



Decadal Survey Tier 1 Missions Road to Mission Concept Review and MCR Lessons Learned

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Outline



- Decadal Survey Tier 1 mission status
- Road to Mission Concept Review (MCR) and Key Decision Point (KDP) A
- Study guidelines
- NPR 7123 requirements for Mission Concept Review (MCR)
- NPR 7120.5 requirements for KDP-A
- Mission Concept Study Report content
- MCR Lessons Learned
- KDP-A Lessons Learned



Tier 1 Mission Status

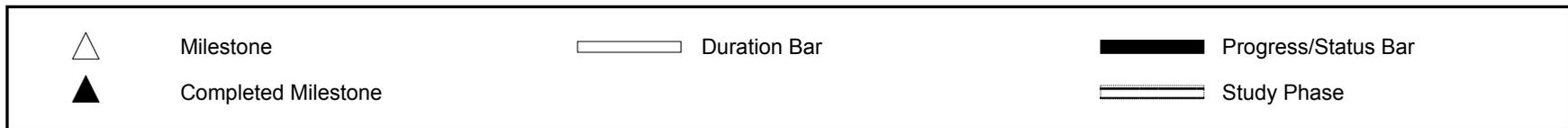
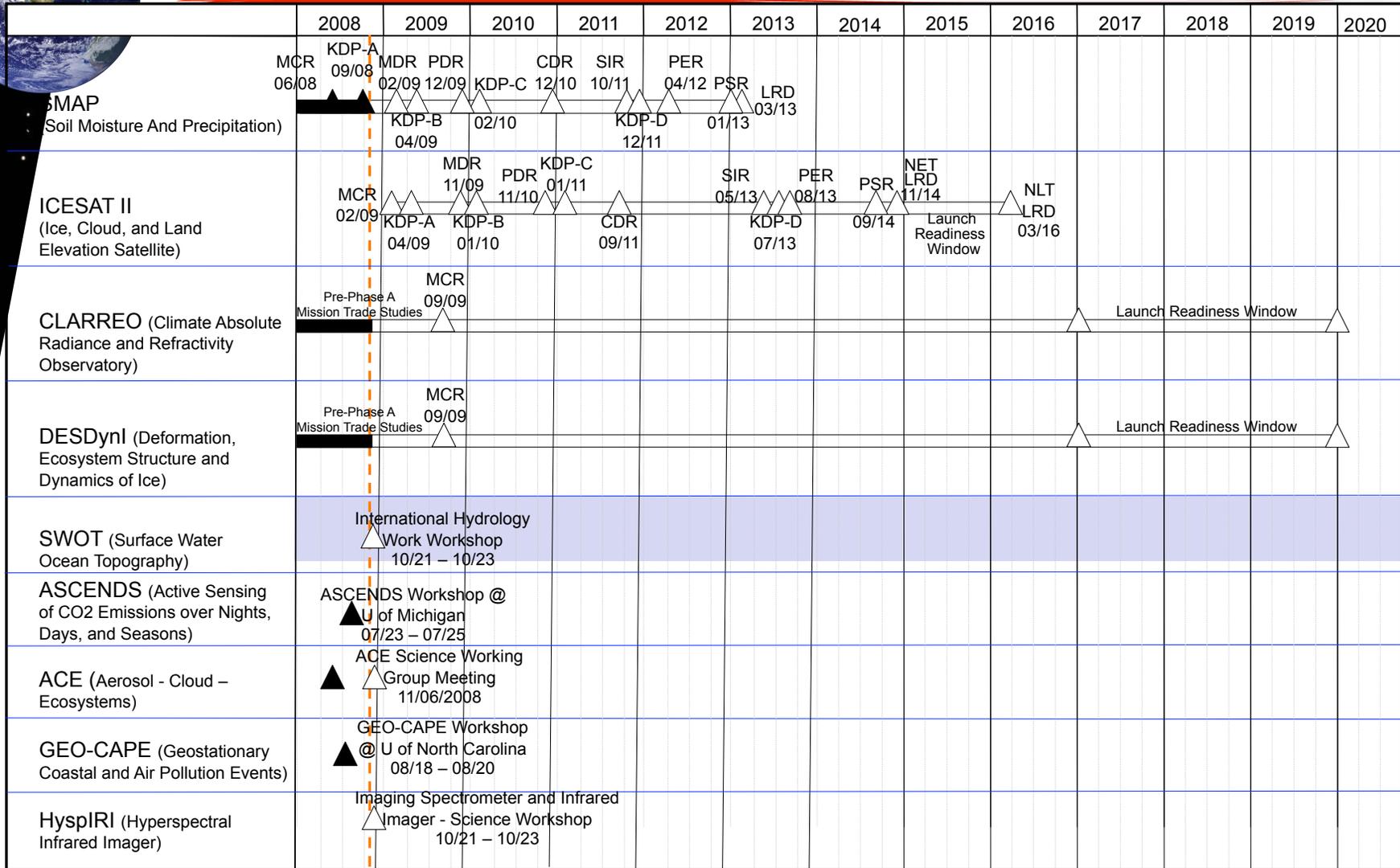


- NASA's goal for the Tier 1 missions is to have all missions in or ready for Phase A by October 2009
 - Must complete Mission Concept Review
- SMAP completed Mission Concept Review in July 2008 and KDP-A (a presentation to the Science Mission Directorate Program Management Council) on September 12, 2008. SMAP is officially in Phase A.
- ICESAT II is on track to conduct MCR in February 2009.
- CLARREO and DESDyni both plan to conduct MCR in September/October 2009

Earth Science Projects Division Decadal Survey Master Schedule



As of 10/14/2008





NASA's Project Lifecycle

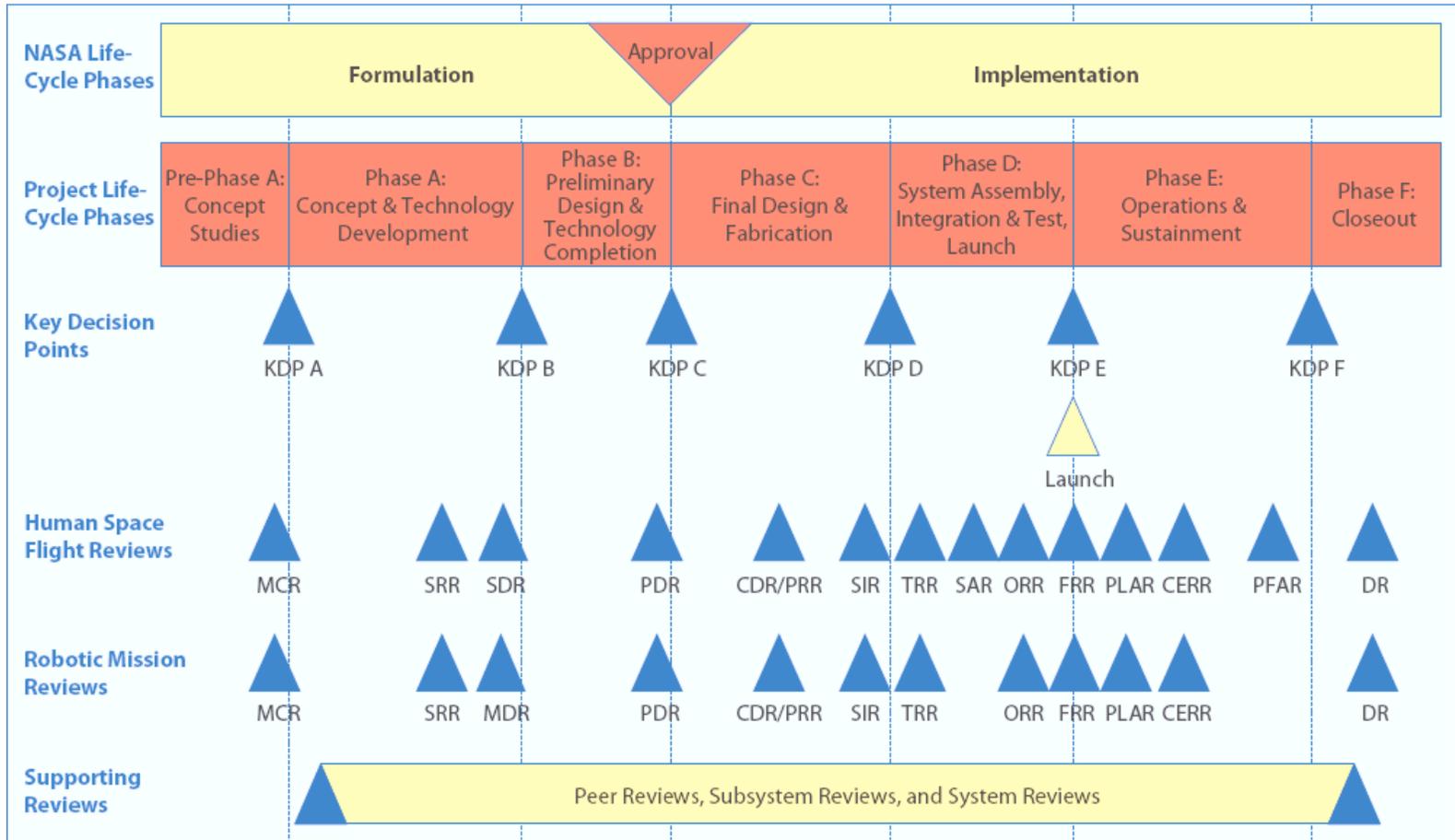


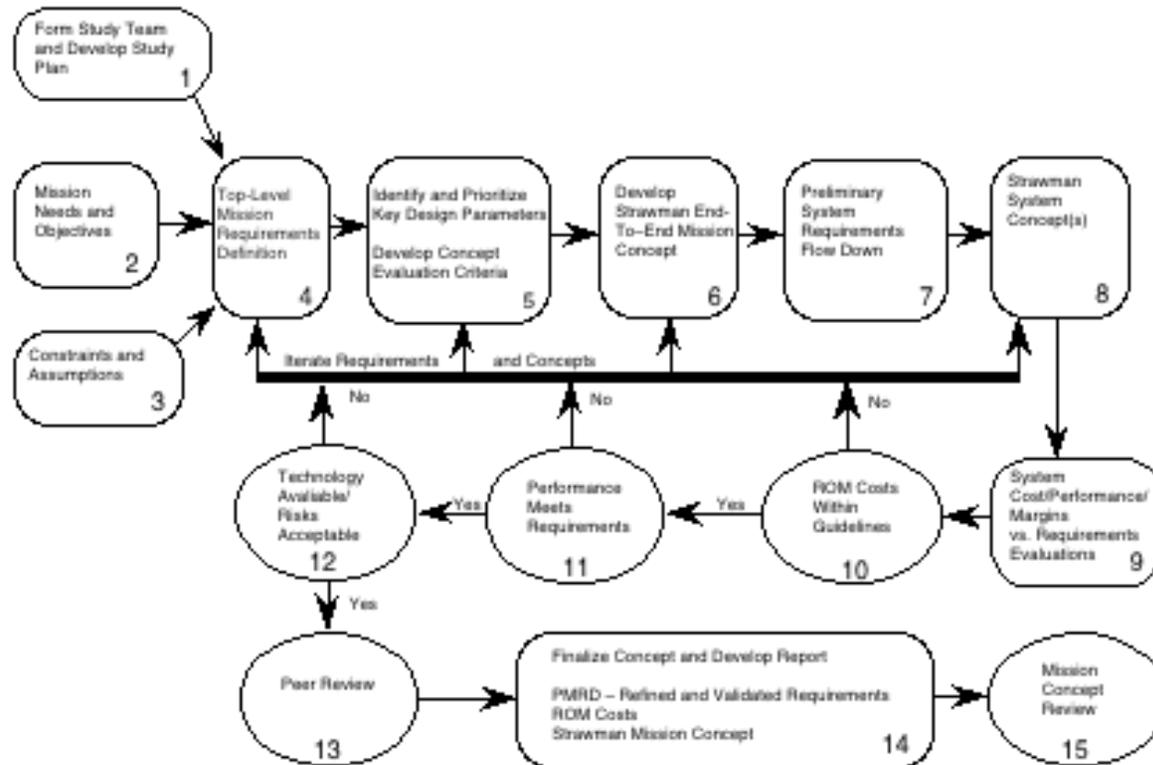
Figure 3.0-2 NASA project life cycle



Road to MCR and KDP-A: The Mission Study Process



- Conduct studies and analyses to derive the Level 1 requirements (Science, engineering, cost and schedule)
- Complete an analysis of alternatives resulting in a conceptual design, and conduct Mission Concept Review
- Prepare for approval all documents required in NPR 7120.5D (NASA Space Flight Program and Project Management Requirements)





NPR 7123 requirements for MCR

Mission Concept Review	
Entrance Criteria	Success Criteria
<ol style="list-style-type: none">1. Mission goals and objectives.2. Analysis of alternative concepts to show at least one is feasible.3. Concept of operations.4. Preliminary mission descope options.5. Preliminary risk assessment, including technologies and associated risk management/mitigation strategies and options.6. Conceptual test and evaluation strategy.7. Preliminary technical plans to achieve next phase.8. Defined MOEs and MOPs.9. Conceptual life-cycle support strategies (logistics, manufacturing, and operation).	<ol style="list-style-type: none">1. Mission objectives are clearly defined and stated and are unambiguous and internally consistent.2. The preliminary set of requirements satisfactorily provides a system that will meet the mission objectives.3. The mission is feasible. A solution has been identified that is technically feasible. A rough cost estimate is within an acceptable cost range.4. The concept evaluation criteria to be used in candidate systems evaluation have been identified and prioritized.5. The need for the mission has been clearly identified.6. The cost and schedule estimates are credible.7. An updated technical search was done to identify existing assets or products that could satisfy the mission or parts of the mission.8. Technical planning is sufficient to proceed to the next phase.9. Risk and mitigation strategies have been identified and are acceptable based on technical risk assessments.



NPR 7120.5 MCR Requirements

- Deliver the following products
 - Draft Level 1 requirements document
 - Preliminary Formulation Authorization Document
 - Mission Concept report
 - Preliminary Integrated Baseline



MCR Lessons Learned



Concept Definition

- Must have sufficient fidelity to support trades, risk identification, and a credible cost estimate
- Sufficient margins per NASA and implementing Center standards must be incorporated
- Robustness

• Technology Readiness and Risk Assessment

- Technology is at an appropriate maturity level (TRL 6). Risks should be identified and risk mitigation plans in place. Project should have a risk management system in place (the software and a primary manager)

• Level 1 Requirements Definition

- Supported by documented trade studies, an SDT report, simulations, modeling, and analysis
- Science requirements formally decomposed and traceable to mission element requirements (Level 2 & 3). Documentation for traceability exists and has been peer reviewed

• Credible cost and schedule estimates supported by at least one independent estimate or assessment

- Estimates should be coordinated with the PE and the ESM-PO at least two months before the MCR itself. Surprises at the MCR itself will delay KDP-A.
- Both cost and schedule must have reserves specified by Agency and implementing Center policies
- Launch Vehicle availability and cost must address availability via NLS contracts

• Credible descope options identified

- Options for cost containment exist and have been quantified

• Partnering & Contributions

- Need to be identified with the notional content of MOU's (gives/gets) identified

• Review Team, TOR, and IPAO

- 7120.5 D does not require a formal SRB for MCR. However, the review chair, agenda, and TOR should be coordinated with the implementing Center's Systems Review Office. The review team members should have independence from the Project, and at least half should be from an independent Center. Team members should be suitable for appointment to the official SRB in Phase A.



MCR and KDP-A



- To be ready to proceed to Phase A, the following must exist:
 - FAD is ready for signature
 - Appropriate trades for Phase A have been identified, planned and budgeted
 - Required Phase A funding has been identified and is available
 - Draft Level 1 Requirements exist. Lower level requirements are understood and documented. Analysis deriving lower level requirements from the Level 1's exists and has been documented.
 - Project has done an excellent job on the technical definition, grassroots cost estimate, and Phase A/D schedule
 - Risks are identified and appropriate mitigation plans in place
 - Project needs to iterate technical content and cost estimates with the ESD and ESM-PO during Phase A to develop a baseline for MDR.



KDP-A Lessons Learned



- KDP-A is approval *for Phase-A only*
- Agenda is defined in SMD management instructions
 - SMAP sample on following page
- Launch vehicle must comply with commercial Space Act Provisions. Must start with a standard NASA Launch Services vehicle as the primary option. This cost must be in the baseline cost estimate
- Payload Risk Classification: rationale and implementation approach for the mission risk classification should be identified



SMAP KDP-A Agenda



Time	Topic	Presenter
1:00 PM	Purpose & Introductions	Eric Ianson (PE)
1:10 PM	SMAP Introduction	Kent Kellogg (PM)
1:35 PM	Science Transition Team Report	Dr. Dara Entekhabi (PS)
1:50 PM	SRB Assessment & SMAP Project Response	Mark Goans (RC) Kent Kellogg (PM)
2:20 PM	Earth Systematic Missions Program Office Readiness Assessment	Mary DiJoseph(Prog M)
2:30	JPL Readiness Assessment	Eugene Tattini (Center M)
2:35	ESD Readiness Assessment	Dr. Michael Freilich (ESD M)
2:40	Discussion	
3:00	Adjourn	