System Perspective Summary

- 10 CCIs represented
  - All are working on making the Phase 1 processing chains robust, well documented and able for regular (re-)processing (missing ozone, sea level, soil moisture)

- Copernicus needs operational ECVs
  - Not clear what is the Climate Change <u>Service</u>
  - Climate Change Service are not the only users of ECVs
  - CCIs consider a continuous (re-)processing plan very important, benefit from R&D developments
  - Balance between quality of the system and quality of the output

- Scientific development – continued relevance - controlled change.
  - Keeping aligned with what users want, evidence of best quality
  - Development processing
  - Full (re-)processing, operational processing (can be same processing environment)
  - Documentation & traceability

- Key criteria from system engineering point of view
  - Version control, (re-)processing capability, documentation, robustness, redundancy, automation & repeatabilty, minimum human interactions, regular production cycles,

- QC & Validation
    - Algorithm validation -> part of the development cycle
    - Operational QC: input & output verification (technically correct)
    - Validation of the generated products before release
    - Validation in inherent part of the operations
    - Requires validation scientists
    - Requires reference (validation) data (who pays for that?)
    - Requires operational funding
- SW written by scientists shall be used to a maximum extend, in close cooperation with software engineers
    - All represented CCIs use directly the SW written by the scientists
- Change from (re-)processing of completed archives to continuous production (data driven), also required if final product is a multi-year analysis

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- There is (currently) no sharp distinction between R&D activities and operational activities
  - R&D -> controlled change has to be always an integral element of ECV production
  - Retain the scientific knowledge on algorithms, validation, … within the ECV operations
  - Development system <-> operational system, clear interfaces (technical, management); same code base!

- Most CCIs plan to retain control over operations

    - Some use operational infrastructure (like CEMS, DFD, Calvalus)

- Funding schemes

    - Mixed funding from Copernicus Climate Change Service + H2020 + ESA CCI2 (+ national co-funding)

    - Critical: mechanism to ensure interface between these lines; → controlled change

- ESA CCI-2 requirements

    - Focus on the R&D part, like H2020

    - Ensure link to operational service