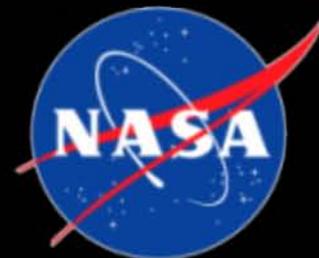


ASRG Status

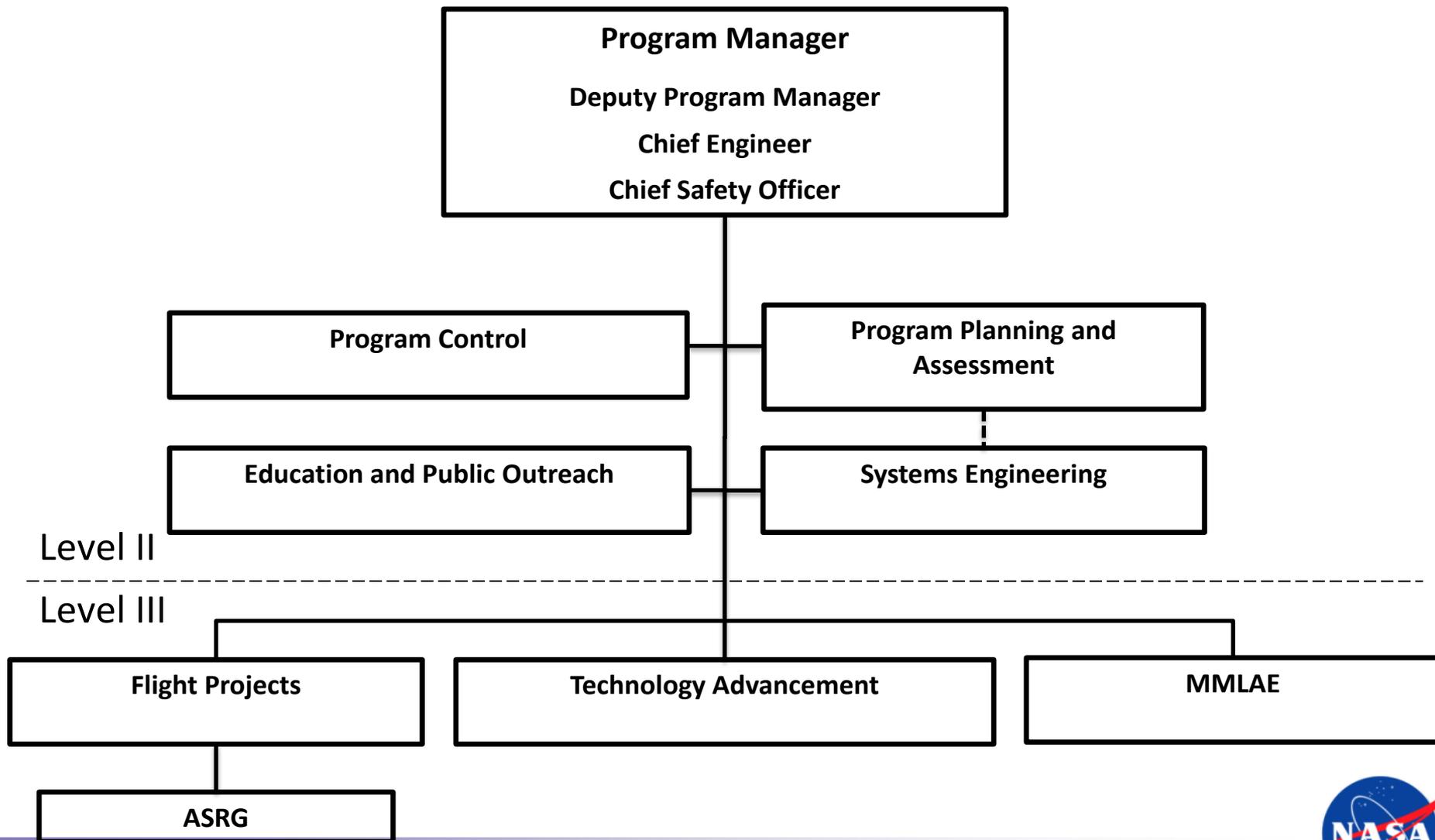
Discovery Concept Study Kickoff



John A. Hamley
RPS Program Manager
5/26/2011

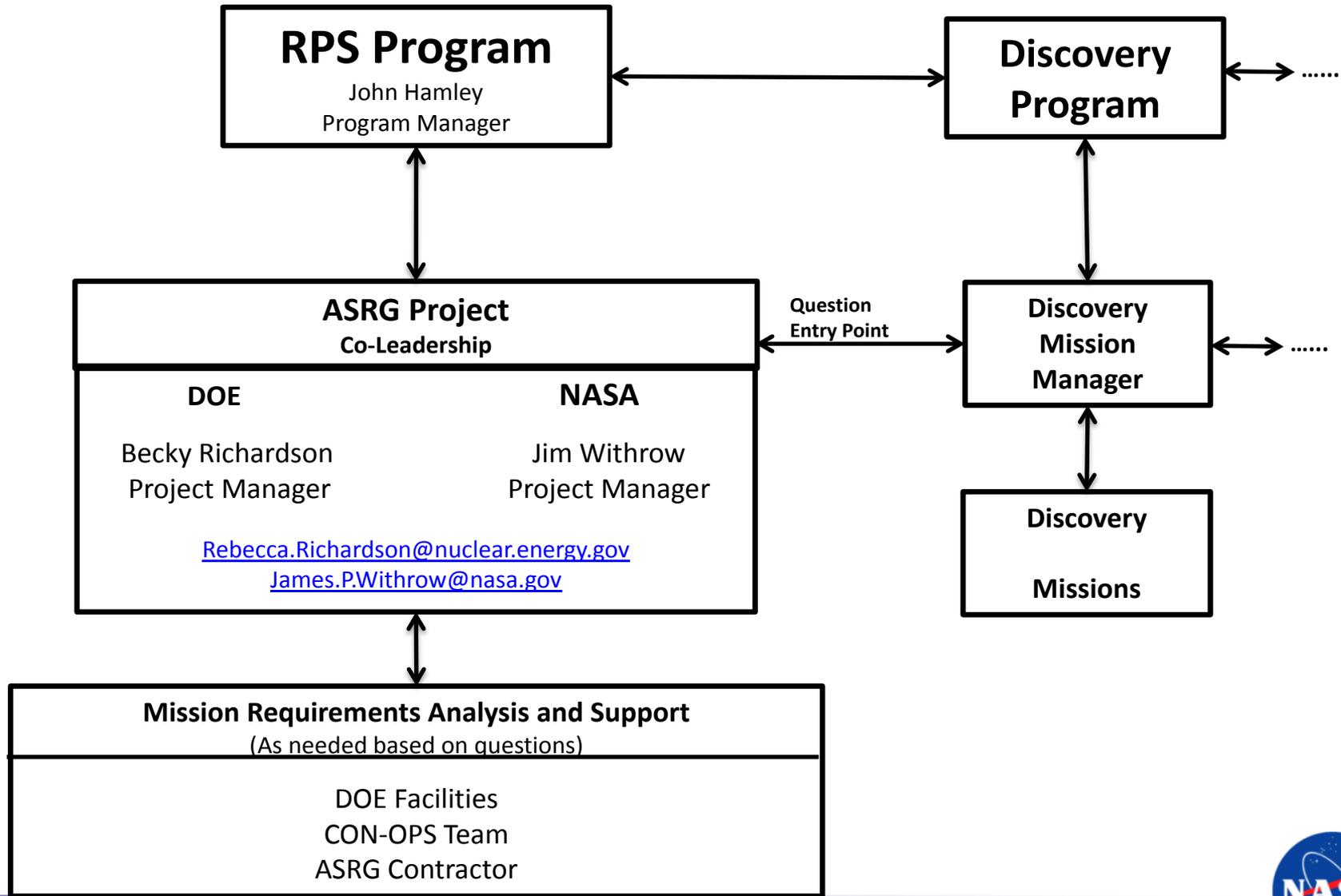


Radioisotope Power Systems Program Office (RPSPO)



RPS Program Office

ASRG Project



ASRG Project

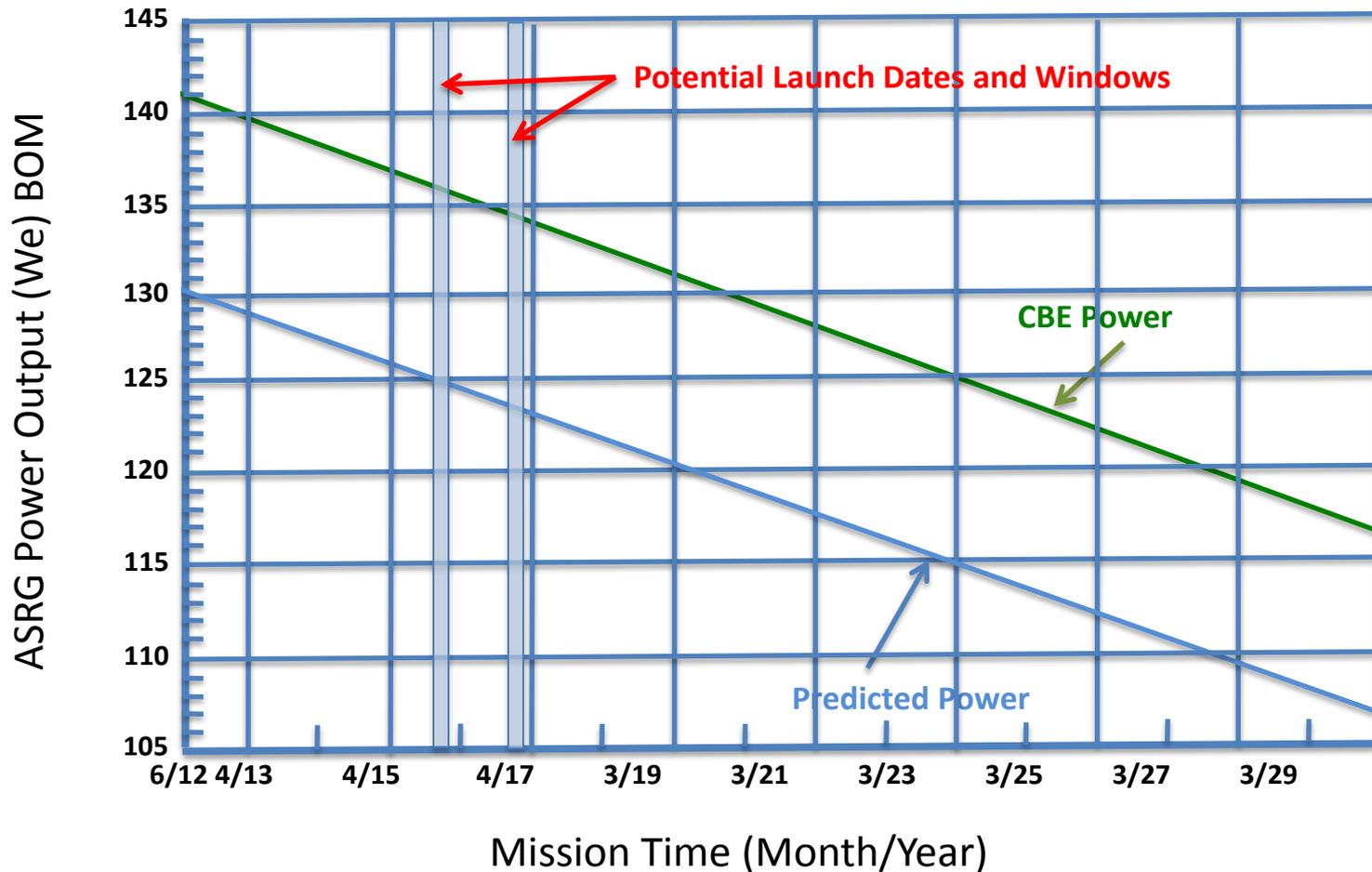
- ASRG PDR held August 2010
 - Delta PDR held December 2010
- ASRG FDR (CDR Level Review) Scheduled for mid-July 2011
- Manufacturing has already begun on limited long-lead components
- Schedule is very tight with little or no ability to change the ASRG design

Discovery – ASRG Interactions

- Interfaces and Integration (con-ops, ground-ops)
- Ground Rules for Discussions
- Discovery Driven Changes would Challenge ASRG Delivery Schedule

- Changes since AO data release
 - Power specification reduced from 137 to 130W
 - AO specification with reserve is 128W
 - CBE remains above 135W
 - Assumes low fuel specification at 244W/GPHS module
 - Power is specified AT FUELING

Updated ASRG Power



Power - CBE 141 We, Predicted 130 We
Assumes GPHS loading of 244Wth @ 06/01/2012

ASRG Summary (July 2010) (May 2011)

Parameter	ASRG
Power per Unit (BOM), (4° K, space vacuum)	128 We (includes 5% program reserve on 135 We) (1.5% reserve on 130We)
Power per Unit (BOM), (Mars avg. temp, CO ₂)	106.4 We (includes 5% program reserve on 112 We) (1.5% reserve on 108 We)
Voltage	22-34 VDC (Nominal Range)
Power Degradation Rate, [%/yr]	~ 0.8 (power decays roughly with fuel decay)
Mass per Unit, [kg]	~ 32 (includes 5% program reserve on 30.6 kg) (1), (Includes ASRG to S/C power cables)
Dimensions [cm]	L: 76.2 cm; W: 39.4 cm; H: 45.7 cm, (L: 78 cm, W: 37.4 cm, H: 38.6 cm)
Radiation Tolerance	126 krad (2)
Additional Shielding, [kg]	Mission Specific, required only for controller in a high-radiation environment (3)
Number of GPHS Modules per Unit	2
Thermal Power (BOM), [Wt]	488-512 (min/max fuel load) (fuel processed in 2011)
Mechanical Disturbance (axial)	~ 22 N peak-peak (EU measured), (35 spec)
Frequency (Hz)	102
Controller	Single-fault tolerant, with N+1 redundant controller cards and the capability for the engines to operate independently of one another in the event of single engine failure.
External Radiator Temperature (4)	~ 45° C (space Vacuum, no Sun)
Operating Environment	Vacuum and Atmosphere (CO ₂)
Lifetime Requirement, [years]	14 + 3 (storage)

(1) Mass does not include: optional spacecraft adapter ring for missions using launch vehicles (> ~ 0.1 g/Hz): adds 1.23 kg: - 1 kg of telemetry cables.

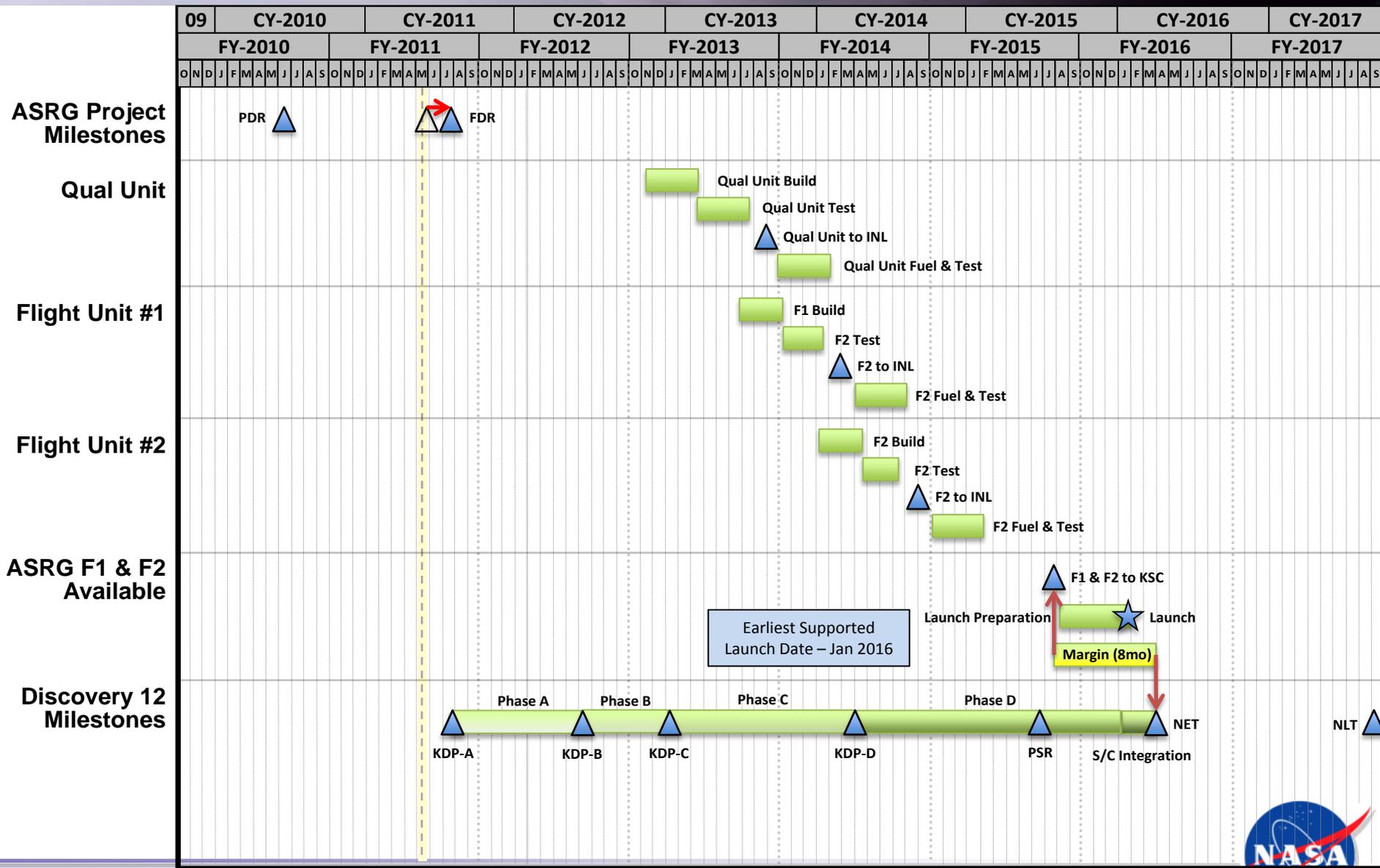
(2) Radiation Tolerance: from 50kRad space and 13 kRad GPHS source Requirement, with RDF 2 applied

(3) For ASRG additional shielding is required to protect the controller electronics. (As an example, controller shielding mass for a Europa type mission was previously estimated at ~ 11 kg (TBR)).

(4) Case temperature for other environmental sink temperatures will vary

GPHS – General Purpose Heat Source BOM – Beginning of Mission

ASRG/Discovery 2011 Schedule



Time Now

May 2011

