can trigger the availability in the long term of additional permanent funding to be made available from different sources
- Progressive implementation
 - based on a stepwise work-plan approach (short, mid, long-term activities).
- Open to all possible members including the possibility for any European EO data owner to preserve missions data beyond their funding schemes

What has been done

- A leading group of European Agencies owning EO mission archives have joined forces in the LTDP Working Group to address this challenge together since 2006.



- Under the Ground Segment Coordination Body control



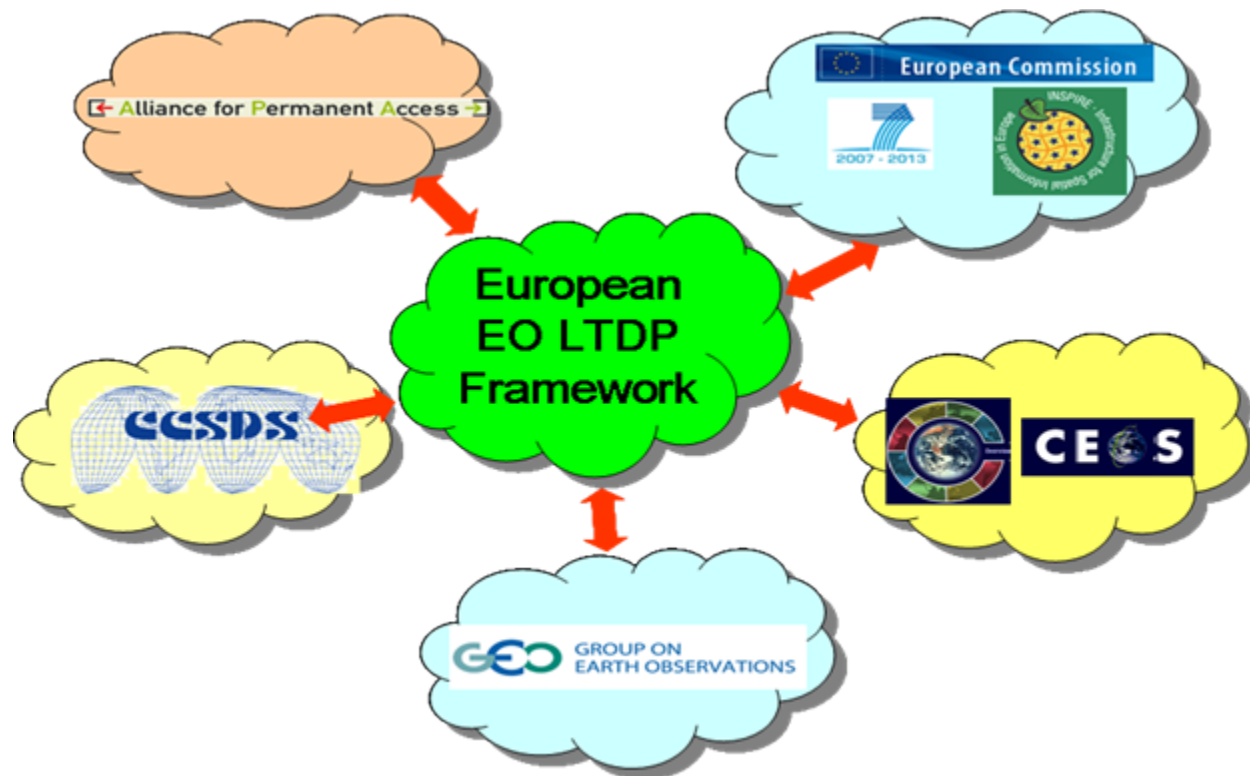
- ESA consultation with its Member States
- Consultations with all European EO mission and data archive owners (http://earth.esa.int/gscb/ltdp/LTDP_Agenda.html)

- 1st European workshop held at ESA/ESRIN in May 2008 aiming at:
 - Collect and exchange information on LTDP policies and technical approaches.
 - Collect feed-back for a potential European LTDP common approach and strive deriving common recommendations for it.
 - Assess the impact (benefits, drawbacks) of the proposed European LTDP Common Guidelines to each archive owner
- Consolidated:
 - The European LTDP Common Guidelines
 - The European LTDP Framework concept and the implementation plan
- Started some technical cooperation activities related to Long-term data preservation.
- **An LTDP programme has been approved at ESA with limited funds available for the period 2009-2011.**

- Structured as a set of nine main themes each with associated a “Definition”, a “Guiding Principle” and a set of “Key guidelines”

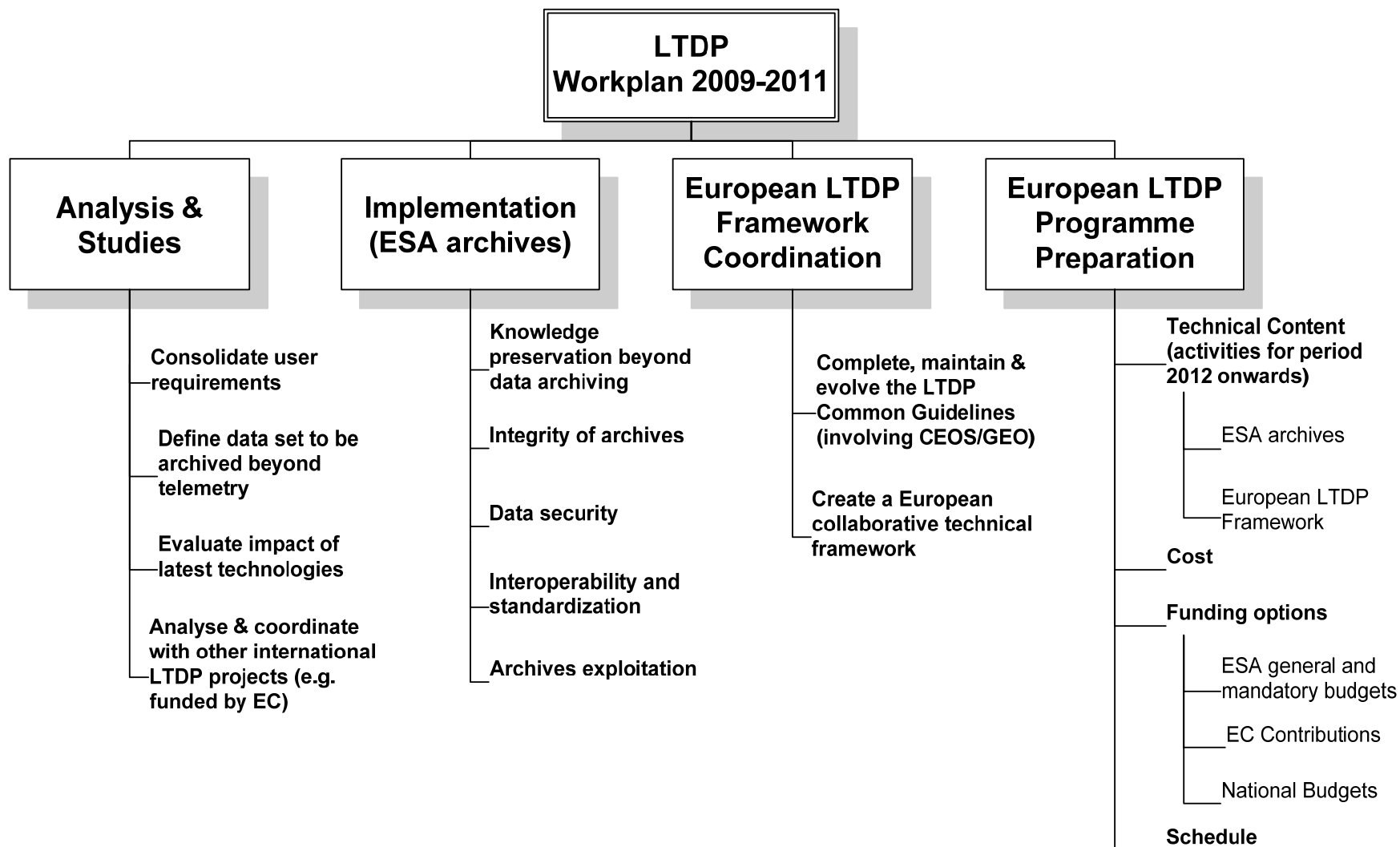
- The nine main themes are:
 - Preserved data set composition
 - Archives maintenance and data integrity
 - Archives operations
 - Data security
 - Data ingestion
 - Data access and interoperability
 - Data exploitation and re-processing
 - Standardization
 - Data Purging/Appraisal

The international context



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ESA EO LTDP Programme Workplan 2009-2011



- Consolidation of user requirements, including those from the Climate Change Initiative and GMES
- Issue of a study in cooperation with other European EO data archive owners in order to define the composition of the “data set” to be archived and to guarantee knowledge preservation (FIRST)
- An open tender is currently issued for a technological study (LAST) covering, the collection and analysis of the operational requirements and an archiving technology survey in short, mid and long term and bench marking/prototyping activities on the recommended technologies
- An LTDP Programme Management support contract is set up aiming at the procurement of support for the preparation of additional studies and activities in the field of Archive security, archive certification, networking, etc., including support to the preparation of the programmatic approach for the period above

- ESA has upgraded the Tape libraries at most of the EO archive centers, replacing the STK Powerhorn Tape Libraries based on 9940 B technology with the new SUN SL3000 based on T10000 B based technology.
- Other initiatives will be soon initiated in order to:
 - recover data from historical missions
 - enhance the on line archive data access
 - implement faster data reprocessing
 - explore adoption of archive virtualization for data distribution
 - adopt new metadata search methodologies including data mining techniques

- LTDP WG activities will continue, with the involvement of all European data owners and archive holders, to coordinate and prepare the set-up of the European LTDP Framework:
 - LTDP guidelines consolidation and promotion within CEOS or GEO
 - Activities for archives security and certification
 - Archives Interoperability
 - Data exploitation enhancements, including support to the Climate Change initiative
 - Analysis of reprocessing infrastructure
 - Alliance partnership and other EC funded projects support
- ESA is already planning to apply the Long Term Data Preservation Common Guidelines to its own missions
- High priority projects will be initiated in the next two years at ESA focusing on data preservation and enhancement of data access.

- The most important activity will be the preparation of the LTDP programme proposal for the period beyond 2011 to be presented to Delegations: the medium and long term LTDP framework activities will be defined. Cost and programmatic aspects, including different funding options, will be part of the proposal, aiming at a long term mandate and mission independent solutions

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The ESA LTDP Programme is progressing, targeting very clear objectives:

- To provide an adequate response to the user needs ensuring data integrity and access with a very long perspective
 - To define and implement a European framework involving all concerned European actors in order to face together the future challenges, including funding issues
 - To enhance the ESA infrastructure in order to adequately respond on a solid ground to all current and future archive technical requirements
 - To aim at a coordinated world wide approach for increasing the awareness about EO long term data preservation
- *The ESA LTDP programme for the period 2009-2011 will allow the Agency to continue the coordination of European efforts and initiatives in the LTDP field and to start the application of the LTDP Common Guidelines to its own missions implementing the high priority activities focussing on data preservation and enhancement of data access.*