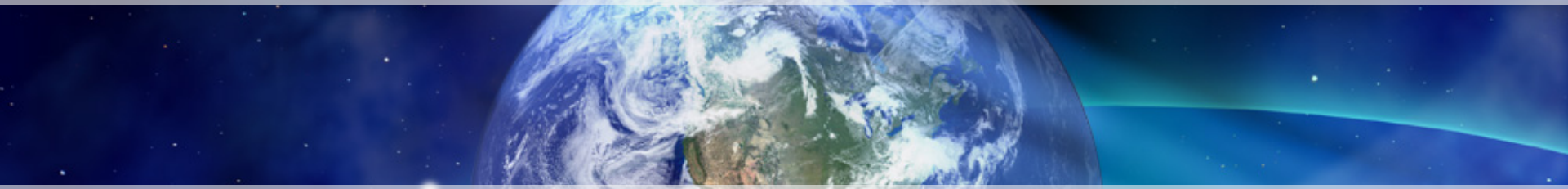
Operational Solutions for Increasing the Value and Usability of Earth Science Data via a Data Quality Framework



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Outline

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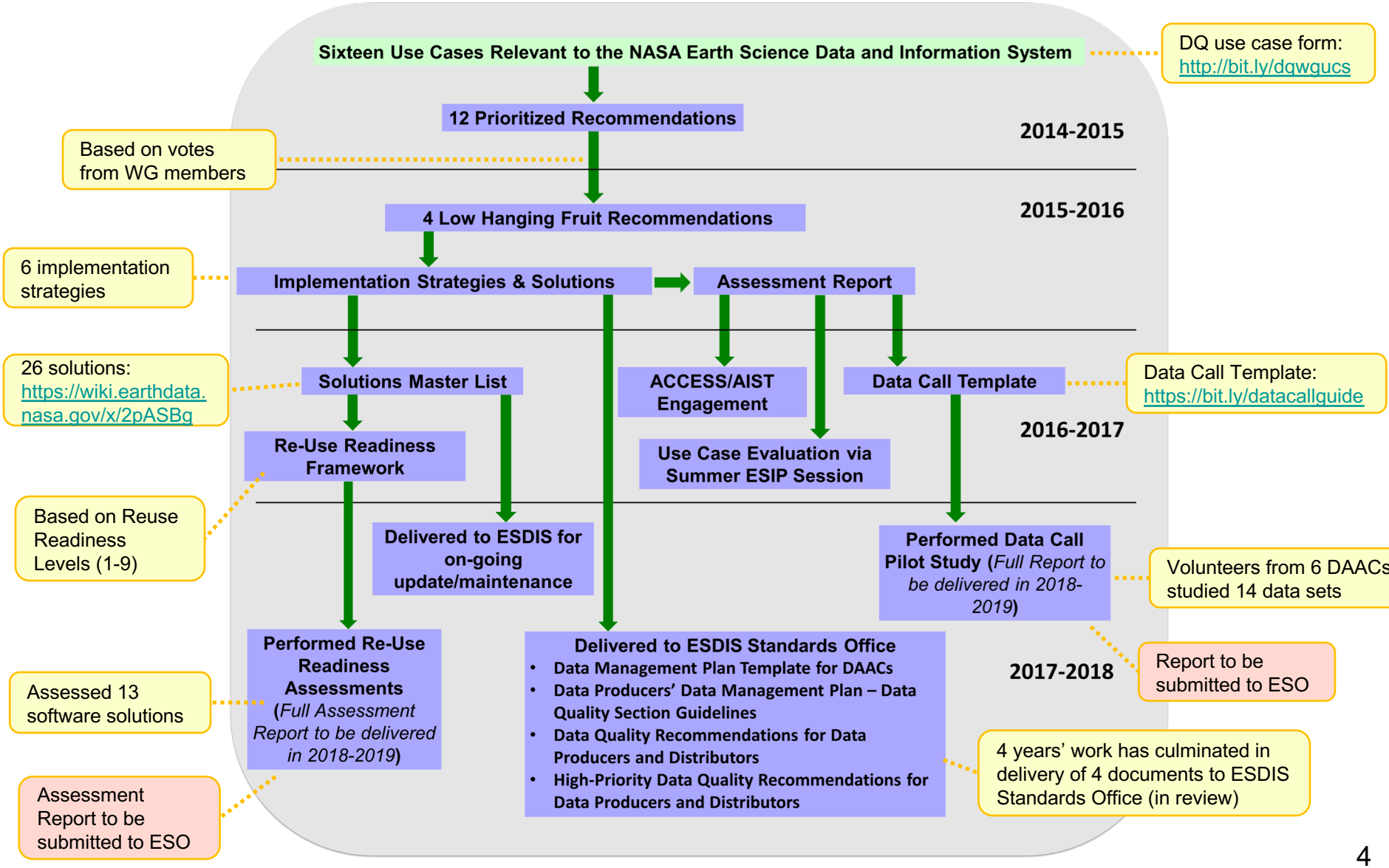
About ESDSWG DQWG

- One of NASA's Earth Science Data System Working Groups (ESDSWG).
- Formed at the annual meeting of the ESDSWG in 2014 as a result of interest expressed by the ESDIS Project and MEaSUREs investigators.
- Mission Statement
  - Evaluate and make recommendations to the ESDIS Project and HQ's Earth Science Data Systems (ESDS) Program for improvements in capturing, representing and enabling the use of data quality information describing accuracy, precision, uncertainty and applicability ("fitness for use") stewardship in the NASA Earth science domain.

https://earthdata.nasa.gov/community/
ESDSWG: **earth-science-data-system-working-groups-esdswg**

Trajectories and Outcomes in 2014-2018



Operational Solutions Master List

- Intended to identify operational solutions (26) relevant to the Implementation strategies identified by the DQWG.
- **https://wiki.earthdata.nasa.gov/x/2pASBg**
- Solutions can either be software, documentation, or standards/practices.
- Solutions cover the following implementation categories:
  - Data Quality Information (representation/dissemination)
  - Facilitate Data Center and Provider/PI Communication
  - Metadata Creation
  - Standards Compliance Checking and Reporting
  - Guidance and Instruction
  - User Services
  - Knowledgebase

Forthcoming Publications of Standards and Practices

- **ESDS-RFC-031**: *Data Management Plan Template for Distributed Active Archive Centers* (Convention)
- **ESDS-RFC-032**: *Data Management Plan Template for Data Processing Systems* (Convention)
- **ESDS-RFC-033**: *Comprehensive Data Quality Recommendations for Data Producers and Distributors* (Suggested Practice)
- **ESDS-RFC-034**: *High-Priority Data Quality Recommendations for Data Producers and Distributors* (Suggested Practice)
- **TBD**: *Assessment of Recommended Data Quality Software Products* (Technical Note)
- **TBD**: *Report of Data Call Pilot Study* (Technical Note)

ESO Standards in Action

https://earthdata.nasa.gov/about/esdis-project/esdis-standards-office-eso

About ESIP IQC

- Vision
  - Become **internationally recognized** as an **authoritative and responsive information resource** for guiding the implementation of **data quality standards and best practices** of the science data systems, datasets, and data/metadata dissemination services.
- Closely connected to Data Stewardship Committee
- Open membership (as with all Collaboration Areas in ESIP)

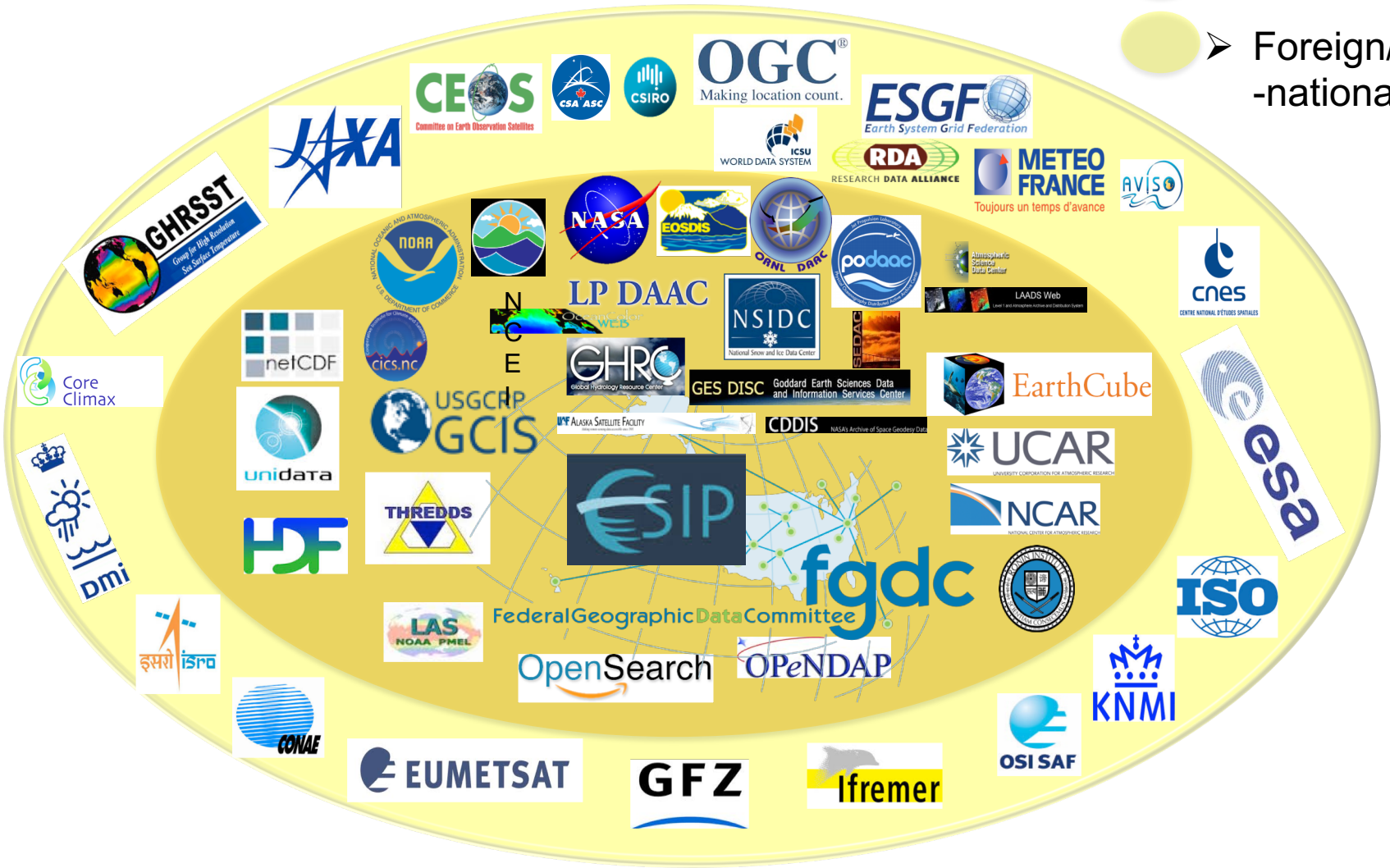
ESIP Information Quality:
http://wiki.esipfed.org/index.php/Information_Quality

IQC Objectives

- Share Experiences.
- Actively evaluate best practices and standards for data quality from the Earth science community.
- Improve collection, description, discovery, and usability of information about data quality in Earth science data products.
- Consistently provide guidance to data managers and stewards on the implementation of data quality best practices and standards as well as for enhancing and improving data maturity.
- Support:
  - Data producers with information about standards and best practices for conveying data quality; provide mentoring as needed
  - Data providers/distributors/intermediaries establish, improve, and evolve mechanisms to assist users in discovering, understanding, and applying data quality information properly.

Many Players Around the World

- US
- Foreign/International



Information Quality Defined

- Scientific quality
  - Accuracy, precision, uncertainty, validity and suitability for use (fitness for purpose) in various applications
- Product quality
  - How well the scientific quality is assessed and documented
  - Completeness of metadata and documentation, provenance and context, etc.
- Stewardship quality
  - How well data are being managed, preserved, and cared for by an archive or repository
- Service Quality
  - How easy it is for users to find, get, understand, trust, and use data
  - Whether archive has people who understand the data available to help users.
- Ramapriyan, H K, Peng G, Moroni D, Shie C-L, **Ensuring and Improving Information Quality for Earth Science Data and Products**. D-Lib Magazine, 23 (7/8), July/August 2017, DOI: **https://doi.org/10.1045/july2017-ramapriyan**

IQC Community Support

- **http://wiki.esipfed.org/index.php/**
- Agency Policies and Guidelines
  - **Agency_Policies_on_Information_Quality**
- Relevant Papers: **IQ_Papers**
- IQ Meeting Presentations: **IQ_Presentations**
- Relevant Standards: **IQ_Standards**
- Relevant Web Pages: **IQ_Webpages**
- IQ Wiki Pages: **Information_Quality**
- IQC hosts monthly telecons featuring invited speakers.
  - Presenters have the option of publishing their slides and obtaining a free, citable DOI through the ESIP Figshare.

Conclusions and Next Steps

- 4 drafted NASA DQWG technical notes (2 - Conventions; 2 - Suggested Practices) are expected to be released for publication in the coming months.
- The previous work on assessing the Re-Use Readiness Levels of the software-related solutions (i.e., “Assessment of Recommended Data Quality Software Products”) on the SML is being drafted for publication.
- The previous work on establishing a standardized Data Call Template and corresponding Pilot Study is also being drafted for publication.
- After 5 years of dedicated service, the DQWG will conclude its activities by March 2019.
- NASA’s involvement in data quality efforts is expected to continue under the auspices of ESIP’s IQC, which has the benefit of inter-agency and international collaboration.
- An ESIP IQC White Paper on the topic of Earth science data uncertainty quantification, characterization, and utilization is expected to be completed in the coming months.
- Membership within ESIP and the IQC is free and open to all persons and organizations.

Thank you!

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- Learn more about the IQC: **http://wiki.esipfed.org/index.php/Information_Quality**
- Access to DQWG Master List of Solutions: **https://wiki.earthdata.nasa.gov/x/2pASBg**
- Access to NASA’s ESO Standards and Technical Notes: **https://earthdata.nasa.gov/about/esdis-project/esdis-standards-office-eso**