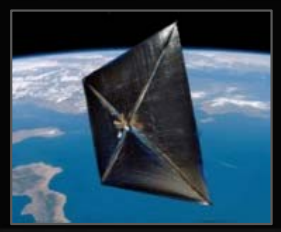
National Aeronautics and Space Administration

Tailoring Enterprise Systems Engineering Policy for Project Scale and Complexity

October 9, 2014



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Integration

Policy Requirements Flow-down at MSFC

NPR-8000 Series Flight Safety and Mission Assurance

HQ

NPR 7123.1 Systems Engineering

NPR 7120.5 Space Flight Prog/Proj Management

NPR 7150.2 Software Engineering

NPR 7120.6 Lessons Learned *(To be replaced with NPD)*

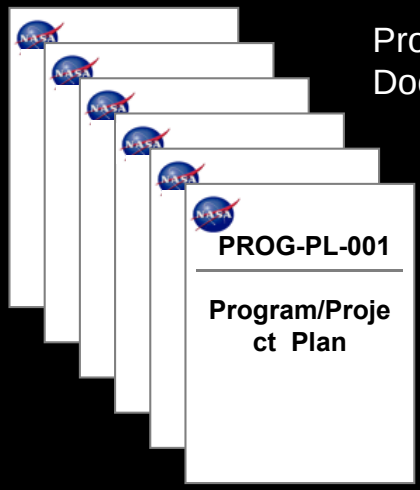
NPR 7120.7 IT & Institutional Prog/Proj Management

NPR 7120.8 R&T Prog/Proj Management

NPR 7120.9 PDLM Management

NPR 7120.10 Technical Standards

MSFC



Program/Project Documentation

MPR 7120.1
MSFC Engineering and Program/Project Management Requirements

MPR 7123.1
MSFC System Engineering Processes and Requirements

MPR 7150.1
MSFC Software Engineering Requirements

MPR 1280.10
Marshall Quality Management System

Horizontal and vertical integration are key.

Handbooks, Guidance, Best Practices

MSFC-HDBK-3173 PM & SE Handbook

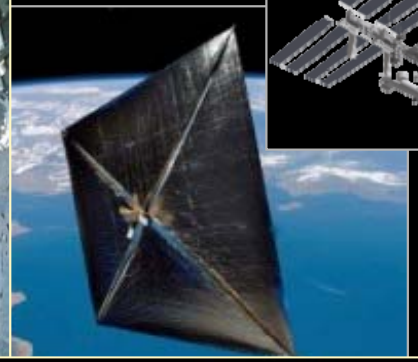
MSFC-HDBK-3684 Program, Planning, & Control Handbook

MGM 8040.1 CM Guide

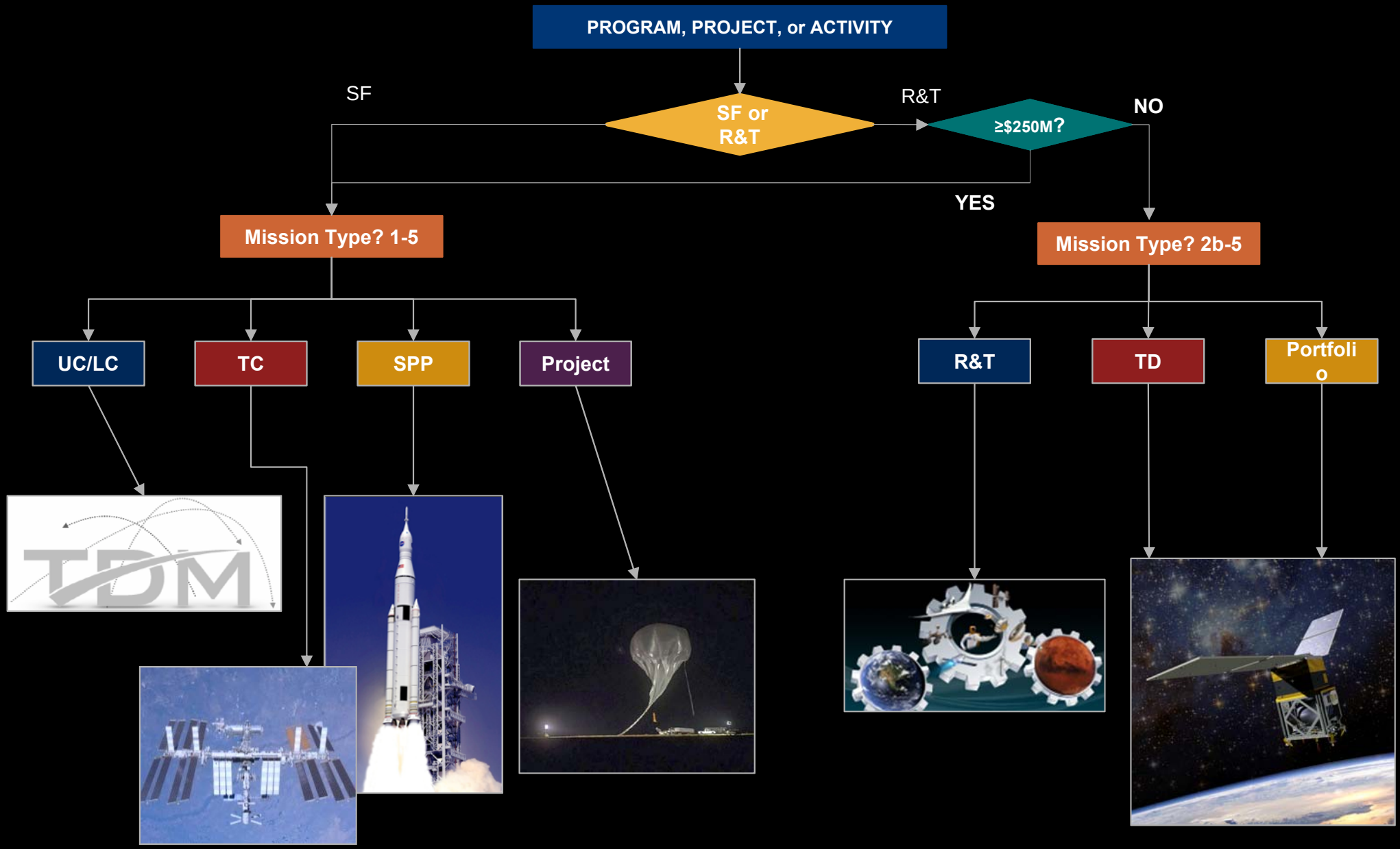
MGM 7120.3 DM Guide

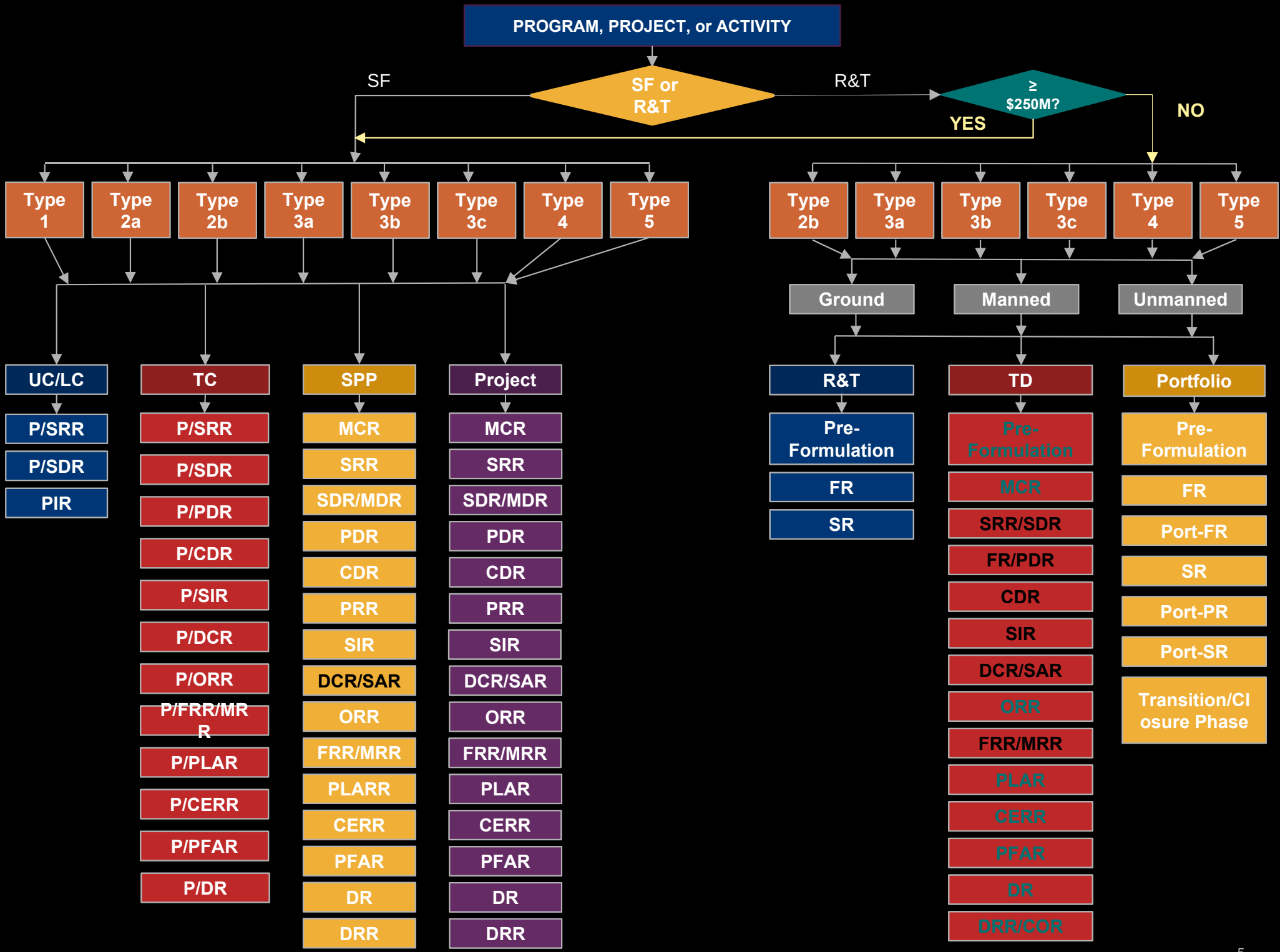
MSFC Guidance

Portfolio Mission Types



Portfolio Life Cycle Options




PROGRAM, PROJECT, or ACTIVITY
SF or R&T
SF
R&T
≥ $250M?
YES
NO
Type 1
Type 2a
Type 2b
Type 3a
Type 3b
Type 3c
Type 4
Type 5
Type 2b
Type 3a
Type 3b
Type 3c
Type 4
Type 5
Ground
Manned
Unmanned
UC/LC
P/SRR
P/SDR
PIR
TC
P/SRR
P/SDR
P/PDR
P/CDR
P/SIR
P/DCR
P/ORR
P/FRR/MRR
P/PLAR
P/CERR
P/PFAR
P/DR
SPP
MCR
SRR
SDR/MDR
PDR
CDR
PRR
SIR
DCR/SAR
ORR
FRR/MRR
PLARR
CERR
PFAR
DR
DRR
Project
MCR
SRR
SDR/MDR
PDR
CDR
PRR
SIR
DCR/SAR
ORR
FRR/MRR
PLAR
CERR
PFAR
DR
DRR
R&T
Pre-Formulation
FR
SR
TD
Pre-Formulation
MCR
SRR/SDR
FR/PDR
CDR
SIR
DCR/SAR
ORR
FRR/MRR
PLAR
CERR
PFAR
DR
DRR/COR
Portfolio
Pre-Formulation
FR
Port-FR
SR
Port-PR
Port-SR
Transition/Closure Phase

Compare and Contrast

SLS

- MCR
- SRR
- SDR/MDR
- PDR
- CDR
- PRR
- SIR
- DCR/SAR
- ORR
- FRR/MRR
- PLARR
- CERR
- PFAR
- DR
- DRR

Differences

Design Reviews

28 Products **1**

Yes Integration Function **No**

Similarities

SE Assessment

PM Functions

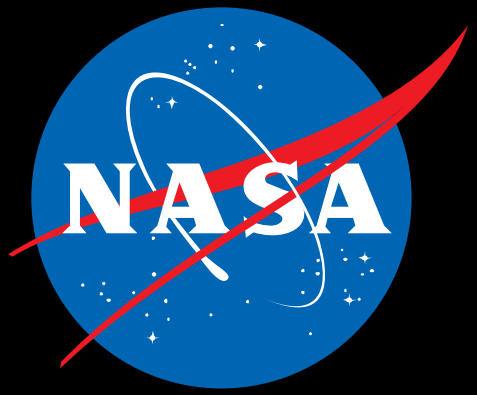
GPIM

- SRR/SDR
- FR/PDR
- CDR
- SIR
- DCR/SAR
- FRR/MRR

Conclusion

- Integration
  - Agency and Center
  - Requirements and Best Practices
  - Mission Types to Life Cycle
- Tailor
  - Big picture tailored down to project scale

- Benefits
  - Integration performed once – left side of V
  - Focus implementers' attention – right side of V
  - Highlights SE Policy path based on scale and complexity
  - Enhanced risk based decision making



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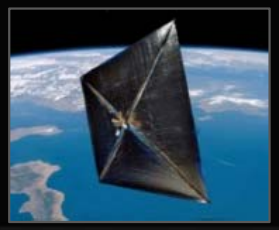
Back Up



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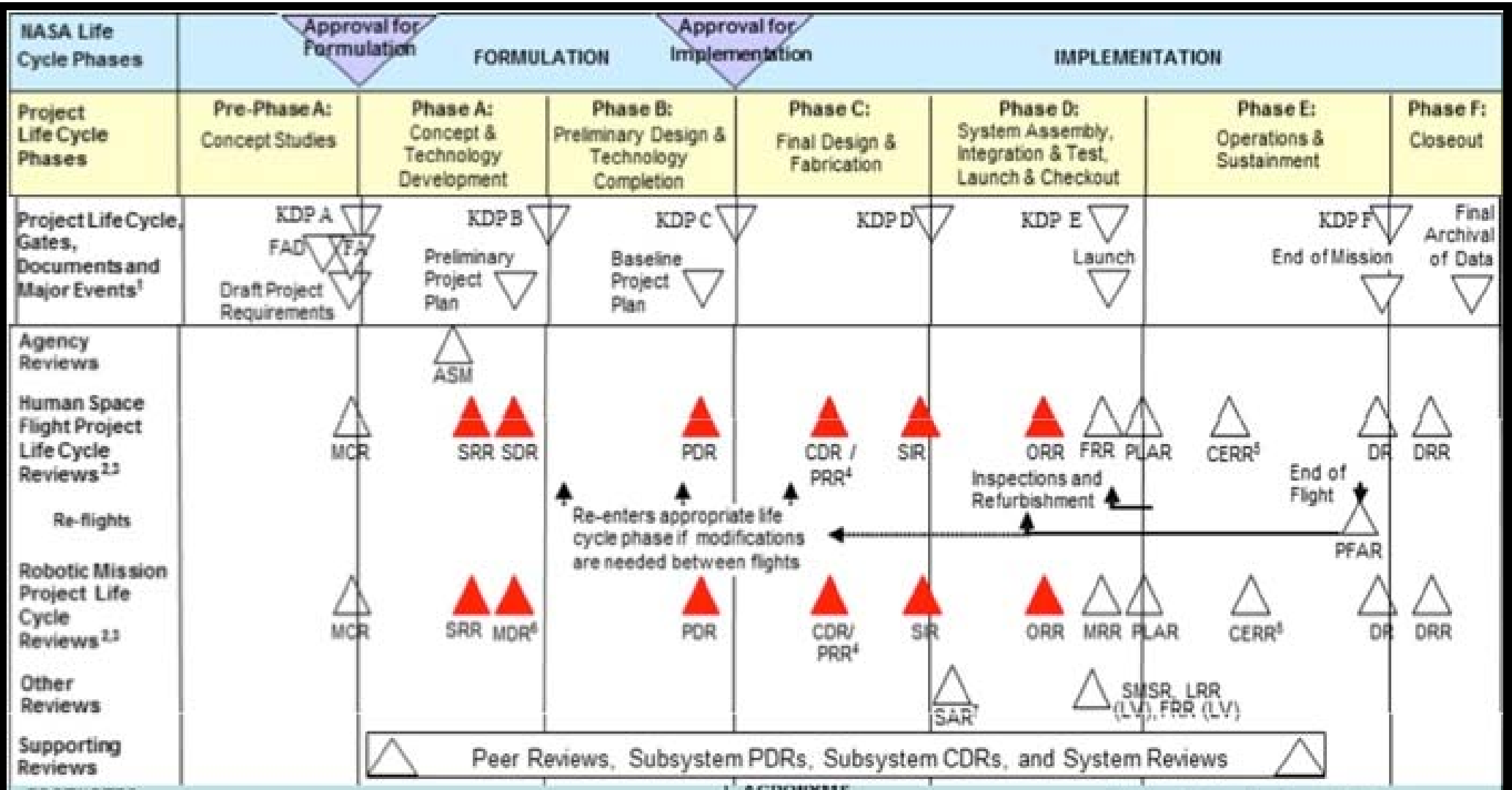


FOOTNOTES

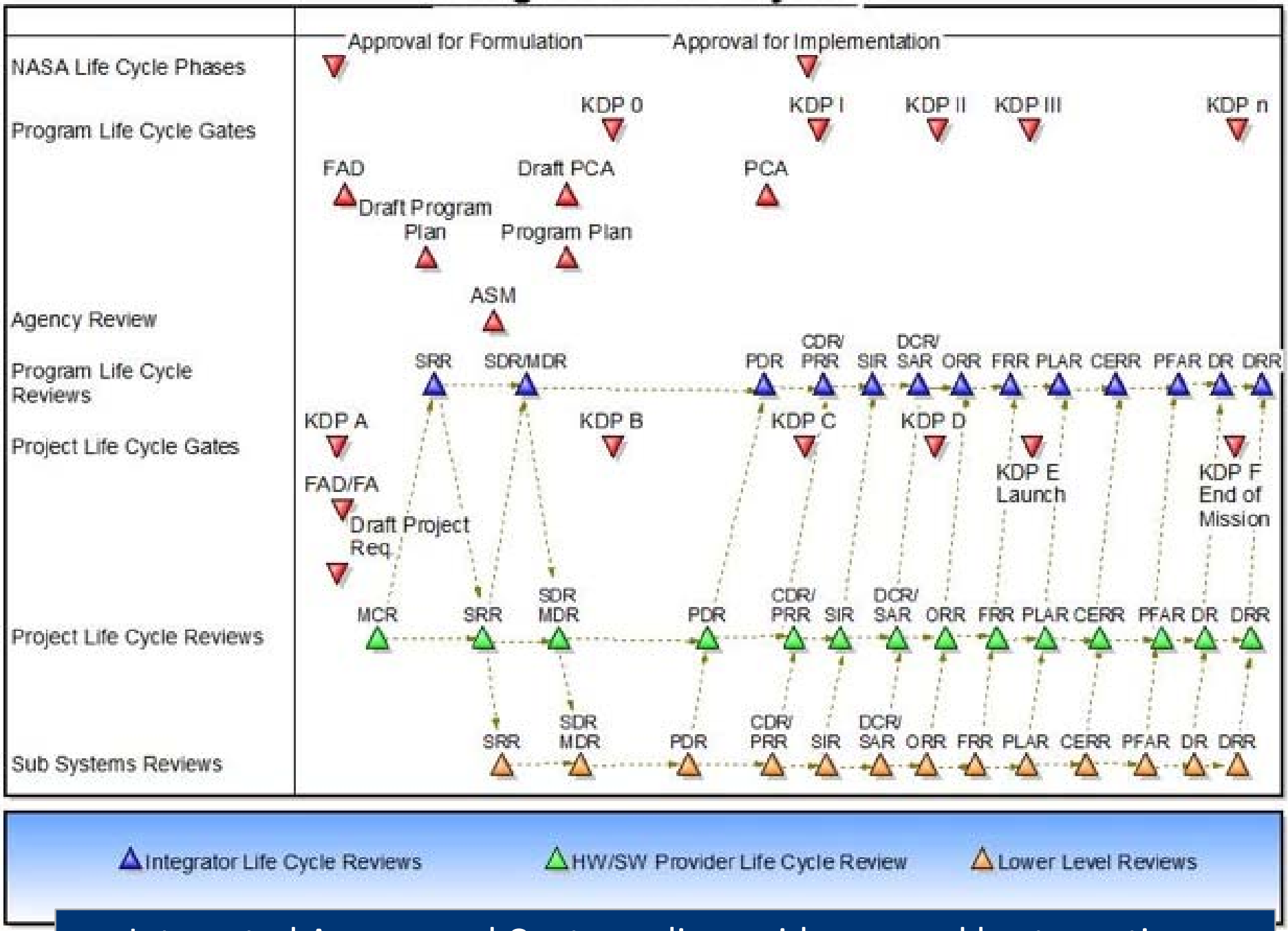
1. Single-project programs follow the project life cycle and associated project requirements and must include the draft Program Commitment Agreement and Program Plan due at KDP B, with final versions approved by KDP C.
2. Flexibility is allowed as to the timing, number, and content of reviews as long as the equivalent information is provided at each KDP and the approach is fully documented in the Project Plan.
3. Life cycle review objectives and expected maturity states for these reviews and the attendant KDPs are contained in Table I-4.
4. PRR is needed only when there are multiple copies of systems. It does not require an SRB. Timing is notional.
5. CERRs are established at the discretion of program offices.
6. For robotic missions, the SRR and the MDR may be combined.
7. SAR only applies to human space flight.

ACRONYMS

ASM - Acquisition Strategy Meeting
CDR - Critical Design Review
CERR - Critical Events Readiness Review
DR - Decommissioning Review
DRR - Disposal Readiness Review
FA - Formulation Agreement
FAD - Formulation Authorization Document
FRR - Flight Readiness Review
KDP - Key Decision Point
LRR - Launch Readiness Review
LV - Launch Vehicle
MDR - Mission Definition Review
MRR - Mission Readiness Review
ORR - Operational Readiness Review
PDR - Preliminary Design Review
PFAR - Post-Flight Assessment Review
PLAR - Post-Launch Assessment Review
PRR - Production Readiness Review
SAR - System Acceptance Review
SDR - System Definition Review
SIR - System Integration Review
SMSR - Safety and Mission Success Review
SRB - Standing Review Board
SRR - System Requirements Review

▲ Red triangles represent life cycle reviews that require SRBs. The Decision Authority, Administrator, MDAA, or Center Director may request the SRB to conduct other reviews.

Integrated Life Cycle



Integrated Agency and Center policy, guidance, and best practices