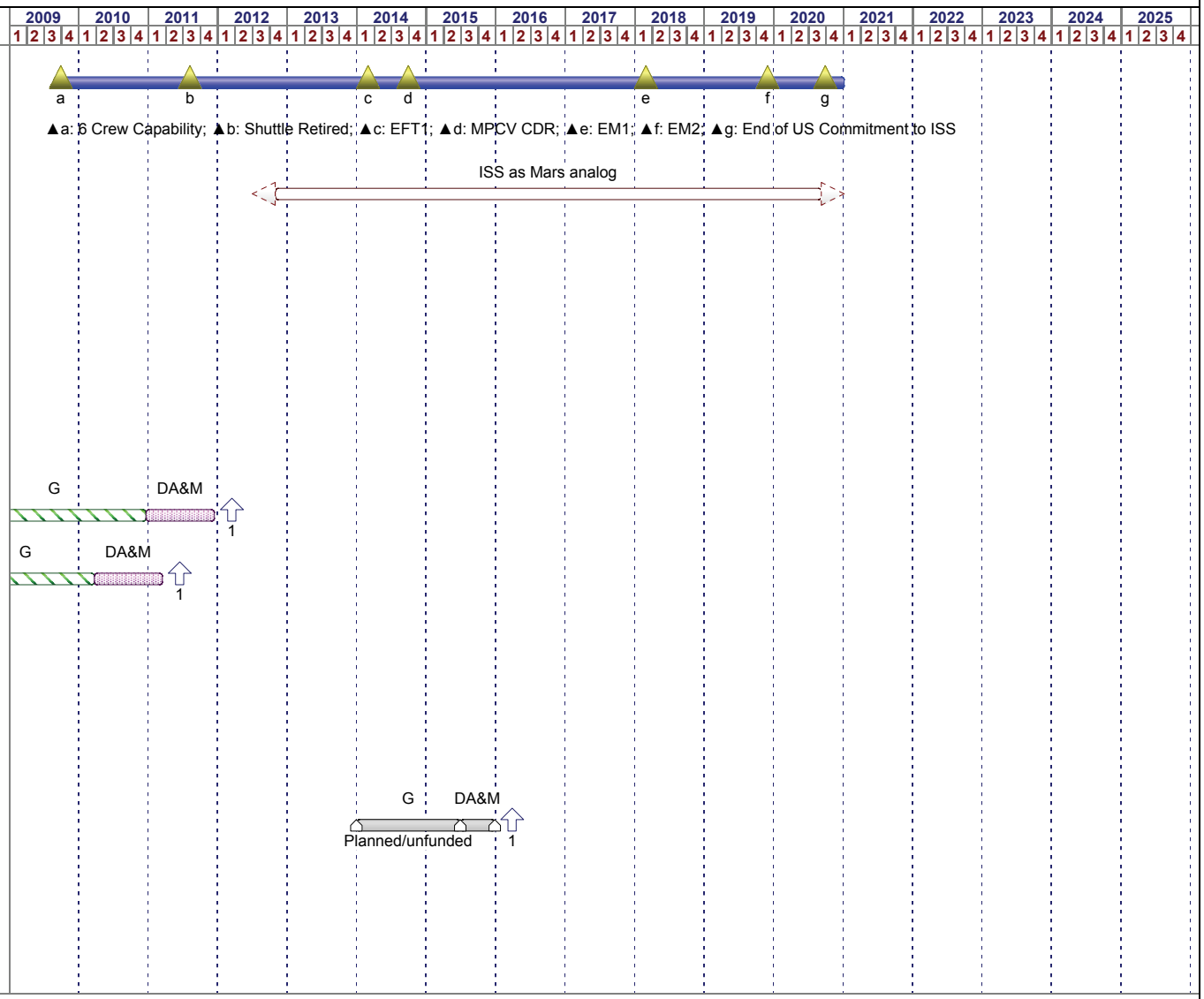
G: Ground Study	**Early Start**	**6) Technology**
F: Flight Study	**Task To Be Determined After Decision Point**	**7) Countermeasure**
L: Lunar	**Major Milestone/Event/Accomplishment**	**8) Information To/From other Elements**
NSBRI	**1) Risk Characterization**	**9) Information to HSRB**
DA&M: Data Analysis & Modeling	**2) Task↓↑Task**	**10) Requirements**
FP: Flight Prep	**3) Standards - New**	**11) Study**
AO: Add on to another study	**4) Standard - Update**	**Major Decision Point**
Planned/unfunded	**5) Tools**	**Stop**


Task Name
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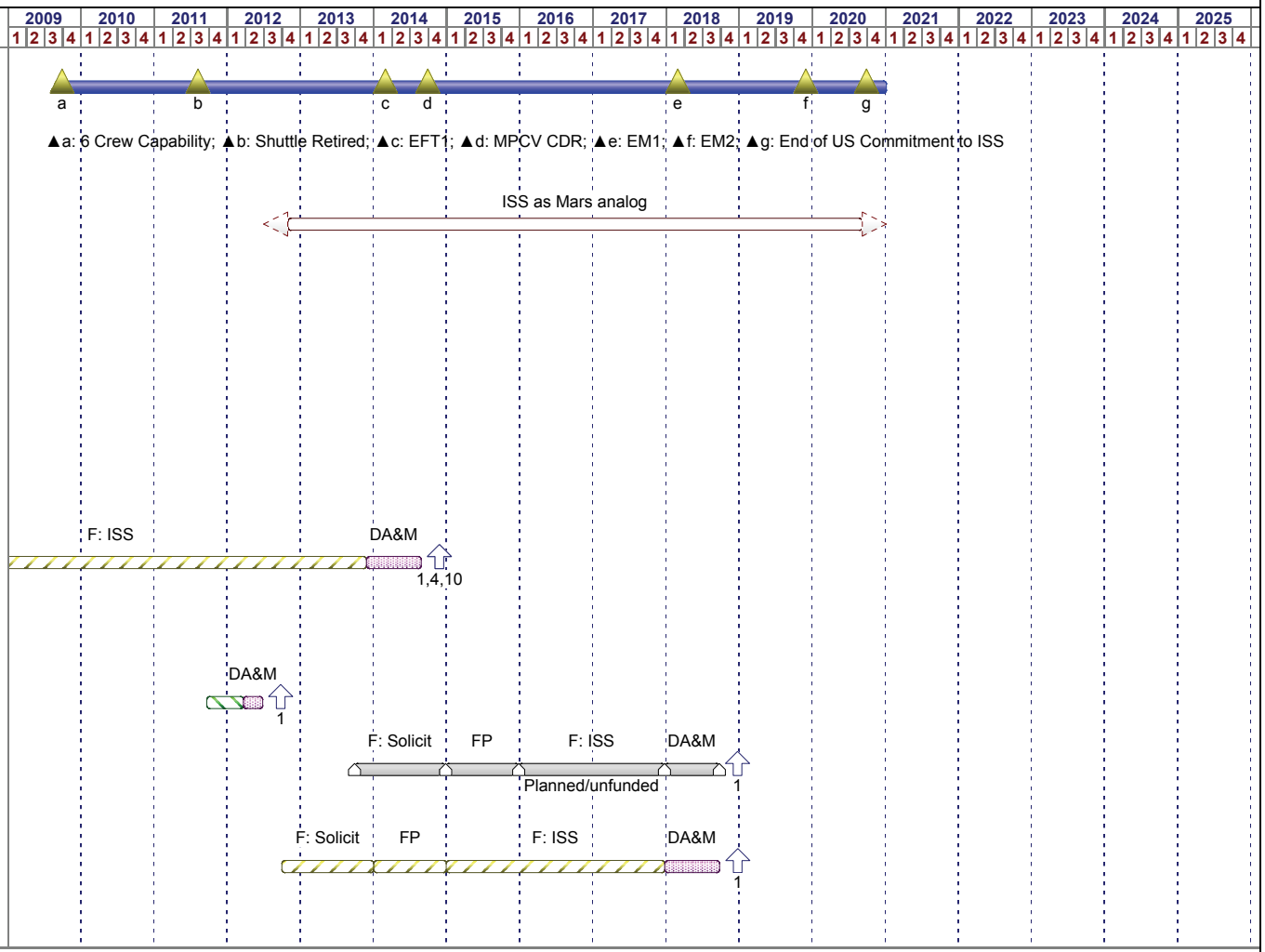
ISS and other vehicles
a b c d e f g
▲a: 6 Crew Capability; ▲b: Shuttle Retired; ▲c: EFT1; ▲d: MPCV CDR; ▲e: EM1; ▲f: EM2; ▲g: End of US Commitment to ISS
ISS as Mars analog
Multisystem Portfolio
Risk Factor of Inadequate Nutrition
(N2) What is the adequate dose range of Vitamin D supplementation?
Polar VitDII (Smith/Pierson Directed Study)
G
DA&M
1
Vitamin D Dosing (Smith Directed Study)
G
DA&M
1
Nutrition SMO (Smith Directed Study) - refer to Nutrition Risk, Gap N3
Murine Nutrition (Smith Directed Study) - refer to Nutrition Risk, Gap N3
Concordia Metabolism (Smith Directed Study)
G
DA&M
Planned/unfunded
1
Energy Expenditure (ESA Study) - refer to ESA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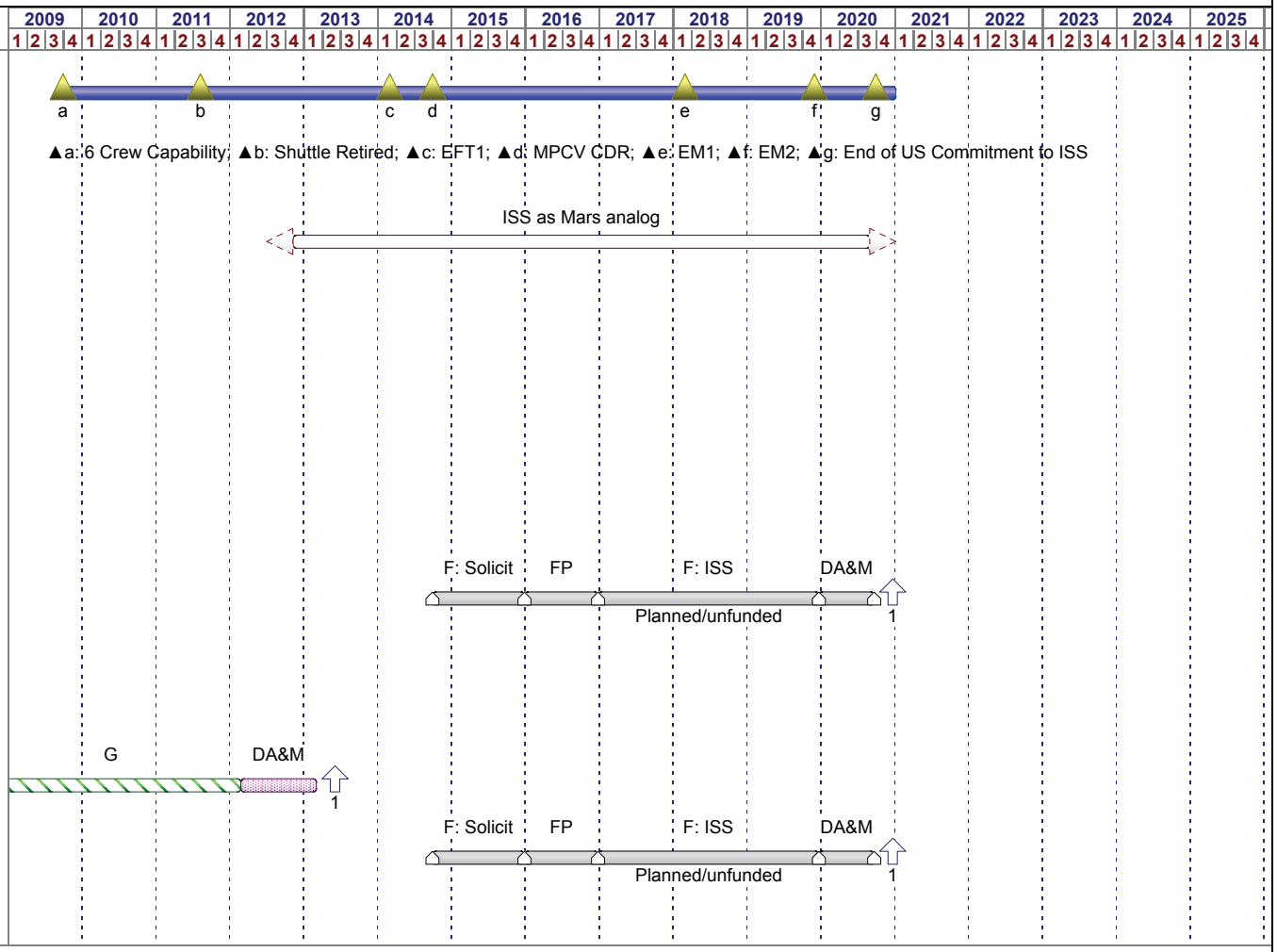
ISS as Mars analog
Multisystem Portfolio
Risk Factor of Inadequate Nutrition
(N3) How do nutritional status / nutrition requirements change during spaceflight?
Nutrition SMO* (Smith Directed Study)
F: ISS
DA&M
1,4,10
Energy Expenditure (ESA Study) - refer to ESA
Murine Nutrition (Smith Directed Study)
DA&M
1
Inflammatory Response (Solicited, TBD)
F: Solicit
FP
F: ISS
DA&M
Planned/unfunded
1
BioSurveillance (Solicited, TBD)
F: Solicit
FP
F: ISS
DA&M
1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ISS as Mars analog
Multisystem Portfolio
Risk Factor of Inadequate Nutrition
(N4) Do countermeasures impact nutrition?
NuPharm (Solicited, TBD)
F: Solicit
FP
F: ISS
DA&M
Planned/unfunded
1
(N5) Can a single test monitor net bone calcium changes?
Calcium Isotope Study (Anbar NRA)
G
DA&M
1
Anbar Follow-on (Solicited, TBD)
F: Solicit
FP
F: ISS
DA&M
Planned/unfunded
1

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ISS as Mars analog

Multisystem Portfolio

Risk Factor of Inadequate Nutrition

(N6) What impact does the spaceflight environment have on oxidative damage?

NEEMO XIV Nutrition ROI (Smith Directed Study)

G DA&M 1

Nutrition SMO (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Oxidative Damage Study (NIH Supplement - ARC)

G DA&M 1

Radiation/Iron (Zwart Directed Study)

DA&M G 1

Murine Nutrition (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Radiation/Iron, CVD (Westby Directed Study)

G DA&M 1

BioSurveillance (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Task Name

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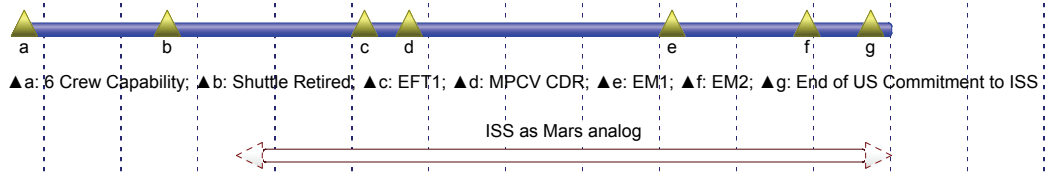
ISS and other vehicles



Multisystem Portfolio

Risk Factor of Inadequate Nutrition

(N9) What are the interactions of exercise and nutrition in altered weight bearing environments that mitigate muscle loss?

Loading Independent Factors that Contribute to Spaceflight-Induced Muscle Loss (Solicited, TBD) - refer to Muscle Risk, Gap M23

Exercise Plus Nutritional Supplement Studies (Solicited, TBD) - refer to Muscle Risk, Gap M23

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ISS and other vehicles

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ISS as Mars analog

Multisystem Portfolio

Risk Factor of Inadequate Nutrition

(N14) What integrated nutritional, exercise and/or pharmaceutical countermeasures can be used to mitigate bone loss?

Pro-K (Smith NRA)

FP F: ISS DA&M 1, 7

Nutrition SMO (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Exercise Plus Nutritional Supplement Studies (Solicited, TBD) - refer to Muscle Risk, Gap M23

SPRINT (Ploutz-Snyder Directed Study) - refer to Muscle Risk, Gap M23

Bone Epidemiologic Analysis (Amin NRA) - refer to Osteo Risk, Gap Osteo 2

Hip QCT (Sibonga Directed Study) - refer to Osteo Risk, Gap Osteo 2

n-3 Fatty Acids (Solicited, TBD)

Solicit G DA&M 1, 7

P/U: Planned/unfunded

Murine Nutrition (Smith Directed Study) - refer to Nutrition Risk, Gap N3

BioSurveillance (Solicited, TBD) - refer to Nutrition Risk, Gap N3

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ISS as Mars analog

Multisystem Portfolio

Risk Factor of Inadequate Nutrition

(N15) Can nutrition/nutrients mitigate O2/radiation risks?

NEEMO XIV Nutrition ROI (Smith Directed Study) - refer to Nutritino Risk, Gap N6

Nutrition SMO (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Oxidative Damage Study (NIH Supplement - ARC) - refer to Nutrition Risk, Gap N6

Lower Iron Stores (Solicited, TBD)

G: Solicit G DA&M

Planned/unfunded 1, 10

Radiation/Iron (Zwart Directed Study) - refer to Nutrition Risk, Gap N6

Murine Nutrition (Smith Directed Study) - refer to Nutrition Risk, Gap N3

BioSurveillance (Smith Directed Study) - refer to Nutrition Risk, Gap N3

Oxidative CM (Christofidou-Solomidou NRA)

G: Solicit G DA&M

1