

ECVs: What's Operational and what requires R&D?

Session Report

CCI 6th Colocation, ESRIN, 30 Sep 2015

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Statement of the Problem:

There are funding sources for operational production of ECV data sets:

- Eumetsat SAFs
- National
- Commercial...?
- Copernicus C3S

CCI teams must take advantage of operational funding sources where these are available and appropriate for their ECV because:

1. ESA does not have a mandate to operate ECV production systems.
NB: operational production was never envisaged to be within CCI.
2. It is one measure of success (among several others) for the CCI programme, to help justify any future potential extension of CCI.

Important Points Raised

- Conclusion of 5th collocation, repeated by GHG CCI:
- Criteria have been defined for „operational“ (proven capability to generate state-of-the-art products, regular product delivery, documentation, version tracking, ...)
- **Based on these criteria it is concluded that [many CCI projects are] operational**

However, levels of "operational maturity" differ between different ECVs.

Important Points Raised

- This is a programmatic question, not directly driven by users needs and it is not straightforward for data producers to separate production from R&D.
- CCI teams have established systems in which processing, feedback, system evolution and R&D are tightly coupled:
 - this is necessary to meet GCOS objectives and maintain CDRs' validity and quality
 - teams will continue with this integrated approach, even if funding is dis-integrated
- CORE-CLIMAX System Maturity is used as an indicator for the status of the production systems; it is not aimed at scientific quality of the products.
- *Operational* does not necessarily mean *automated*
- A strong interface must be established between operational and R&D activities to ensure uptake of new R&D by operational production, and to ensure strong feedback loop to R&D activities on product quality and new user requirements.
- Need to take care that essential activities do not fall into a funding gap:, e.g.:
 - “system evolution” generally should be included as “operational” activity
 - other activities are more ambiguous and vary case-by-case

- For CDRs, a universal definition of what's "operational" is not available. C3S proposes interacting with the ECV community on this with a focus on what is required for specific deliverables.
- Considering the timescale for the work may help to distinguish operational activities: "R&D" takes longer than "system evolution".
- Most CCI projects can self-identify operational activities, but the funding will be clarified when operational services define their requirements in detail (e.g. in the upcoming C3S ITTs). Need to be pragmatic!
- Operational should not mean "fixed" – products must improve over time in response to user feedback and evolving scientific requirements
 - A mechanism for linking strongly to R&D activities must be established as an integral part of any operational ECV activity.
- Integration of new missions in a satellite series (e.g. MetOp-C, Sentinel-B,C,D,...?) could be supported by CCI, but support is unlikely from other research funding modes

- Improve algorithms:
 - Need to get closer to GCOS requirements, and respond to changing requirements.
 - For most (all?) ECVs, known techniques cannot achieve all GCOS ECV requirements.
 - Need to improve both physical understanding as well as retrieval techniques.
- New ECV products (e.g. small fires, Case 2 water) not covered by CCI
- Improve uncertainty estimation
- Consistency between ECVs from the user perspective
- New instruments with upgraded capabilities (Sentinels, Earth Explorers, etc)
- Aging instruments (e.g. instrument degradation)
- Old instruments (e.g. CZCS and AVHRR, calibration, etc)
- Merging/integrating multi-mission data from multiple space agencies

Overall, presentations by CCI teams presented a thorough list of new R&D/system evolution required on the CCI ECVs

NB: The need to include further R&D on existing CCI ECVs is not yet accepted by ESA Member States.

SPARE SLIDES

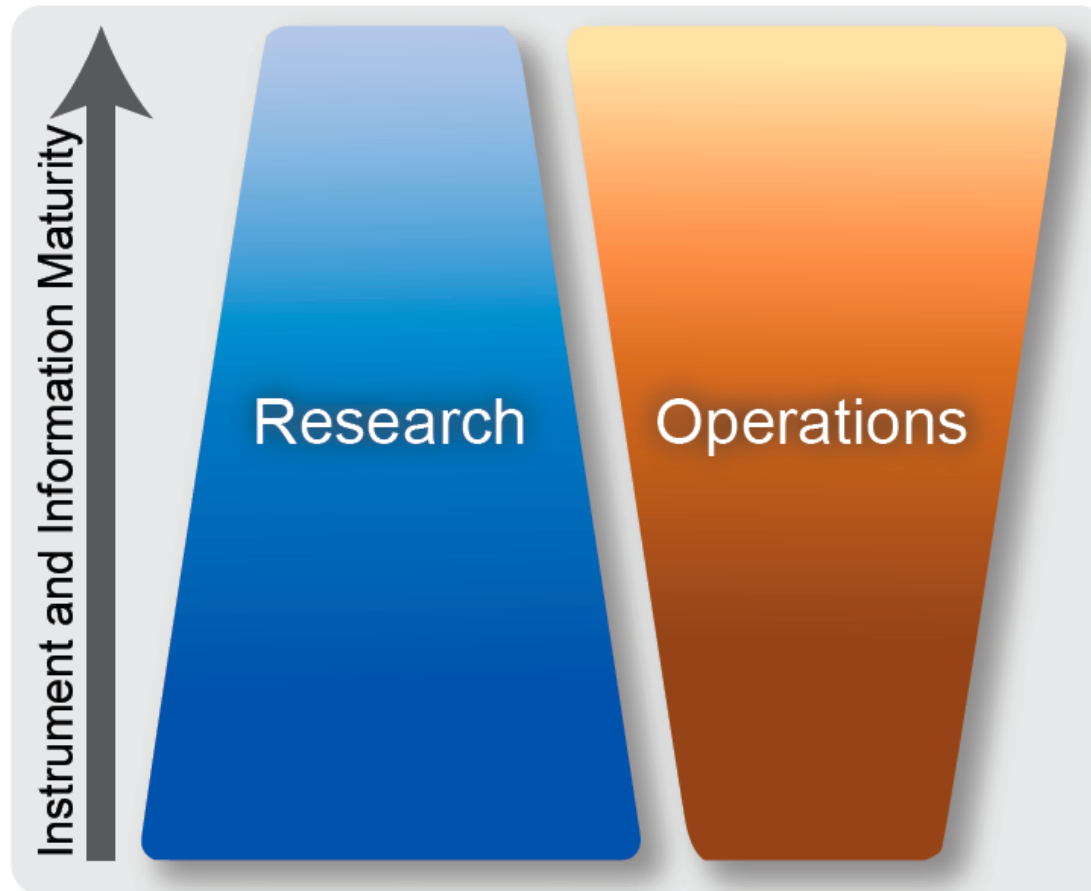
Why are we asking this question?

Because the sources of funding for Operations are separate from the sources of funding for R&D.

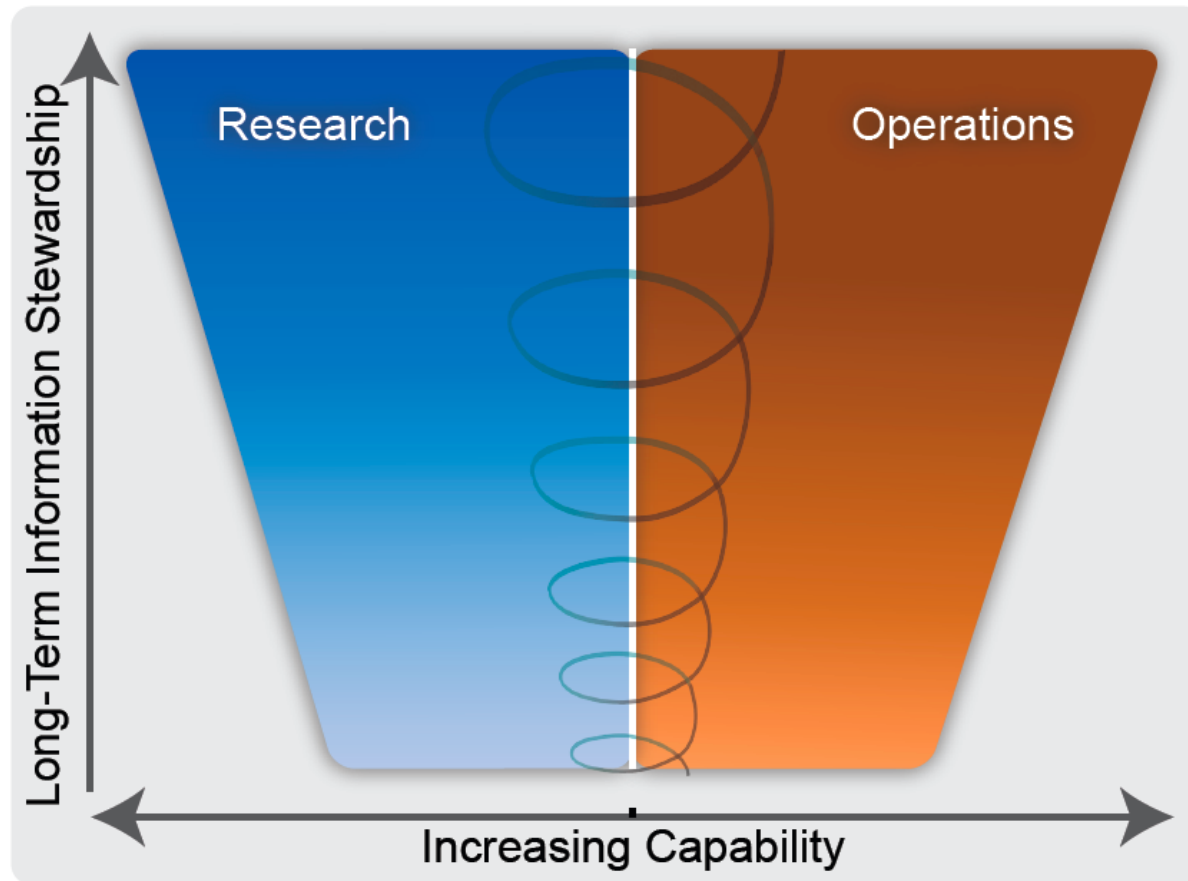
i.e.

- separate ITTs
- separate contracts

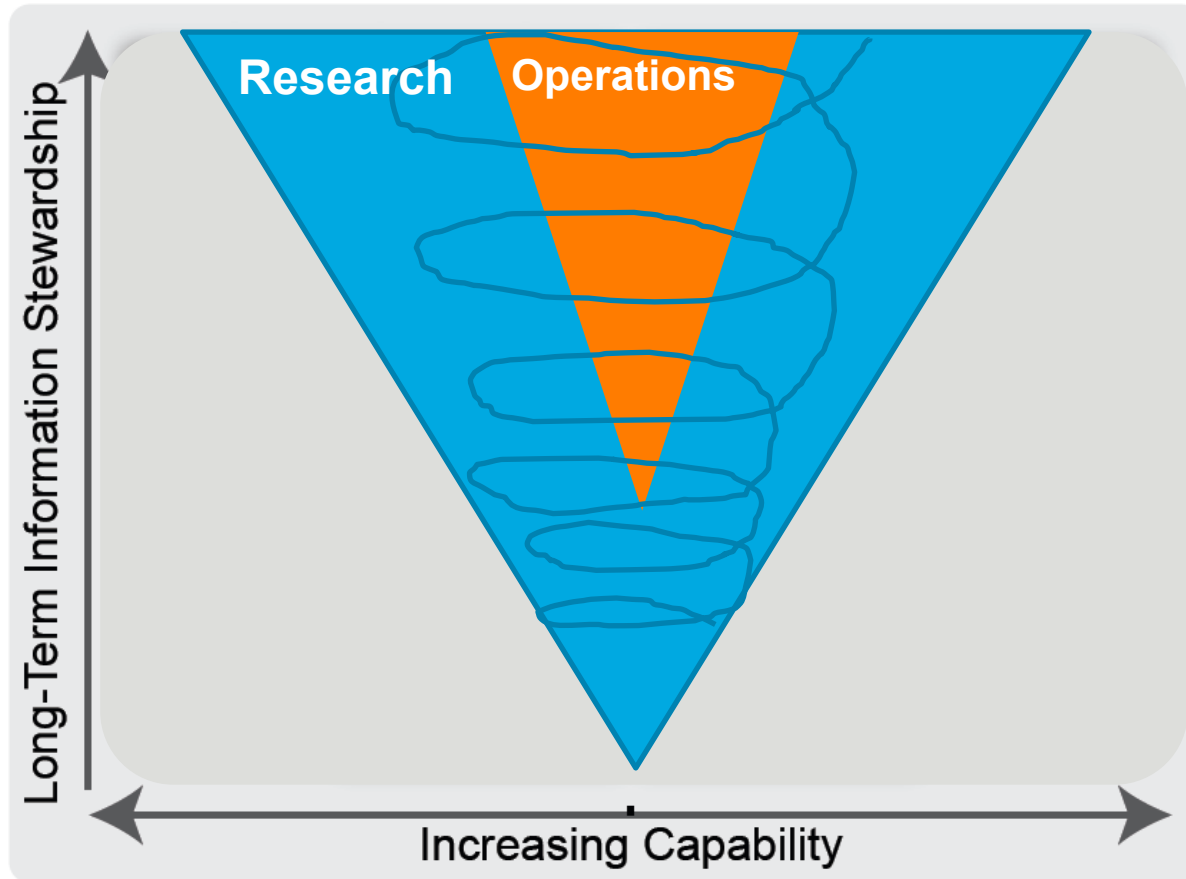
(Also, because our Member States delegates are asking us this question)



Notional evolution of the level of effort in a research to operations transition for a satellite mission



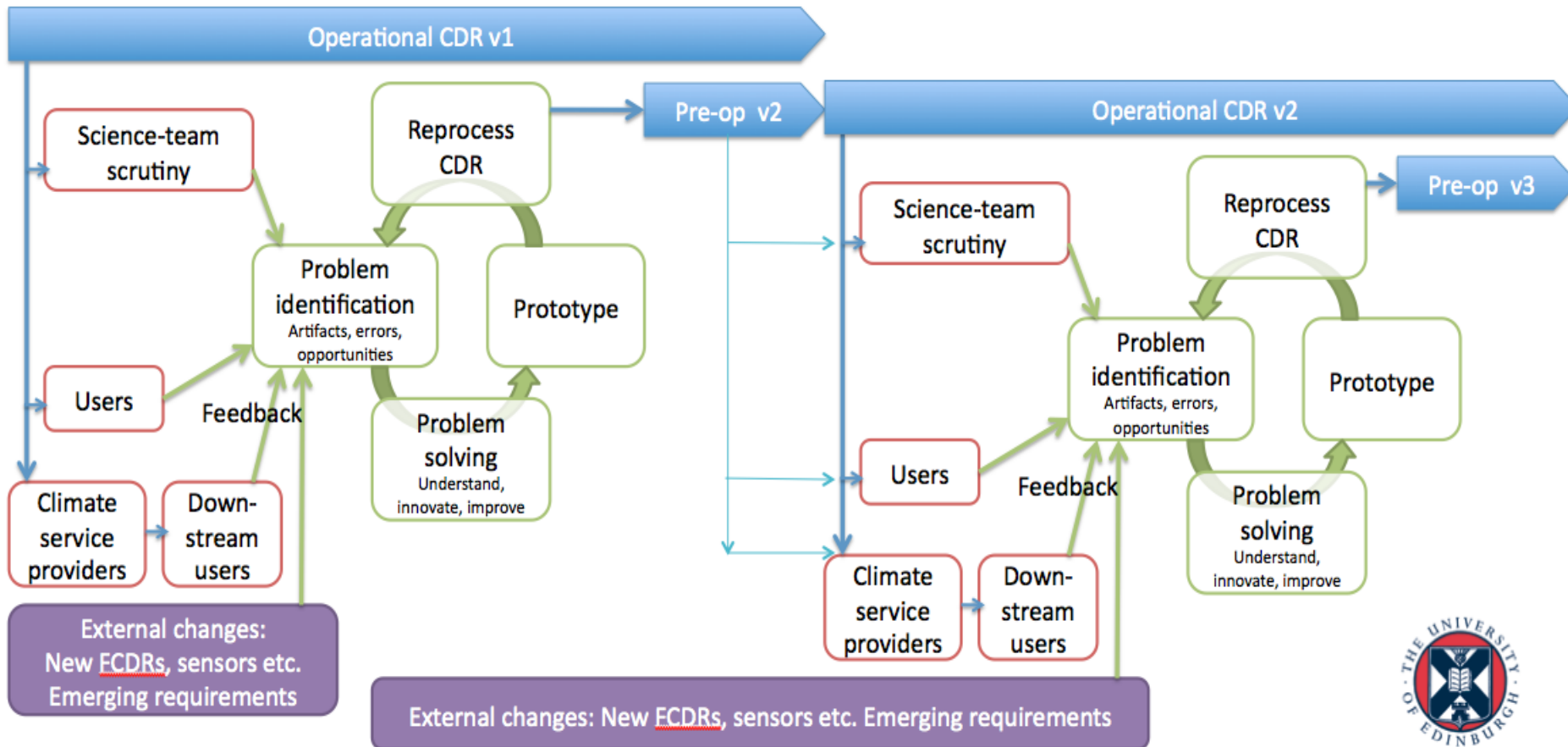
A more realistic view of the interdependency of research and operations needed for sustained and routine climate monitoring?



Output from Science Leaders' discussion at Colocation 5 (Oct 2014)

Acknowledgement: M. Buchwitz

ECVs: Operational vs R&D



Which elements could be eligible for operational funding?

Separating ECV Operational Production from ECV R&D is not simple.

- Development of a new retrieval algorithm for a GCOS ECV product
- Develop a harmonised CDR across multiple satellite instruments
- Adapt an existing retrieval to a new satellite instrument (e.g Sentinels)
- Algorithm round-robin and selection
- Development of processing chain
- Maintenance of a processing chain
- Data processing and re-processing
- ECV product validation
- ECV product assessment by Climate Users

FACTS:

- In 2018-2020, C3S plans to provide ~33 ECVs operationally, including all 13 ECVs included in CCI so far.
NB: the first call is in early 2016.
- Until the C3S competitive ITTs are released, we won't know for sure exactly what technical activities C3S will consider to be eligible for operational funding.
- There are also other potential operational homes: EUMETSAT SAFs, national activities, commercial, etc.
- ESA doesn't have a mandate to operate ECV production systems.
- Current funding for CCI ends in 2017/2018. CCI+ is a potential extension of the CCI for new ECVs, and is in very preliminary discussion.
- In order to extend the CCI programme, we need to show that CCI was a success.
- One of the measures of success will be whether operational production of CCI ECVs is transferred to operational funding outside CCI.

Purpose of this Session:

- Difficult question and diversity of views among CCI teams

=> Provide an opportunity to present the different views and examples from different CCI teams on how to make the split between operational and R&D activities, given the separate funding lines.
- Try to work towards a common view across the CCI, on how to make the split.
- Determine if there are still elements of your ECV which need more R&D – given that CCI+ is currently focussed on "new" ECVs, e.g. salinity, long-lived GHGs, snow, ...
- To help us (ESA) respond to questions from delegations on Operational vs R&D, and to provide input to the CCI+ programme proposal.

- Copernicus programme (B. Pinty, Copernicus Bureau) – silent presentation
- Copernicus C3S (D. Dee, ECMWF/C3S)
- Intro to the session (S. Pinnock, ESA Climate Office)
 - Soil Moisture (W. Wagner)
 - Fire (E. Chiuvienco)
 - Land Cover (P. Defourney)
 - Glaciers (F. Paul)
 - Ice Sheets – Antarctica (A. Shepherd)
 - Ice Sheets – Greenland (R. Forsberg)
 - Ocean Colour (S. Sathyendranath)
 - Sea Level (G. Larnicol)
 - SST (C. Merchant)
 - Sea Ice (S. Sandven)
 - GHG (M. Buchwitz)
 - Ozone (M. Van Roozendaal)
 - Aerosol (T. Popp)
 - Cloud (R. Hollmann)
- Discussion