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DOCUMENT

Scientific Readiness Levels (SRL) Handbook

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1 PURPOSE OF THE DOCUMENT

This document shall serve as a “Scientific Readiness Level (SRL) Handbook”. Its purpose is to establish the standard measure of the maturity of evolving science with respect to a mission concept, satellite mission, or satellite instrument activity (from this point on referred to as “the mission activity”). This SRL Handbook is intended to provide definitions of the various SRL levels and of the questions that must be addressed in a Scientific Readiness Assessment (SRA). In addition, guidance on the required evidence is provided for the individual SRLs.

The structure of this Handbook and the description of the SRAs follow the “Technology Readiness Level Handbook” [RD-1].

2 INTRODUCTION

2.1 Overview

The ability to make informed, objective decisions concerning the selection of new mission concepts, implementation decision, and preparatory scientific studies is essential to respond to growing demands on scientific and technological progress in Earth Observation (EO) Programmes. Accurate and timely ‘scientific readiness assessments’ (SRAs) are therefore important for the cost-effective and traceable management of advanced scientific R&D portfolios. Although an approach has been developed to assess the “Technology Readiness”, no decision support tools exist for the evaluation of the “Scientific Readiness” through the life cycle of an EO mission, spanning the evolution from pre-Phase 0 to Phase F [RD-2]. A critical step in the process of assessing scientific maturity, however, is the consistent assessment of the scientific maturity of a mission activity in parallel to its implementation in, or exploitation of, new mission concepts.

Critical to the success of new mission concepts and / or exploratory scientific programs is the *effective evaluation* and *continuous assessment* of the level of scientific maturity and associated scientific risk not to achieve the scientific objective. SRLs are defined here as to provide a common metric by means of which knowledge of scientific maturity will be communicated among Programme managers, system developers and scientists, and among individuals from different organisations. The SRLs are not linked to a specific scientific discipline or Programme. In addition, the use of SRLs support a traceable maturation of science and provide a foundation for developing and communicating insight into the scientific risks accompanying the development of an observing system and its constituent new technologies. It should be noted that SRLs should not be used to judge the importance or relevance of one particular scientific discipline or its value compared to another.

Earth Observation missions that address new scientific objectives inevitably face four major challenges during implementation and operation:

1. **Developing** a theoretical understanding of the relationship between the measured quantity and the geophysical parameter to be observed;
2. **Collecting** observational evidence that this relationship between measurement and geophysical parameter exists;
3. **Maturing** the readiness of a scientific user community to process and exploit the measurements obtained from the new observing system;
4. **Demonstrating** the impact of a new measurement type for science, applications, and society.

While challenges (1) and (2) should primarily being addressed in the early phases of an EO satellite mission prior to launch, challenge (3) and (4) can mainly be answered during and/or after mission implementation, i.e. after launch. However, the readiness of a user community and the data exploitation shall already be prepared before launch in the earlier development phases.

The Scientific Readiness Levels (SRLs) defined in this handbook are intended to provide a metric to support objective evaluation of maturity for a specified Mission Activity and its specific scientific objectives.

3 SCIENTIFIC READINESS LEVEL DEFINITIONS

3.1 Scientific Readiness Level (SRL) Definitions

SRLs are a set of metrics that enable the assessment of the maturity of a particular scientific discipline and the consistent comparison of maturity between different types of disciplines — all in the context of an EO satellite mission. Any combination of the four challenges described in Section 2.1 shall be addressed for each SRL during an SRA. There are 9 steps in the SRL and the relative importance of each challenge can be different during the maturation process captured by SRL-1 to SRL-9.

TRLs can be defined for hardware and / or software components and it is possible to apply a common metric with “hard” evaluation criteria. SRLs can be related to objective milestones during mission development and implementation. In addition, peer-reviewed literature provides a reference for scientific developments directly or indirectly related to the scientific objectives and disciplines – independent of the mission implementation process.

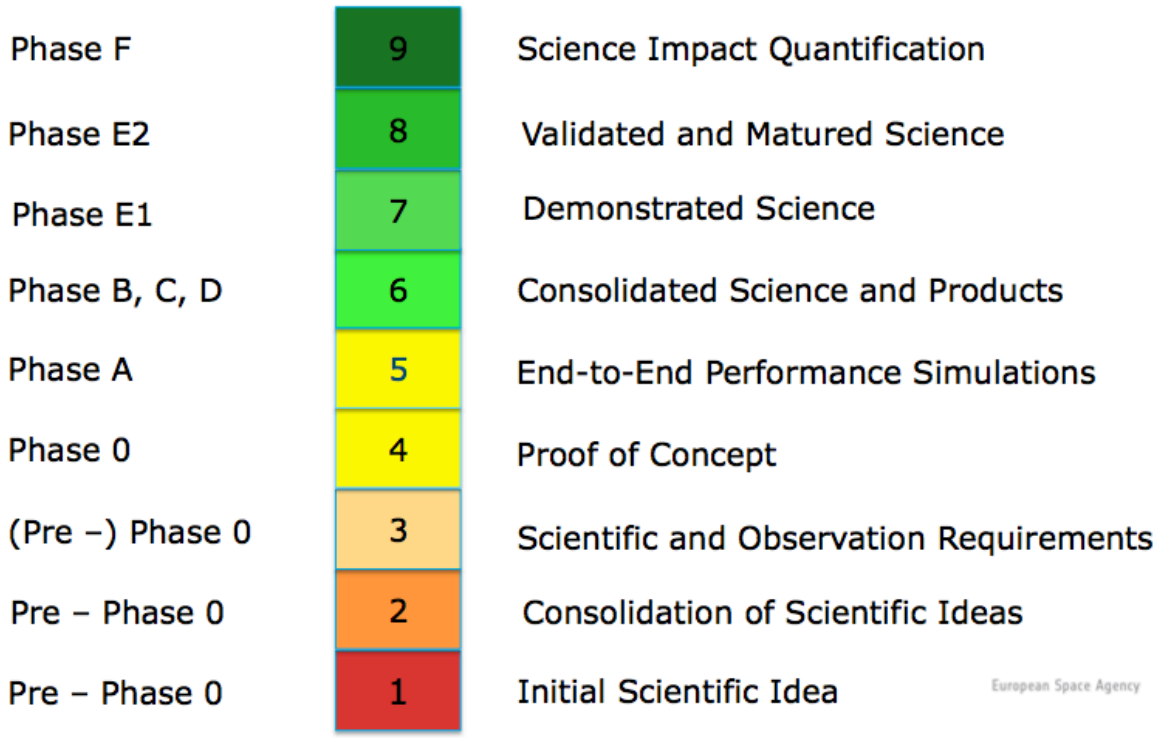

Figure 3.1 provides a high-level illustration of the SRL scale in the context of the progression from basic research to matured science in (operational) applications in relation to the Phases of an EO mission.

SRL 1: Initial Scientific Idea
An idea combined with a general *scientific objective* is stated and a *scientific hypothesis* is presented. An interest from the (scientific community) users has been expressed and high-level user requirements are created. The idea can still be decoupled from specific mission activity objective or a specific measurement concept. The scientific idea can also be based on a problem statement.

SRL 2: Consolidation of Scientific Ideas
Scientific evidence and supporting scientific theories are established addressing one or more scientific ideas. This could for example be done based on theoretical grounds or through laboratory experiments. Observations and theories are linked to the consolidated user requirements and / or the problem statement. The scientific strategy to address the scientific challenge is defined.

SRL 3: Scientific and Observation Requirements
A first iteration of top-level scientific and observation requirements, e.g. product accuracy and temporal and spatial sampling, is performed and mapped against the user requirements. During this process a justified selection of the conceptual measurement technique(s) is developed based upon derived observational requirements.

SRL4: Proof of Concept
The measurement concept is validated. A model linking geophysical parameters and measurements is established. Sensitivity of the measurements to the targeted geophysical parameter is demonstrated through extensive analyses by means of dedicated experiments but at least through simulations.

SRL5: End-to-End Performance Simulations
An end-to-end measurement performance simulator is developed, tested and validated using realistic and / or actual measurements[1]. The performance model used is applicable to a predefined range of conditions (including realistic uncertainties of natural and observational nature) and can be used to address the needs originating from the science requirements in an end-to-end manner. Retrieval algorithms applicable for a realistic range of error sources (both geophysical and technical) are demonstrated against a pre-defined performance metric reflecting observation and measurement requirements.

SRL6: Consolidated Science and Products
Consolidated geophysical retrievals are established and implemented. These are Level 1, Level 2, and higher order algorithms (if applicable) providing measurements and observations that directly respond to the Mission Activity measurement and observation requirements.

SRL7: Demonstrated Science
Retrieval algorithms verified using real mission activity measurements. Retrieval uncertainties are provided and mapped against the measurement and observation requirements of the Mission Activity.

SRL8: Validated and Matured Science
Data products are systematically generated and disseminated. The Mission Activity scientific goals and objective are tested and evaluated. The scientific aim is tested. Science linked to the Mission Activity is advancing leading to a growing scientific community, new applications, and new scientific insights.

SRL9: Science Impact Quantification
The measurements and observations have been re-processed ensuring high quality data sets. The scientific aim and objective of the Mission Activity are evaluated. The end-to-end scientific impact across the Mission Activity with respect to the user requirements is assessed and quantified. The requirements have been revised and based on the outcome future strategies are being discussed.

[1] Measurements could for example be provided through well-defined experiment or as proxy data from existing measurement systems.

Table 3.1-1 provides an overview of the Scientific Readiness Levels (SRLs) in a matrix structure, outlining scientific goals related to the Mission Activity.

SRL	Name (ESA)	Associated documents (ESA)	Theory	Experiments	Users & Requirement	Targeted Project Phase (ESA)
1	**Scientific Idea**	TBD – not yet available	- A scientific challenge is identified. - The scientific objective is formulated. - A scientific hypothesis is established.	No observational evidence is required.	- The application area is defined. - Interest of the users is identified. - Start defining high-level scientific requirements.	Pre-Phase 0
2	**Consolidation of Scientific Idea**	TBD – not yet available	- A scientific theory is formulated. - The physical principle behind the hypothesis is outlined (at least qualitatively).	- Experimental evidence supporting the scientific hypothesis.	- Consolidated scientific requirements are established. - A gap analysis with respect to the uniqueness of measurements and observations is performed. - Scientific objective are formulated.	Pre-Phase 0
3	**Scientific / Observation Requirements Definition**	Mission proposal for Phase 0	- Quantitative theoretical understanding of link between measurement and observation (no software required) is established.	- Initial capability assessment performed. (Information content analysis) - Conceptual measurement technique is established.	- Scientific objective confirmed and approved. - Scientific goal formulated. - Mission objective(s) formulated.	Pre-Phase 0
4	**Proof of concept**	MRD / Report for Mission Assessment	- Simulation of measurements based on geophysical parameters (e.g. numerical forward model). - 1st simulated measurements are available.	- First measurement device approximating the instrument is available in case possible for the measurement principle. - Sensitivity of measurements wrt observation is demonstrated.	- Mission objective confirmed and translated into mission requirements and system requirements	Phase 0

5	**End-to-end performance simulations**	Stable MRD, E2E (End-to-end simulator) / Report for Mission Selection	- Consolidated retrieval and draft ATBDs (+ prototype) are available	- Demonstrator (e.g. airborne instruments) provides/simulates representative measurements with error budgets, - Draft calibration strategy available.	- First evaluation of observations and / or measurements in applications, - Higher-level products approached.	Phase A
6	**Consolidated science and products** (End: launch of sat)	Final ATBD's, DPMs, Cal/Val Plan	- Operational processor developed and implemented (Level 0, Level 1, and Level 2)	- Test data and sampled data processing - Verification data sets collected - Calibration and validation Plan established	- User studies with simulated or pre-cursor data; - AO call to user community for validation	Phase B/C/D
7	**Demonstrated science** (Commissioning phase)	Commissioning report	- First uncertainty analysis	- Cal/Val conducted (L1 and L2) - Early release of first data / demonstrational data are provided - Characterisations of measurements and observations; - Performance vs. specification	- User feedback collected, - Feedback from beta-users received.	Phase E1
8	**Validated and matured science** (Satellite operational declared)	Science feedback, peer reviewed publications	- Full uncertainty analysis - Enhancing scientific understanding	- Systematic validation and quality assurance performed - Operational / nominal processing of measurements and observations	- Science impact quantification, - first performance assessment wrt mission objective - scientific goal evaluation	Phase E2
9	**Science Impact quantification**	TBC	- Advancing scientific understanding and addressing its impact for scientific and societal applications	- Generation of long-term data sets - Data fusion	- User impact quantification, - Final performance assessment wrt mission objective - Final performance assessment wrt science objective	Phase F

4 SCIENTIFIC READINESS ASSESSMENT (SRA) IMPLEMENTATION GUIDELINES

4.1 Overview

4.1.1 Introduction

The following section provides a standard, internally consistent set of guidelines for the use of the SRLs when conducting Scientific Readiness Assessments (SRAs). A description of a typical process for conducting SRAs is provided, which is then followed by a series of detailed guidelines for SRAs, one for each SRL.

4.1.2 The Scientific Readiness Assessment (SRA) Process

General steps in the process for conducting a SRA include:

- Definition of the terms of reference (ToR) for the assessment (including timing, how and which inputs for the SRA are provided, the detailed criteria for the SRA, establish qualification criteria for SRL, etc.).
- Identification of key supporting documents and data.
- Identification of SRA participants (appropriate involvement of scientists).
- Invitation and appointment of SRA Review Board.
- Development and delivery of scientific material for the SRA to the Review Board.
- Implementation of the SRA itself (often involving one or more meetings of a formal review committee).
- Development of the SRA qualification report by the Board, including SRA recommendation.

The details of an appropriate scientific readiness assessment process depend on the scientific readiness level under consideration, specifics of the prospective scientific applications and requirements, and are, therefore, beyond the scope of this document.

Specific qualification criteria for the SRLs are used when conducting a formal scientific readiness assessment that conform to the SMART approach:

- Specific (target a specific scientific objective/aspect).
- Measurable (progress towards the specific target is quantifiable - or at least an indicator of progress can be suggested)
- Assignable (the activity has an assigned owner).
- Realistic (the specific target can be, given available resources, realistically be achieved).
- Time-bound (the scientific assessment is time bound).

A given SRL is only achieved (and thus progressing to the next SRL level) after all of the qualification criteria are addressed for that SRL level - and not before.

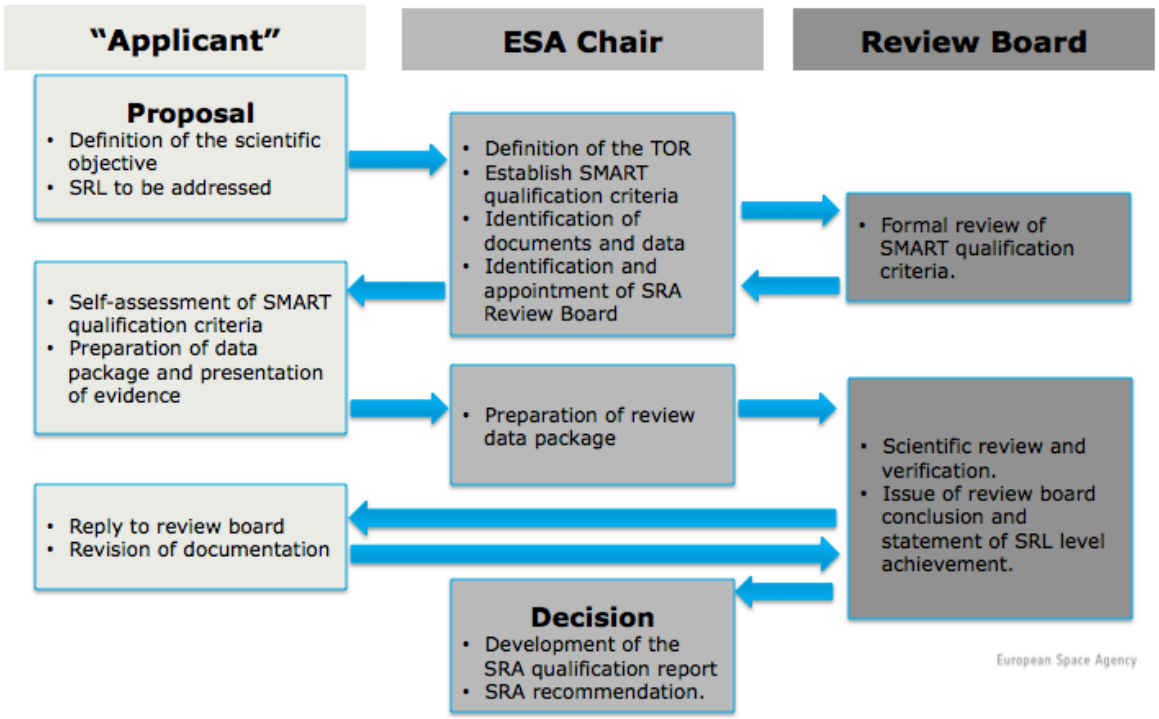

Figure 4.1.2 indicates a linear process for a generic scientific readiness assessment, including four elements for the SRA. Throughout this process, similar types of information should be examined to establish that a given SRL has / has not been achieved.

1) On the "applicant" side:

- Definition of the specific scientific objective/aspect to be addressed.
- Satisfaction of SMART objective.
- Risk assessment (including proposed way forward for reduction or elimination of risk).
- Preparation and presentation of Evidence.
- Reply to reviewers and revision of documentation.

2) On the "reviewer" side:

- Formal review of qualification criteria closing the process (which may require several iterations depending on the Yes/No SRL qualification decision of the board).
- Scientific review and verification.
- Issue of review board conclusion and statement of SRL level achievement.

4.1.3 Independent Review and Validation of SRA Results

As science maturation continues, it becomes increasingly important to implement an independent review and to validate the results presented for a scientific readiness assessment. As a general guideline, the demonstrated scientific competence of the a review board shall allow a thorough scientific review of the inputs for the SRA, namely the "Description" and the "Problem Understanding". Depending on the SRL under consideration, a different level of detailed understanding can be required.

4.1.4 Structure of these Guidelines

The definitions and guidance regarding each of the nine scientific readiness levels are presented in the next section. Each paragraph provides (1) a general description of the respective SRL; (2) some high-level questions to be posed during a scientific readiness assessment that are intended to facilitate determination of whether a given scientific discipline is or is not at a given SRL; and (3) some notional and/or specific examples of the type(s) of accomplishments that would characterize each level.

4.2 SRL 1: Initial Scientific Idea

An idea combined with a general *scientific objective* is stated and a *scientific hypothesis* is presented. An interest from the (scientific community) users has been expressed and high-level user requirements are created. The idea can still be decoupled from specific mission activity objective or a specific measurement concept. The scientific idea can also be based on a problem statement.

Targeted at Pre-Phase 0.

4.2.1 Scientific Readiness Assessment at SRL 1

4.2.1.1 Key Questions to Address

- Is the idea stated?
- Has a scientific hypothesis been formulated?
- Does the hypothesis make sense?
- Is there an interest from a user community?
- Are user requirements articulated properly?

4.2.1.2 Appropriate Evidence Required

- Hypothesis
- Expression of interest from user community
- High-level user requirements articulated
- SRL-1 qualification criteria established

4.3 SRL 2: Consolidation of Scientific Idea

Scientific evidence and supporting scientific theories are established answering one or more scientific ideas. This could for example be done based on theoretical grounds or through laboratory experiments. Observations and theories are linked to the consolidated user requirements and / or the problem statement. The scientific strategy to address the scientific challenge is defined

Targeted at Pre-Phase 0.

4.3.1 Scientific Readiness Assessment at SRL 2

4.3.1.1 Key Questions to Address

- Are the user requirements clear?
- Are scientific objective and goal formulated?
- Is the scientific theory behind the idea articulated?
- Has an appropriate (qualitative) theoretical model been established?
- Has the phenomenon been observed and / or are supporting field/laboratory data available?
- Is the uniqueness of measurement and observation characteristics (e.g. type, their accuracy, spatial or temporal resolution, coverage) discussed?

4.3.1.2 Appropriate Evidence Required

- Scientific Literature review
- Critical assessment of requirements
- Statement(s) from user community.
- Clear roadmap of activities to be pursued is available
- SRL-2 technical report addressing key questions
- SRL-2 qualification criteria established

4.4 SRL 3: Scientific and Observation Requirements

A first iteration on top-level scientific and observation requirements, e.g. product accuracy and temporal and spatial sampling, is performed and mapped against the user requirements. During this process a justified selection of the conceptual measurement technique(s) is developed based upon derived observational requirements.

Targeted at Pre-Phase 0 / Phase 0.

4.4.1 Scientific Readiness Assessment at SRL 3

4.4.1.1 Key Questions to Address

- Are the science requirements complete?
- Can the requirement be validated?
- Are the requirements adequately traced to source?
- Are the (science) user requirements mapped against observational requirements?
- Is the scientific goal traceable, measurable and testable?
- Has a viable measurement concept been established?
- Have alternative solutions been analysed?
- Is the chosen concept justified?
- Has an initial capability assessment been performed?
- Has a quantitative theoretical understanding between measurements and observations been established?

4.4.1.2 Appropriate Evidence Required

- Supporting statement from user community
- Clear roadmap of activities to be pursued is available
- Peer reviewed scientific literature.
- SRL-3 technical report addressing key questions
- Report for mission assessment.
- SRL-3 qualification criteria established

4.5 SRL 4: Proof of concept

The measurement concept is validated. A model linking geophysical parameters and measurements is established. Sensitivity of the measurements to the targeted geophysical parameter is demonstrated through extensive analyses by means of dedicated experiments but at least through simulations.

Targeted until the end of Phase 0.

4.5.1 Scientific Readiness Assessment at SRL 4

4.5.1.1 Key Questions to Address

- Is the scientific goal confirmed and translated into mission objectives, mission requirements and system requirements?
- Are Mission Requirements Document (MRD) and System Requirements Document (SRD) available with traceable requirements?
- Is a model (software package) available that allows the computation of measurements based on observation input data?
- Is the model technically and scientifically adequate and has it been independently reviewed?
- Has the sensitivity of the measurements to the targeted geophysical parameter been demonstrated based on representative measurement data (e.g. campaign data) or in any other way?
- Is the validation approach independent and viable?
- Has a risk analysis been performed?
- Has a demonstration data set of measurements been produced?

4.5.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available.
- MRD and SRD.
- Software code for the model and documentation.
- Peer reviewed scientific literature.
- SRL-4 technical report addressing key questions.
- SRL-4 qualification criteria established.

4.6 SRL 5: End-to-End Performance simulations

An end-to-end measurement performance simulator is developed, tested and validated using realistic and / or actual measurements[2]. The performance model used is applicable to a predefined range of conditions (including realistic uncertainties of natural and observational nature) and can be used to address the needs originating from the science requirements in an end-to-end manner. Retrieval algorithms applicable for a realistic range of error sources (both geophysical and technical) are demonstrated against a pre-defined performance metric reflecting observation and measurement requirements.

Targeted for mission selection at end of Phase A/B1.

4.6.1 Scientific Readiness Assessment at SRL 5

4.6.1.1 Key Questions to Address

- Is an E2E simulator in place and are the most important processes and input parameters (including uncertainty estimates) properly represented?
- Is an error propagation model in place allowing the rigorous computation of uncertainties (e.g. accounting for co-variant error effects) for measurements and observations?
- Has a set of realistic test scenarios been established and are they scientifically justified?
- Is the simulator tested and validated and applied for the predefined set of scenarios?
- Are all assumptions of the performance simulator documented and critically discussed?
- Has the robustness of the simulator been demonstrated against independent observations (e.g. campaign data)?
- Is a draft instrument calibration strategy available and properly described?
- Is there a demonstrated interest of users?
- Is there a first evaluation of (simulated or measured data) in applications?

4.6.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available.
- Formal issue of MRD (accepted and signed).
- ATBDs.
- E2E software and documentation.
- Report for mission selection.
- Peer reviewed scientific literature.
- SRL-5 technical report addressing key questions.
- SRL-5 qualification criteria established.

[2] Measurements could for example be provided through well-defined experiment or as proxy data from existing measurement systems.

4.7 SRL 6: Consolidated Science and Products

Consolidated geophysical retrievals are established and implemented. These are Level 1, Level 2, and higher order algorithms providing measurements, observations and uncertainty estimates that directly respond to the Mission Activity measurement and observation requirements.

Targeted for Critical Design Review (CDR)/ early phase C.

4.7.1 Scientific Readiness Assessment at SRL 6

4.7.1.1 Key Questions to Address

- Has the E2E simulator been revised and is it fully documented?
- Are final ATBDs available?
- Is a prototype processor available and implemented?
- Are calibration and validation plans established for measurements and observations and Level 1, Level 2, or higher level products?
- Do ideas exist for secondary objectives and / or new observations?
- Has the operational processor been developed and implemented?
- Is validation evidence provided to demonstrate the performance of the processing / retrieval algorithms (as outlined in the ATBD)?
- Have the results from the E2E simulator been used to address higher level product performance?
- Prototype products available?
- Have user studies been performed using simulated or pre-cursor measurements through, e.g. airborne campaigns?
- Has an AO call been issued engaging an extended user community in the data validation?

4.7.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available
- ATBDs
- E2E simulator and documentation.
- TDS
- Validation of Prototype processor and algorithms.
- Peer-reviewed literature.
- Cal / Val Plans.
- AO proposals.
- SRL-6 technical report addressing key questions
- SRL-6 qualification criteria established.

4.8 SRL 7: Demonstrated Science

Retrieval algorithms verified using real mission activity measurements. Retrieval uncertainties are provided and mapped against the measurement and observation requirements of the Mission Activity.

Targeted for end of commissioning after phase E1.

4.8.1 Scientific Readiness Assessment at SRL 7

4.8.1.1 Key Questions to Address

- Are retrieval algorithms implemented and tested?
- Are retrieval products verified against independent observations?
- Are products validated?
- Has a first mission activity performance analysis been performed and matched against specifications?
- Are first uncertainty estimates for the measurements available?
- Has user feedback been collected and analysed?

4.8.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available
- Cal / Val reports for Level 1 and Level 2 (preliminary version)
- Results published in the peer reviewed literature
- SRL-7 technical report addressing key questions
- SRL-7 qualification criteria established.

4.9 SRL 8: Validated and Matured Science

Data products have been systematically generated and disseminated. The Mission Activity scientific goals and objective are tested and evaluated. The scientific aim is tested. Science linked to the Mission Activity is advancing leading to a growing scientific community, new applications, and new scientific insights.

Targeted for Phase E2.

4.9.1 Scientific Readiness Assessment at SRL 8

4.9.1.1 Key Questions to Address

- Is a systematic quality control and performance analysis for measurements and observations in place?
- Is there evidence that the scientific community uses geophysical products?
- Are the scientific goals reached?
- Has a consistent reprocessing been performed to generate one or more stable data sets (Level 1 or Level 2 or both)?
- Is the mission performance evaluated against the mission objectives?
- Is there an outreach for growing user community and news scientific insights?
- Do ideas exist for quality of emerging opportunities related to new application areas?
- Is the community approaching the initial intended user requirements?

4.9.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available.
- Stable and consistent data set available.
- Peer reviewed publications.
- Summary and recommendations from dedicated workshops.
- Skill scores from key applications.
- SRL-8 technical report addressing key questions
- SRL-8 qualification criteria established.

4.10 SRL 9: Science Impact Quantification

The measurements and observations have been re-processed ensuring high quality data sets. The scientific aim and objective of the Mission Activity are evaluated. The end-to-end scientific impact across the Mission Activity with respect to the user requirements is assessed and quantified. The requirements have been revised and based on the outcome future strategies are being discussed.

Anytime during or after Phase F.

4.10.1 Scientific Readiness Assessment at SRL 9

4.10.1.1 Key Questions to Address

- To what degree was the science community exploiting the products?
- Have long-term data sets been generated?
- Are clearly identified research questions based on the geophysical products answered (for science missions) / operational targets met (for operational missions).
- Has the impact on (science) user applications been quantified?
- Have the initial intended scientific goals and objectives been met?

4.10.1.2 Appropriate Evidence Required

- Clear roadmap of activities to be pursued is available
- Peer reviewed scientific literature.
- Summary and recommendations from dedicated workshops.
- SRL-9 technical report addressing key questions.
- SRL-9 qualification criteria established.

5 REFERENCES

RD-1 Technology Readiness Levels Handbook for Space Applications, TEC-SHS, TEC-SHS/5551/MG/ap, Version 1, revision 6, September 2008

RD-2 ECSS-M-ST-10C, available under https://www.skatelescope.org/public/2011-11-18_WBS-SOW_Development_Reference_Documents/ECSS-M-ST-10C_Rev.1%286March2009%29.pdf

6 APPENDIX A

Definitions:

ATBDs	Algorithm Theoretical Baseline Documents refer to the Level 0, 1 and 2 processors.
Data	Measurements and observations.
DPM	Detailed Processing Model
E2E Simulator	End-to-End simulator. As a minimum, the E2E simulator shall comprise a Scene Generator Module and a Satellite Geometry Module providing the input parameters for the Instrument Module generating measurements at Level 0. A Level 1 Processing Module and a Level 2 Retrieval Model generating the Level 1 and 2 data products for the performance analysis specified in the Performance Evaluation Module shall complement the simulator.
Goal	A target or a desired result. Two state: achieved / not achieved.
Level 1	Reconstructed, unprocessed instrument data at full resolution, time-referenced, and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing parameters (e.g., platform ephemeris) computed and appended but not applied to the Level 0 data (or if applied, in a manner that level 0 is fully recoverable from level 1 data).
Level 2	Derived geophysical variables (e. g., ocean wave height, soil moisture, ice concentration) at the same resolution and location as Level 1 source data.
Level 3	Variables mapped on uniform spacetime grid scales, usually with some completeness and consistency (e. g., missing points interpolated, complete regions mosaicked together from multiple orbits, etc.).
Measurement	Data at level 0 and 1, e.g. radiances, temperatures, counts ...
Measurement requirement	A requirement related to a measurement at Level 0 or 1 needed to fulfil an observation requirement.
Mission requirement	A requirement related to the mission activity and

	its goals and objectives.
MRD	Mission Requirement Document
Objective	What you want to achieve in the long-term. In this document we distinguish between scientific objectives related to a broad scientific challenges or questions, e.g. as defined in a strategy document, and a mission objective as defined in the MRD.
Observation	Data at level 2 and higher, i.e. geophysical parameters.
Observation requirement	A requirement related to a geophysical parameter at level 1,2 (or higher) needed to address a science requirement.
Science requirement	A requirement related to a scientific question and a scientific objective.
System requirement	A requirement related to any hardware or software of the Observation or Processing System.
SRD	System Requirement Document