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| **World Meteorological Organization**  **COMMISSION FOR BASIC SYSTEMS**  **Task Team on Information Management**  **First meeting** Geneva, 5-6 October 2017 | **TT-IM-1/Final Report** |
| 3.JAN.2018 |

# Final Report of the First meeting of the Task Team on information Management 5-6 October 2017



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## Final Report of the First Meeting of the Task Team on Information Management 5-6 October 2017

## 1 Welcome and introductions

1. Mr Schroeder, Chair of the Task Team on Information Management (TT-IM) was unable to attend the meeting. Mr dell’Acqua, Chair of the Open Area Programme Group on Information Systems and Services (OPAG ISS) opened the meeting on his behalf at 0900 on 5 October 2017. Mr dell’Acqua noted the Mr Schroeder had asked that the team consider the impact of changes in technology on information management. He then asked Dr Wright, co-chair of TT-IM, to chair the remainder of the meeting.
2. Dr Wright also welcomed members to the first meeting of the team. He noted that the team performing the CBS-led review of emerging data issues (CBS-LR-EDI) and the WIGOS Task Team on Data Partnerships (TT-WDP) had met shortly before the meeting of TT-IM, and that the WMO Workshop on Information Management had taken place during the three days immediately preceding the meeting. Each of these had made recommendations that TT-IM would need to consider. Mr Wright emphasized that TT-IM should consider the needs of all WMO members, regardless of the maturity of their information management practices and the state of the information technologies available to them. The aim of the team was to update the regulations and guides for information management so that they were valid across all programmes. It was essential that these should be relevant to everyone, regardless of their current capabilities.
3. The agenda for the meeting is in Annex 1 and the list of participants is in Annex 2.

## 2 Aims of TT-IM

1. The terms of reference for TT-IM are in Annex 3.
2. The team considered how it should approach emerging issues and technologies that were rapidly evolving. It would not be appropriate, or even relevant, to develop and publish best practices that would be out of date soon after they were published.
3. Participants decided that the most appropriate approach for handling emerging issues would be for the team to identify how WMO could maintain awareness of emerging challenges and issues relating to ICT technology and data and produce technology review notes on these.

## 3 Technical regulation process

1. Dr Foreman outlined the approach being taken to prepare draft standards and guidance for approval by eighteenth Congress (Cg-18). Expert teams should prepare as much material as possible for consideration by a meeting of ICT-ISS in January 2018. Following review by ICT-ISS, that material would be provided to EC-70 as part of an “information document” to inform EC-70 on what needed to be included in the agenda for Cg-18. Expert teams would continue to refine their proposals until September 2018, following which they would be formatted as annexes to draft recommendations to Cg-18. Those annexes were expected to be made available to Members in November 2018 and feedback sought in time for the “final draft” of the annexes to be included in the documents for Cg-18 that had to be submitted in March 2019.

## 4 Outcomes of the WMO Workshop on Information Management

1. Mr dell’Acqua outlined the requirements for information management that had been identified by TT-WDP (see Annex 4).
2. Team members had attended the WMO Workshop on Information Management that had taken place from 2-4 October 2017 (see http://wis.wmo.int/file=3799).
3. The workshop had concluded that TT-IM would need to identify: key principles for which standardization would be needed, and would therefore need to concentrate on operations that were common to many application areas; how to ensure that the guidance would be valid for a prolonged period; how to apply maturity model approaches to guide information management improvement activities in Members and to allow “trusted” datasets to be identified; examples of best practice.
4. From the discussions at the workshop, the most likely areas to be given priority in standards and guidance on information management were: effective search facilities for discovery of information; interoperability of information management systems; identifying a modest number of preferred representation formats for information; facilitating the combination of datasets of different origin; data preservation, and access to data.
5. It was noted that many of the issues raised at the two previous meetings were already addressed in the Climate Data Management Systems (CDMS) Specifications (WMO–No. 1131).
6. It was recognized that in addition to details of the advice differing depending on application area, there might also need to be regional differences.
7. Dr Wright noted that the Bureau of Meteorology (Australia) was required as a Government agency to annually complete details of its information management capabilities in a maturity model format that did not distinguish between scientific and corporate data. Although the maturity model from NCEI that had been discussed at the WWIM covered many of the areas for which guidance was needed, it did not cover guidance on managing ICT infrastructures in support of information management.
8. Participants agreed that a maturity model approach would be appropriate for developing, managing and monitoring information management practices within WMO.
9. The World-wide Web Consortium best practices in data on the web ([www.w3.org/TR/dwbp](http://www.w3.org/TR/dwbp)) should be taken into consideration when developing WMO standards.
10. A basic principle to be followed in WMO information management was that when sharing information, information should also be shared on the context of the information (the “metadata”).
11. It was decided that it would be necessary to include guidance on quality of the information being provided could be improved through seeking user feedback.

## 5 Options for resolving identified issues

1. Participants divided into two break out groups to identify priority areas for guidance. The conclusions from the two groups were discussed in plenary.
2. The recommendations of the team on which topics should be prioritized when developing WIS standards and guidance on information management are summarized in [Annex 5](#_Annex_5:_Priority).

## 6 Structure and outline contents of regulatory and guidance material

1. The team concluded that the top level categories to be used to describe WIS Information Management and to develop the maturity matrix were: documentation, governance, storage and preservation, quality management, access and sharing, discovery, change management, and competences.
2. The structure proposed for the regulatory and guidance material is in [Annex 6](#_Annex_6._Top). Each of the top level categories should be sub-divided into aspects of that category for which standards or guidance would be needed. The maturity model would be developed by considering behaviours for each of the aspects that would be expected at each of five maturity level (from level 1 at which there was no systematic approach to that aspect, to level 5 at which the organization was applying behaviours uniformly across all its areas and was using process improvement techniques to ensure that its information management practices were appropriate to support the intended use of the information).
3. Information and communications technologies (ICT) underpinned information management, and the team concluded that although guidance was needed on how ICT should be managed, the team members did not personally have the expertise required to design that guidance. They also considered that those reading looking for such guidance would not look in the information management section of the Manual on WIS or the Guide to the WIS. A separate section might be needed to cover ICT operations. The team also noted that the existing WIS competencies covered IT Operations, and that structuring the guidance to align with the WIS competencies would be appropriate.
4. On behalf of TT-IM, the secretariat would ask the joint meeting of ET-CTS and ET-WISC to consider how to develop guidance on management of ICT operations.
5. TT-IM would develop specifications for Information management competences for inclusion in the WIS competences.
6. TT-IM recommended that ICT-ISS raise the profile of cyber security in the WIS community.
7. In the discussions on discovery, TT-IM supported the intention expressed in the WIS 2.0 of making the WIS catalogue visible to general purpose search engines and proposed that Ms Roberts (co-chair of IPET-DD TT-MDS) should include this in the work plan for that team.
8. Ms Roberts (co-chair of the IPET-DD TT-MDS) would add to the work plan of that team production of a standard approach to create WIS metadata at a collection level and to express this within a hierarchy in order to reduce the current problems of users that resulted from the high number of metadata records that were returned by a search query.
9. TT-IM would include guidance on information management practices to support management of issues around Intellectual Property Rights, and expected that EC-WG EIDP handle policy issues on charging.

## 7 Work plan for TT-IM

1. The team proposed the following work plan.
2. Immediately after the meeting: Lead authors complete the high level descriptions (for the manual) and define the next level of headings for their topic (for the Guide).
3. First half of November: exchange texts and agree these among the team; hold a telephone conference.
4. By early January: repeat process for the second level of headings, producing their descriptions and a first go at behaviours with at least one row complete before submission to ICT-ISS.
5. Following ICT-ISS: review the topics identified as needing urgent additional guidance (by TT-IM and adjusted by ICT-ISS), and allocate writing tasks to each that is required.
6. January to July 2018: continue development of the standards and guidance.
7. August or September 2018: meeting of TT-IM needed to finalize the documentation.
8. October 2018: publish information management documentation for the CBS consultation process starting in October 2018. The documents would need to be considered by ICT-ISS.

## 8 Close of meeting

1. The meeting closed at 1610 on 6 October 2017.

## Summary of Actions and Decisions

### Actions

**A1** On behalf of TT-IM, the secretariat would ask the joint meeting of ET-CTS and ET-WISC to consider how to develop guidance on management of ICT operations.

**A2** TT-IM would develop specifications for Information management competences for inclusion in the WIS competences.

**A3** In the discussions on discovery, TT-IM supported the intention expressed in the WIS 2.0 of making the WIS catalogue visible to general purpose search engines and proposed that Ms Roberts (co-chair of IPET-DD TT-MDS) should include this in the work plan for that team.

**A4** Ms Roberts (co-chair of the IPET-DD TT-MDS) would add to the work plan of that team production of a standard approach to create WIS metadata at a collection level and to express this within a hierarchy in order to reduce the current problems of users that resulted from the high number of metadata records that were returned by a search query.

### Decisions

**D1** Participants decided that the most appropriate approach for handling emerging issues would be for the team to identify how WMO could maintain awareness of emerging challenges and issues relating to ICT technology and data and produce technology review notes on these.

**D2** Participants agreed that a maturity model approach would be appropriate for developing, managing and monitoring information management practices within WMO.

**D3** The World-wide Web Consortium best practices in data on the web (www.w3.org/TR/dwbp) should be taken into consideration when developing WMO standards.

**D4** A basic principle to be followed in WMO information management was that when sharing information, information should also be shared on the context of the information (the “metadata”).

**D5** It was decided that it would be necessary to include guidance on quality of the information being provided could be improved through seeking user feedback.

**D6** The team concluded that the top level categories to be used to describe WIS Information Management and to develop the maturity matrix were: documentation, governance, storage and preservation, quality management, access and sharing, discovery, change management, and competences.

**D7** TT-IM recommended that ICT-ISS raise the profile of cyber security in the WIS community.

## Annex 1: Agenda

|  |  |
| --- | --- |
| 1 | Welcome and introductions |
| 2 | Aims of TT-IM |
| 3 | Technical Regulation process |
| 4 | Outcomes of WMO Workshop on Information Management and issues identified by the team |
| 5 | Options for resolving identified issues |
| 6 | Structure and outline contents of regulatory and guidance material |
| 7 | Work plan for TT-IM |
| 8 | Close of meeting |

## Annex 2: Participants

|  |  |
| --- | --- |
| William WRIGHT **(Chair)** | Australia |
| Bruce BANNERMAN | Australia |
| Kate ROBERTS | Australia |
| Fang GAO | China |
| Yuyu REN | China |
| Matteo DELL’ACQUA | France |
| Julie PERES | France |
| Thorsten BUESSELBERG | Germany |
| Kenji TSUNODA | Japan |
| Dimitri TELIUK | Russian Federation |
|  |  |
| **WMO Secretariat** |  |
| Omar BADDOUR |  |
| Steve FOREMAN |  |
| Peiliang SHI |  |
| Jeremy TANDY |  |
| Igor ZAHUMENSKY |  |

## Annex 3: Terms of Reference

(a) Collaborate with technical commissions to review available information management practices and develop and document appropriate standards and practices in information management;

(b) Recommend procedures for the long term maintenance and development of standards and best practices related to information management;

(c) Replace the Guide on World Weather Watch Data Management (WMO‑No. 788) with a new guide on best practices for information management across all WMO Programmes;

(d) Propose updates to incorporate standards and practices for information management under WIS Part C in the Manual on WIS (WMO‑No. 1060) and Guide to the WIS (WMO‑No. 1061);

(e) Recommend updates to the WIS competencies related to information management and associated training and learning guides.

## Annex 4: Issues identified by the Task Team on WIGOS Data Partnerships

1. The guidance should include a high level diagram to shows how the different elements of the information management standards and guidance fit together.
2. Emphasis should be placed on ensuring interoperability between information of diverse origin, such as from different centres or from outside the WMO community.
3. There needed to be a cultural shift around security and data stewardship, and an emphasis on distinguishing between the functions to be performed and the technologies used to deliver them.
4. Data policies, such as Resolutions 40 (Cg-XII), 25 (Cg-XIII) and 60 (Cg-17) needed to be addressed.
5. Standards and guidance had to address approaches to data licensing, including how data licenses should be negotiated and implemented in information systems.
6. Systems needed to be able to handle observations that were made using different quality standards.
7. Guidance would be needed on managing data shared under “open data” policies; there was uncertainty as to whether different approaches were needed for this type of data than for other types of data licence.
8. Guidance would be needed on processes for managing changes to information, including procedures, and human communication and the technical aspects of data management
9. The information management system needed to provide traceability between information and the supporting information used to create it (including the provenance of data).
10. Standards and guidance needed to take into consideration the diversity of the capabilities of Members.
11. An initial version of a guide should identify the most critical areas, to allow Members to understand and respond to the key aspects of data management.
12. Each item of information should have a single authoritative source, whatever the processing used to create it.

## Annex 5: Priority topics on which guidance and standards will be needed on Information Management.

Introduction to Manual/Guide: Information is a valuable asset, but only if managed and used.

1. Documentation (metadata)
   1. \* Standard way(s) of describing datasets (national, regional, global)
   2. \* Inventories (know what has to be managed)
2. Governance
   1. \* Accountability / responsibility
   2. \* Data policy management
      1. \* Intellectual property, data licensing
      2. \* WMO defined policies vs nationally agreed policies
      3. \* Policy on how to decide which data to share and the conditions of sharing
3. ICT operations
4. Preservation
   1. \* Technology migration to ensure continued integrity and accessibility of information
   2. \* Guidance on retention
5. Quality management
   1. \* Criteria for deciding on appropriate quality management regime (and documenting it)
6. Access and sharing
   1. \* Always use an open data format (that is change- and version-managed)
   2. \* Communities agree the “conventions” they will use to underpin interoperability
   3. \* Make data available on the web and provide complementary services to help users access them
7. Discovery
   1. \* Document and make document available
   2. \* publish through mechanisms that are visible to search engines
8. Change management (traceability)
   1. \* Control and record changes to datasets and their production
9. Competence

## Annex 6. Top level categories for developing the standards and guidance on information management.

Aim for TECO: all Categories and Aspects should be defined. Strawman drafts of the behaviours should be ready. One row of the maturity matrix should be filled in as an example. The first draft should be available for the ICT-ISS meeting in January 2018.

| **Categories** | **Aspects** | **Behaviours** |
| --- | --- | --- |
| **Documentation**  Documentation is important so that:   * users can find, understand and use the data and associated services (metadata) * data are processed / produced in a consistent way (including guidance for new staff) (QMS) * users can trust the data they use (and you can defend yourself in court) (provenance)   You need to include in your documentation of data:   * How it was produced and processed, how it is managed, ownership, how it is accessed, who can use it and what how they may use it, what application areas it is intended to support, services available, its quality and how that is assured, what it contains, what data were used to create it, where to go for help | Document (and retain documentation) your procedures  standard ways of describing datasets  inventories  intended use  maturity  vocabularies |  |
| **Governance**  We need governance so that:   * Your investment in gathering, processing, storing and exchanging data delivers value * Irreplaceable information is available for future generations * Risks associated with information production and use are managed (… IPR, traceability,…) * Saves effort and increases operational efficiency through clear understanding by staff of what is expected and permissible * Your information assets are managed so they achieve what you want and to reduce your risks associated with them * P18 CDMS spec. People can use the data over a long period (sustainability)   To achieve this Governance has to cover:   * Consistent approaches to processes – facilitate authoritative data – sharing and integration - clear IPR issues – data access – data usage – process for integrity – long term sustainability * Accountabilities and responsibilities * Data policy * Clarity on standards to be used (national and international) * Funding model * National/international commitments |  |  |
| ~~Information storage~~  ~~ICT operations deliver:~~ |  |  |
| **Storage and Preservation**  We need managed storage and preservation so that:   * Data content and associated contextual information are trustworthy, available and usable when needed, now and in the future * Policies on use and retention can be applied   Managed storage and preservation has to cover:   * P40 DDNS: backup, restore, redundant copies, retention, technology migration, capacity management, long term accessibility, (competent – individual, corporate), storage strategy, controlled ingestion process, access controls, archive, deletion of data no longer to be retained, accountabilities and responsibilities, technology exit strategies (eg cloud) |  |  |
| **Quality management**  We need quality management so that:   * Data and related contextual information are, and can be demonstrated to be, fit for purpose (complete, accurate, …)   Quality management has to cover:   * Documented decisions, audit, quality related procedures, algorithms, definition of quality measures, required contextual information (quality managed using same principles as data) (including metadata, “engineering” data…..), monitoring data (being received, stored appropriately, …), feedback mechanisms to providers, metrics (summaries of quality control findings), assessing uncertainty, verification, (may need notes in the text to explain equivalent terms in different disciplines), standards to be applied (and conformance audited, eg ICAO), “usability”, provenance of data and software used in creating products * Peer review of data, algorithms and processes where appropriate | How decisions are made, what decisions are made, how decisions are recorded |  |
| **Access and sharing**  We need access and sharing so that:   * Data can be used by the appropriate people and software systems where and when it is needed * Data can support delivery of societal benefits   Access and sharing has to cover:   * Exchange “conventions” (open formats, data models, machine-to-machine interactions, web services, etc ), community agreed ways of working together using open standards, * Protection of data in transit, access control (supporting usage conditions), promote open data, * Methods of access suitable for intended user communities (consider the access from the perspective of users) * Tracking delivery and use * Compliance with policies and regulations * [telecoms should already be covered by the WIS centre regulations] * Cost recovery models * Controlled vocabularies | Digital Object Identifiers … |  |
| **Discovery**  We need discovery so that:   * Data providers can deliver additional societal value through reuse by others of their data, and their contribution can be recognized * Data providers can publicize the data and associated services that they are offering * Users can find efficiently the data most suitable for their needs * Duplication of effort in creating data can be avoided   Discovery has to cover:   * Inventory, contextual information, user focus, controlled vocabularies, catalogues searchable by commercial search engines, access to documentation and data, meeting community conventions, web page, operating a catalogue, catalogue-catalogue interaction, usage statistics and feedback on search experience , currency of information in catalogue | Put list on web page  Use other’s catalogue  Use own catalogue  Host others’ info in your catalogue |  |
| **Change management**  We need change management so that:   * Users can have confidence in the data * Users know when and why changes are made to data they use * We understand what changes have been made and we have traceability of those changes   Change management has to cover:   * ICT change management must not corrupt or change the meaning of data (underpinning factor), intensity of change management/provenance depends on the data being managed, authority to change and controls over change, recording of changes, notifications of changes, * Don’t delete the original data – flag it. |  |  |
| **Competences**  We need to ensure that people and suppliers supporting our data:   * Have the knowledge to do the tasks required of them * Have the ability to apply the knowledge to deliver the tasks required of them   Competences need to include:   * Quality management * Storage/database management * Data change management * Documentation/ context information management * Data governance |  |  |
| **Management of ICT operations**  (To be a separate section of the Manual on WIS and/or Guide to WIS from the section on information management) |  |  |

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| **Categories** | **Responsibility for developing the standard and guidance** |
| Documentation | Wright |
| Governance | Wright |
| Storage and Preservation | Peres |
| Quality management | Gao |
| Access and sharing | Tandy |
| Discovery | Roberts |
| Change management | Teliuk |
| Competences | Buesselberg |
| ICT operations | ET-WISC or ET-CTS |