OVERVIEW OF THE POWER SYSTEMS ENGINEERING BRANCH & EXPERIENCE WITH 4D TEAM BUILDING

Summary:

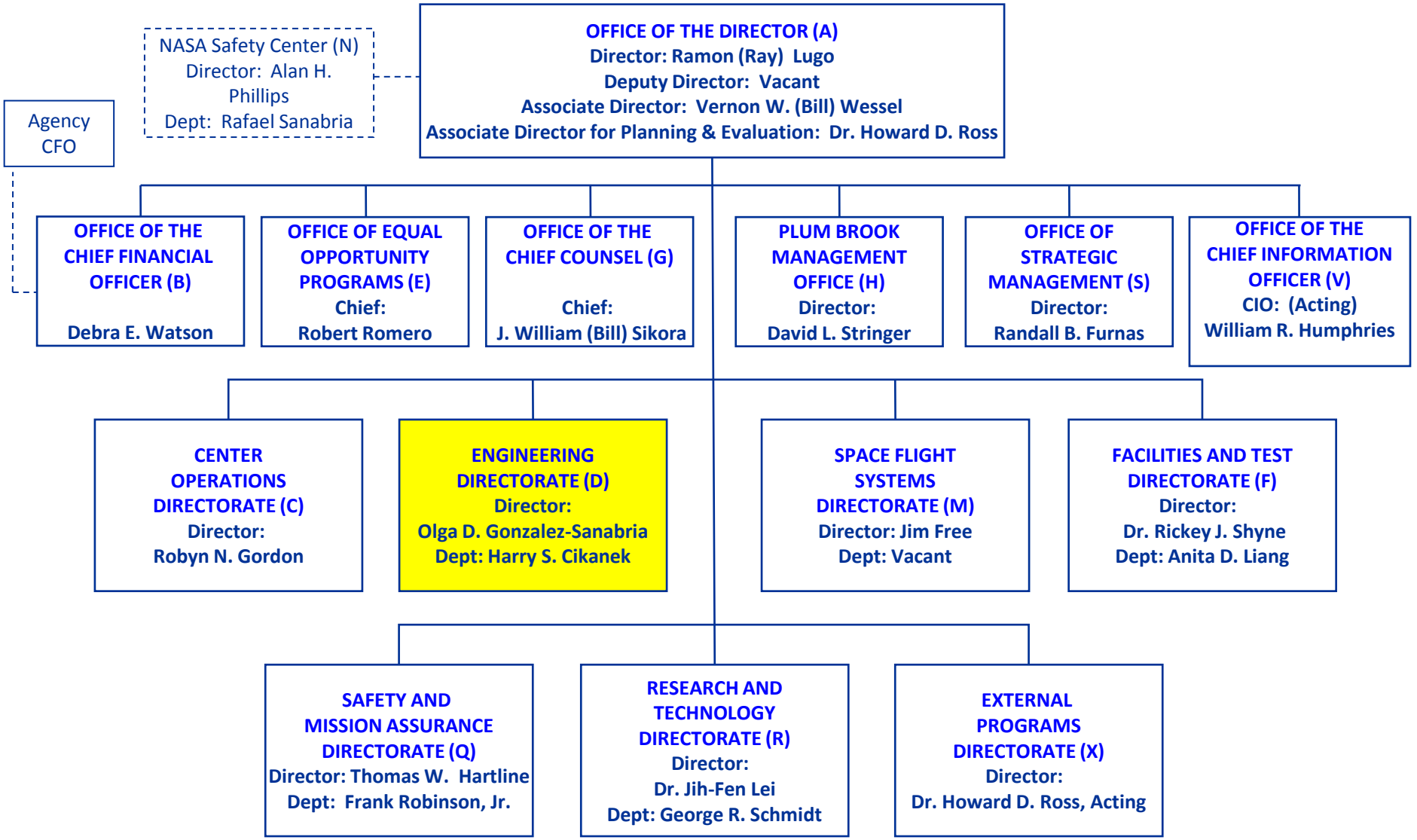
This presentation provides a brief overview of a “4-D” teambuilding assessment conducted for the Power Systems Engineering Branch.

Overview of the Power Systems Engineering Branch & Experience with 4D Team Building

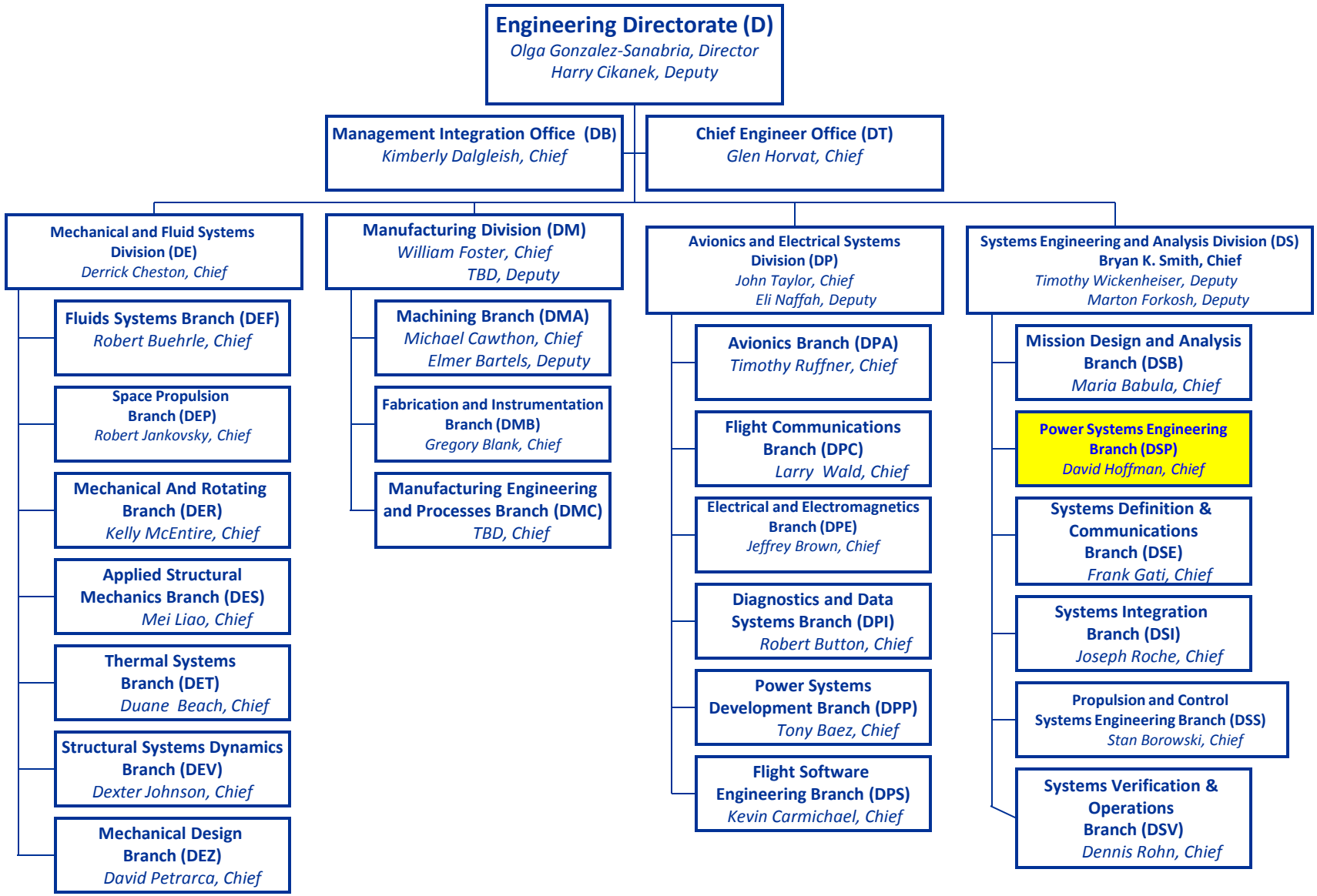
2/17/2011

Dave Hoffman, Chief

John H. Glenn Research Center at Lewis Field (GRC)



Code D/Engineering Directorate



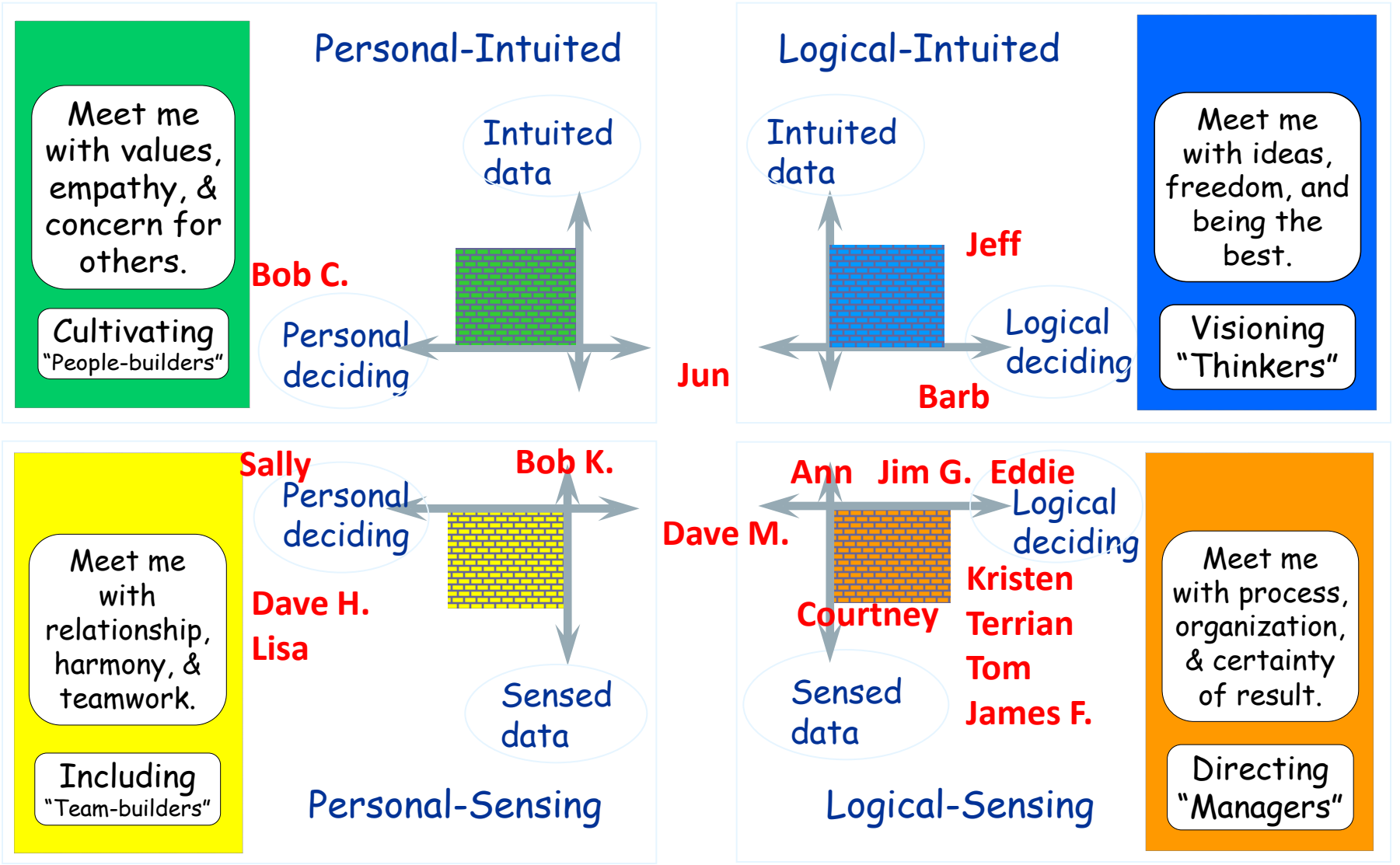
Power Systems Engineering (DSP)

- Hoffman, David J., Branch Chief
- Gulan, Sally (SGT, Inc.), MSA (**M**anagement **S**upport **A**ssistant)
- Bury, Kristen M.
- Cataldo, Robert L.
- Collins, Leon S.
- Delleur, Ann M.
- Fincannon, H. James
- Goldin, Natalie
- Gras, Courtney (Co-Op)
- Guptill, James D.
- Hojnicki, Jeffrey S.
- Kerslake, Thomas W.
- Klimek, Robert B.
- Kohout, Lisa
- Mao, Jun
- McKissock, Barbara I.
- McKissock, David B.
- Nowden, Terrian V.
- Terrell, Edward (SELDP) (Systems Eng. Leadership Dev. Program)
- Trase, Kathryn (Co-Op)

Total

- **19 Civil Servants (CS)**
- **1 Support Service Contractor (SSC)**

Where is DSP's Personality Foundation (per 4D)?



GRC Power Systems Engineering (DSP)

- **Primary Functions:**
  - **Power system modeling and simulation**, code development and verification/validation, analytical results assessment
  - **Preliminary conceptual design and system sizing** of space power systems/components
  - **Design Analysis Cycle (DAC) support**, trade studies and alternative system/component evaluation and optimization
  - **Operational system modeling and simulation**, Verification Analysis Cycle (VAC) and Certification of Flight Readiness (CoFR) support
  - **Systems engineering support**, power system requirements development and formulation

GRC Power Systems Engineering (DSP)

- **Project Responsibilities:**
  - International Space Station (ISS), Orion Crew Exploration Vehicle, Ares Launch Vehicles, Altair Lunar Lander, Destination Surface Systems, Extravehicular Activity (EVA) Technologies, Radioisotope Power Systems, Advanced Stirling Radioisotope Generator, Commercial Orbital Transportation System
- **Systems Engineering Tools:**
  - **S**ystem **P**ower **A**nalysis for **C**apability **E**valuation (SPACE)
- **Institutional Responsibilities:**
  - NASA Engineering and Safety Center (NESC) - Systems Analysis Team
  - Staff the "Power Systems" console on the GRC **CO**llaborative **M**odeling for **P**arametric **A**ssessment of **S**pace **S**ystems (COMPASS) Team

International Space Station Power System

- **Perform analyses of ISS electrical power system's operation**
  - Use **SPACE** computer code to perform time phased analysis to support certification of flight readiness for Space Shuttle missions to ISS
- **SPACE Computer Code**
  - **S**ystem **P**ower **A**nalysis for **C**apability **E**valuation
  - Predicts electrical performance of a space-based power system

History/Importance of ISS EPS Analysis at GRC

Analytical power systems assessments are critical to the ISS, due to its size and scope. Since the entire EPS can never be assembled and tested on the ground, most assessments are performed entirely by analysis.

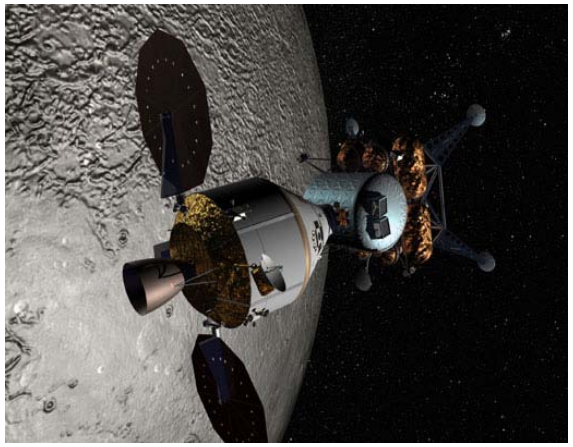
- **GRC has conducted EPS performance assessments since the *Freedom* program**, and has developed the computer model, *SPACE*, to accurately predict EPS performance. Due to the quality work performed (and lower costs), the GRC was selected *over Boeing* to continue this work for ISS.

- ***SPACE* has become the *preeminent tool* for this type of analysis**, with integrated capabilities unique in the industry. Analyses conducted by GRC using *SPACE* have resulted in numerous design and operational changes to the ISS yielding resource savings and increased performance.

- **The GRC analysis team, and *SPACE*, is recognized *internationally*** for its contributions to the ISS program. Assessments have been conducted for numerous ISS partners and team members, at their request.

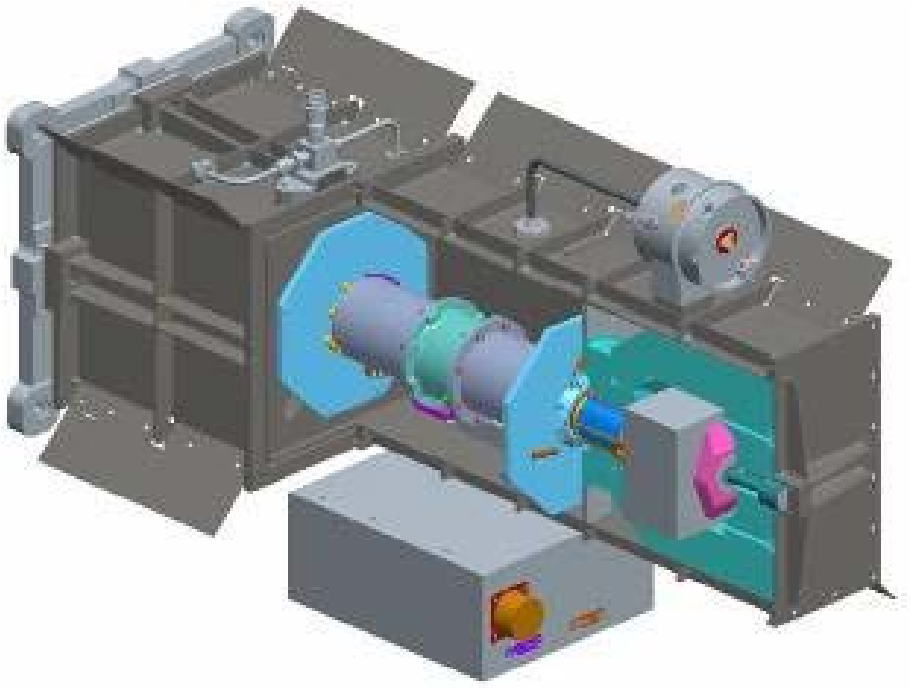
Constellation Spacecraft Power Systems

- Detailed sizing analyses
- Test planning and requirements development for the Orion Crew Exploration Vehicle power system
- Engineering project management of Orion prime contractor Lockheed-Martin
- Requirements development and sizing for Altair Lunar Lander power system
- Power system design and assessments of Ares I and V launch vehicle concepts



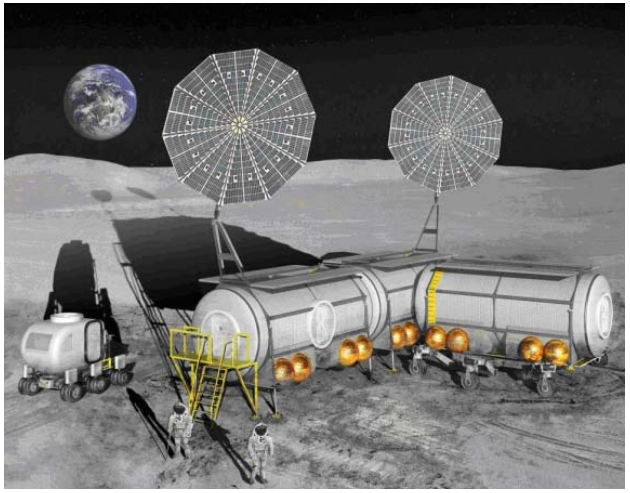
Radioisotope Power Systems

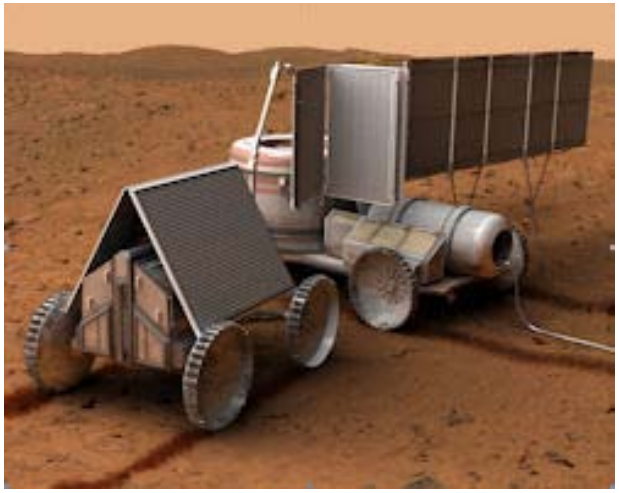
- Collaboration between NASA and Department of Energy
- Engineering support to Radioisotope Power System Program and the Advanced Stirling Radioisotope Generator (ASRG) “first flight” project



Future Human Lunar and Mars Outposts Power System Development

- Technology assessments
- System conceptual design
- System performance for planned human lunar outpost
- Advanced surface EVA suit
- Precursor robotic lunar lander and rover missions
- Predictions of lunar polar illumination

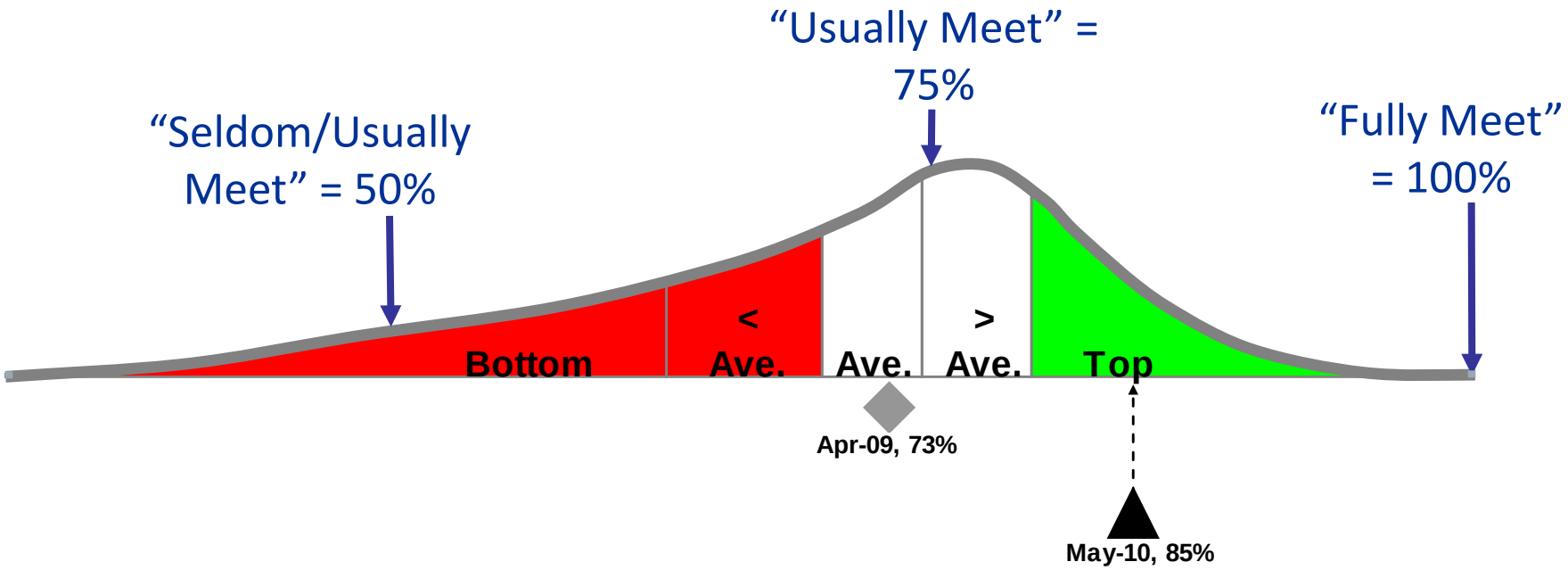




4D Team Building Experience

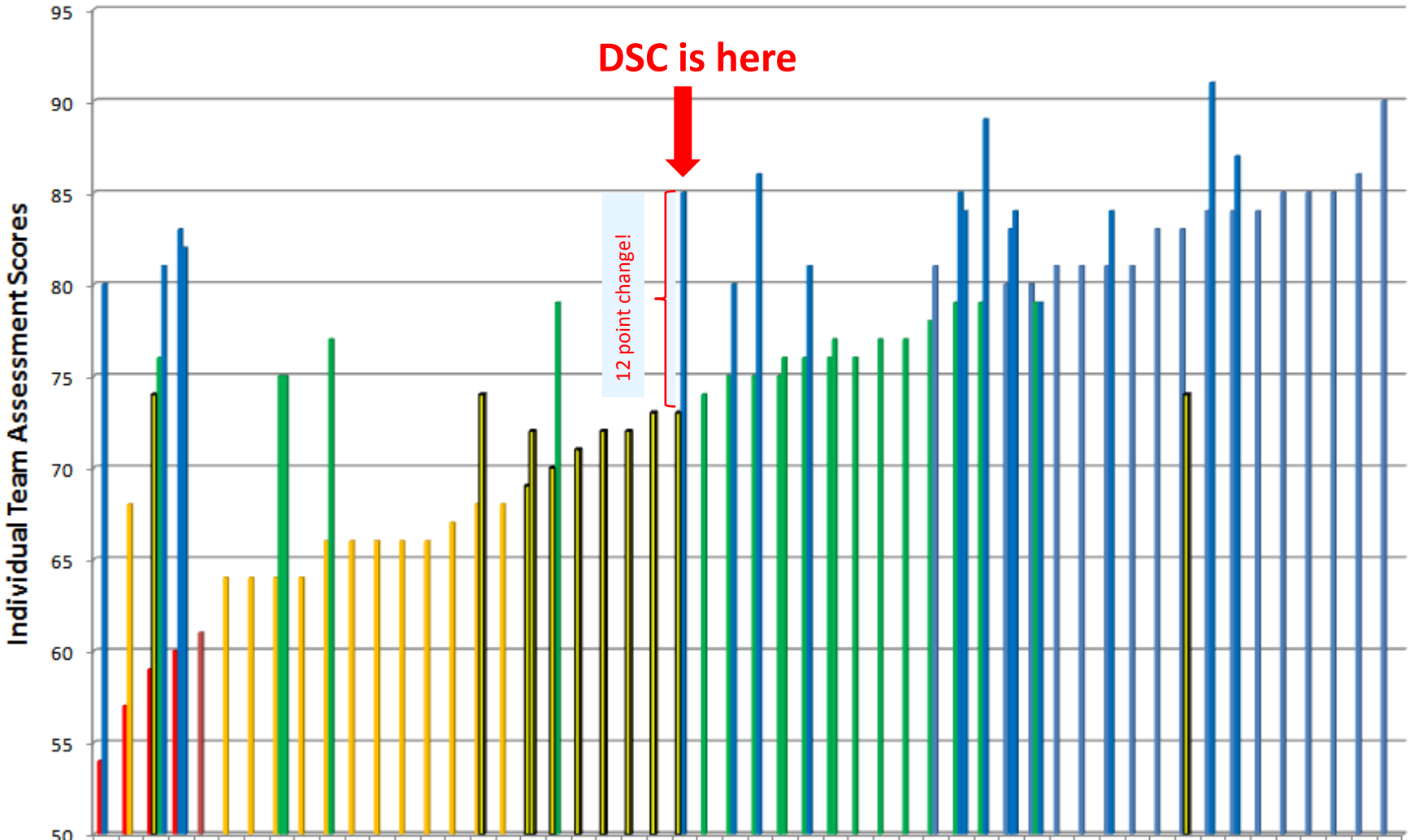
- **As a Team (5 Assessments & 1 Workshop):**
  - **Power Systems Engineering Branch**
    - ✓ May 2010 Team Assessment
    - ✓ Apr. 2009 Team Assessment
  - **Ares I Upper Stage: GRC Project Team**
    - ✓ Feb. 2008 Team Assessment
    - ✓ Feb. 2007 Team Assessment
  - **Launch Systems Project Office**
    - ✓ May 2007 4D Workshop
    - ✓ Dec. 2006 Team Assessment
- **As an Individual (4 Assessments):**
  - **2 as a Branch Chief (supervisor)**
    - ✓ Nov. 2010 & Jun. 2009
  - **2 as a Project Manager**
    - ✓ May 2007 & Sept. 2007
  - **Monthly Coaching Sessions**

Your Team's Average Score & Trend



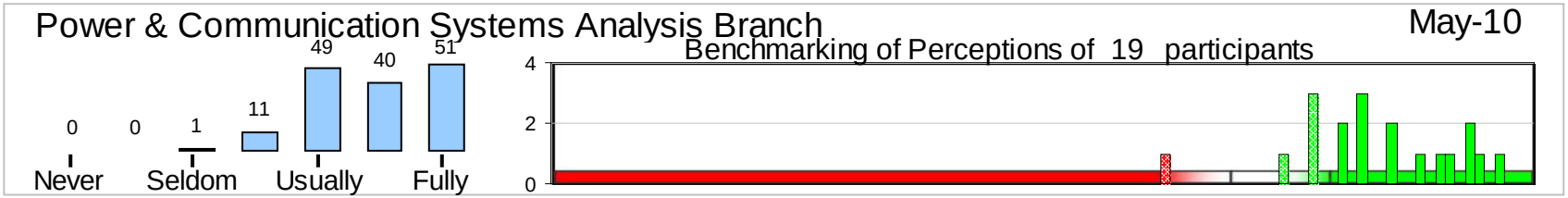
Power & Communication
Systems Analysis Branch

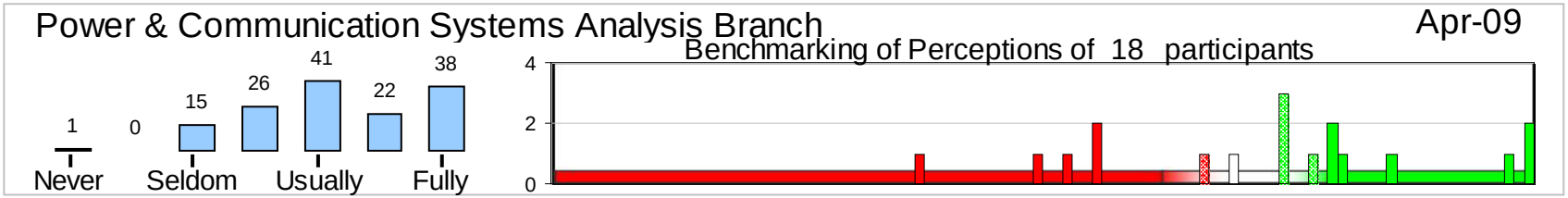
APPEL 4D Team Assessment Scores for 52 NASA GRC Teams Assessed as of 6/4/10 and 83 Team Assessments



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Series1	54	57	59	60	61	64	64	64	64	66	66	66	66	66	67	68	68	69	70	71	72	72	73	73	74	75	75	75	76	76	76	77	77	78	79	79	80	80	81	81	81	81	83	83	84	84	84	85	85	85	86	90
Series2	80	68	74	83				75		77						74		72	79					85		80	86	76	81	77				81	85	89	83	79			84			74	91	87						
Series3			76	82				75																											84			84	79														
Series4			81																																																			

Trends in Distribution of Perceptions

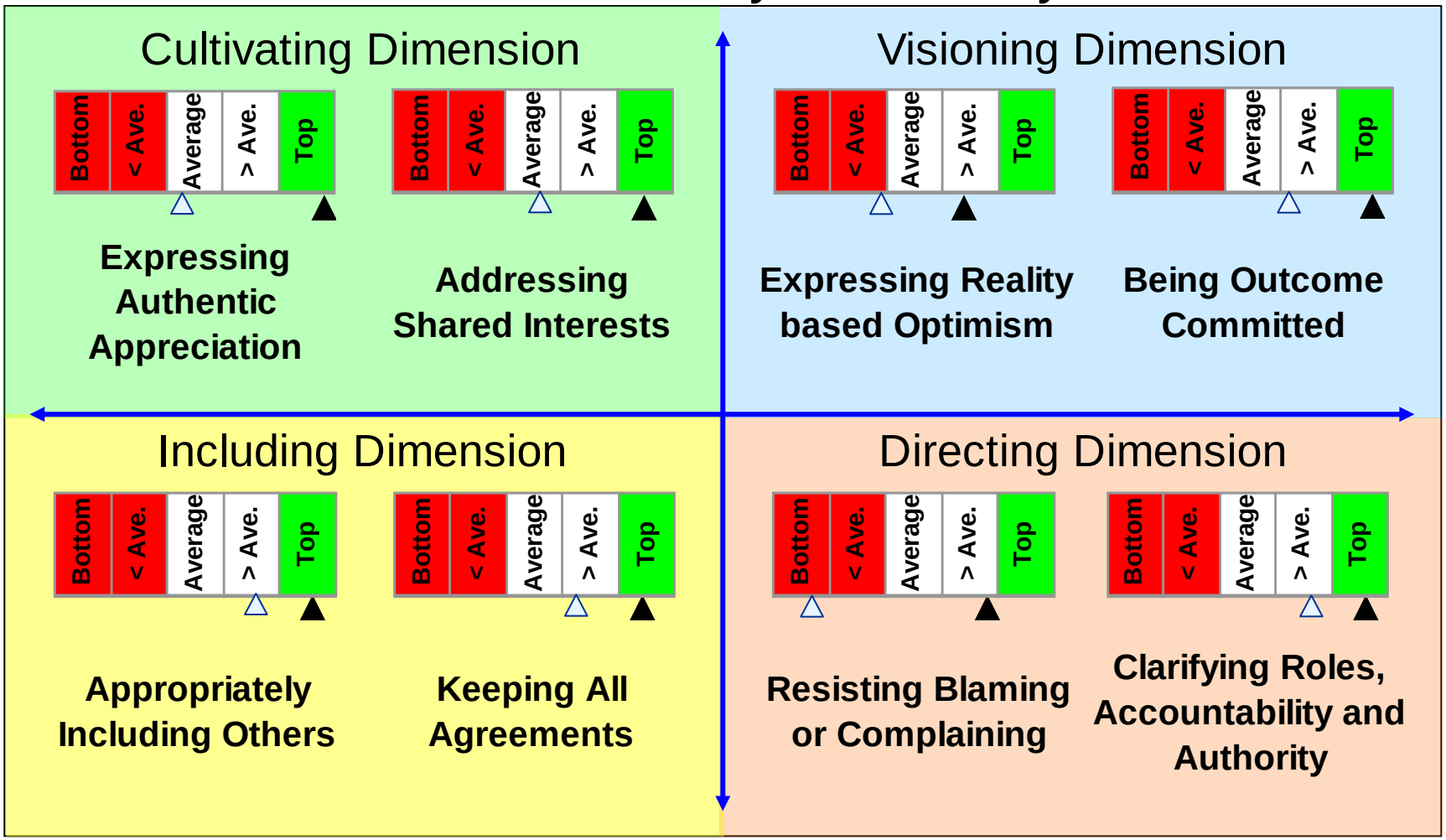




Relative Ranking of Behaviors

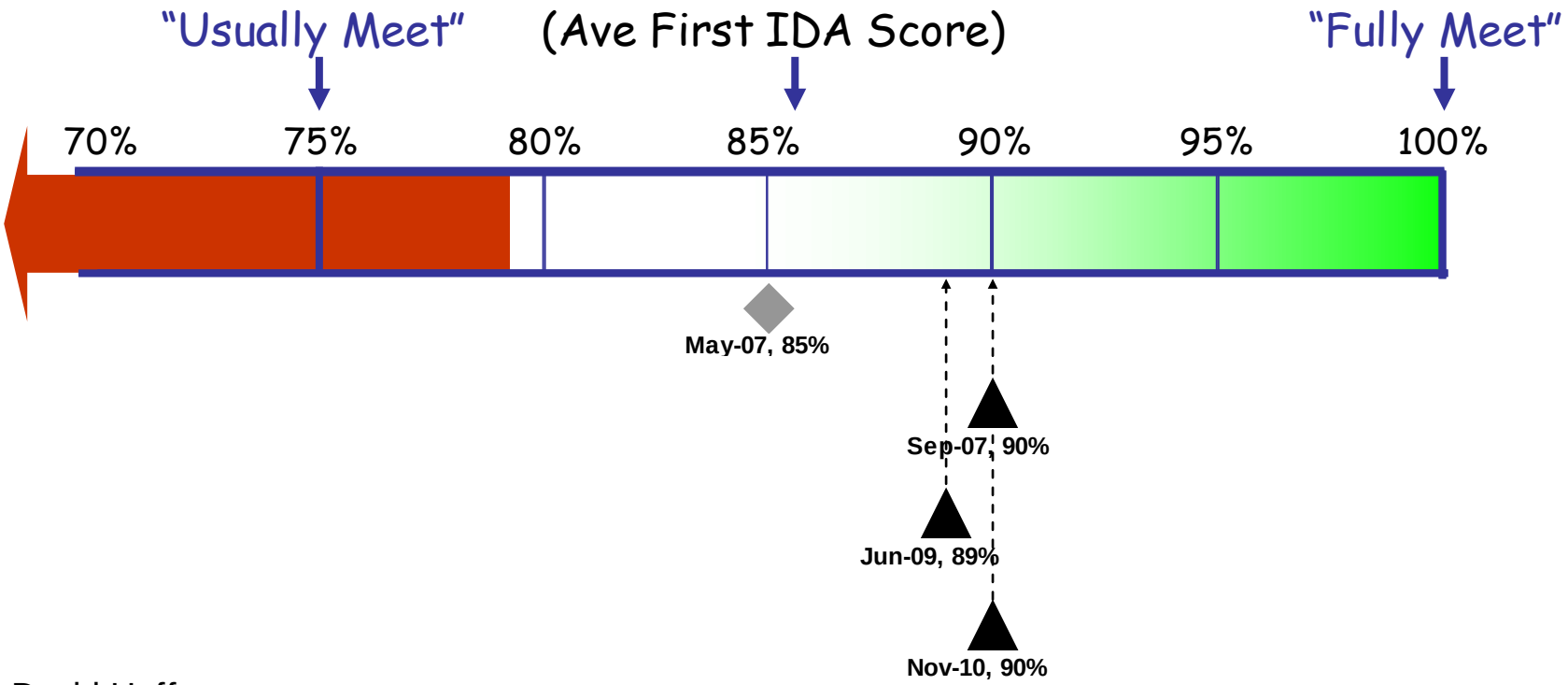
Power & Communication Systems Analysis Branch

May-10



Note: Each behavior is separately benchmarked.

My Individual Score - Average Trend Over Time

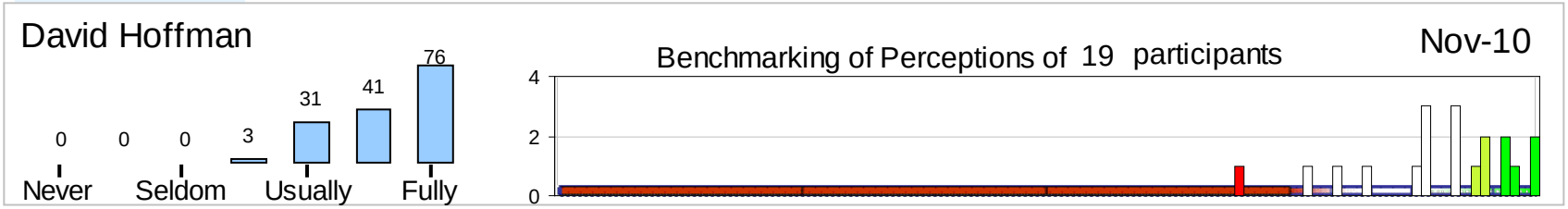


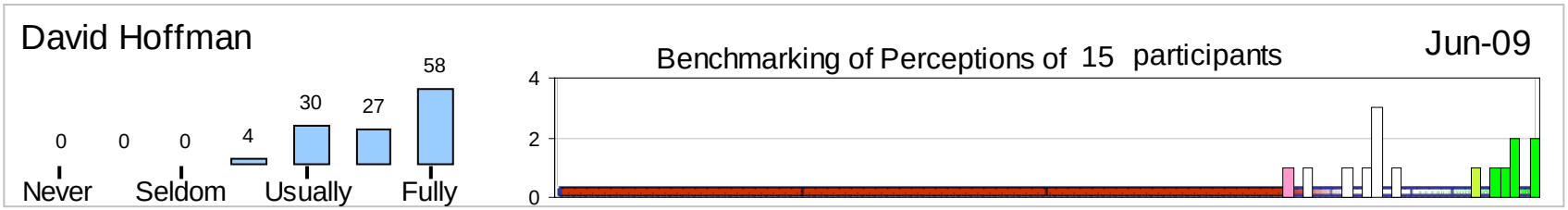
David Hoffman

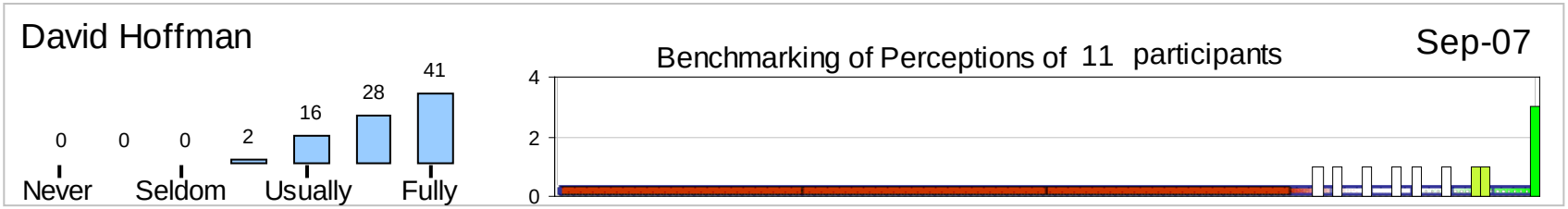
We do not benchmark IDAs, as we do TDAs, because:

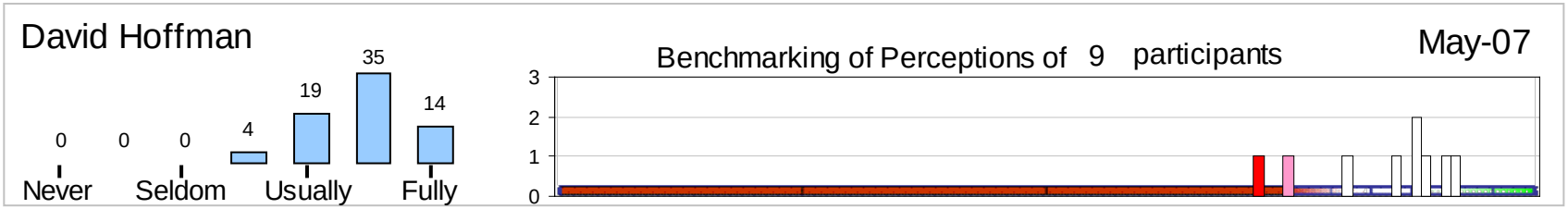
- We want you to include assessors who may give you low scores; and
- Team context can drive your IDA scores up or down.

Trends in Distribution of Perceptions





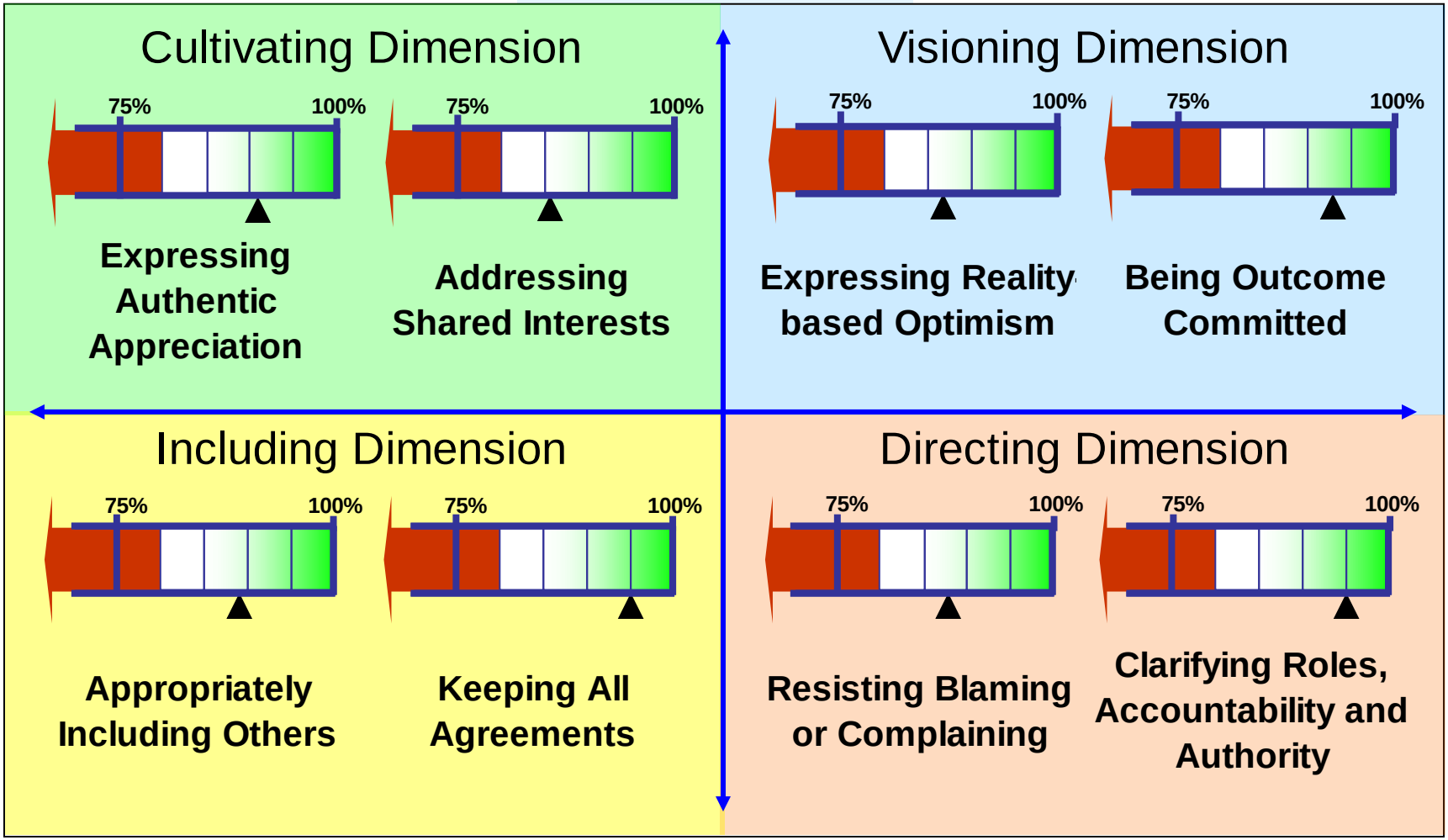




Relative Ranking of Behaviors

David Hoffman

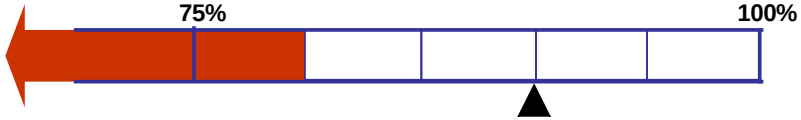
Nov-10

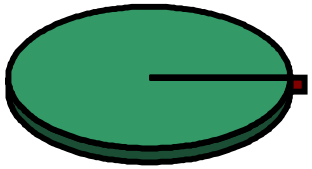


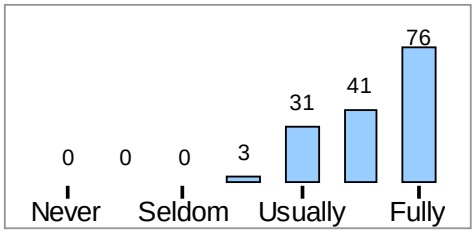
Summary

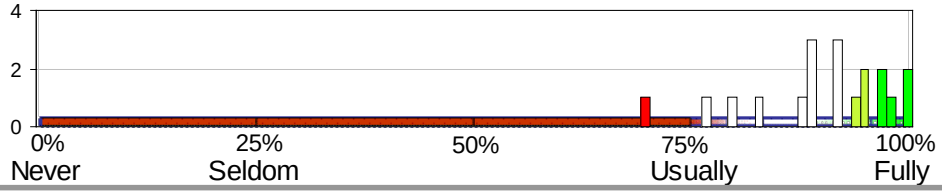
David Hoffman

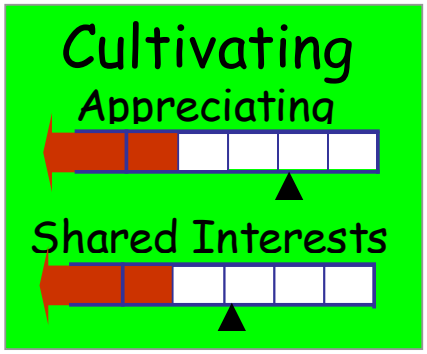
Nov-10

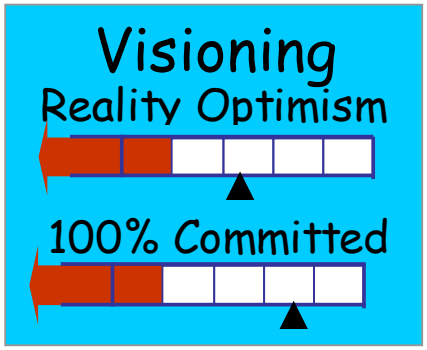


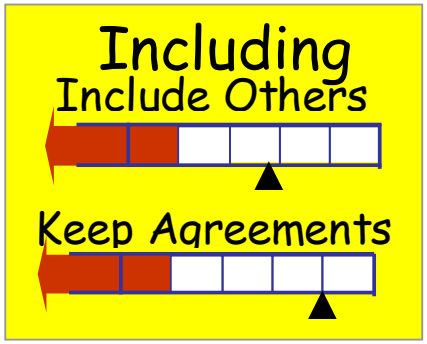


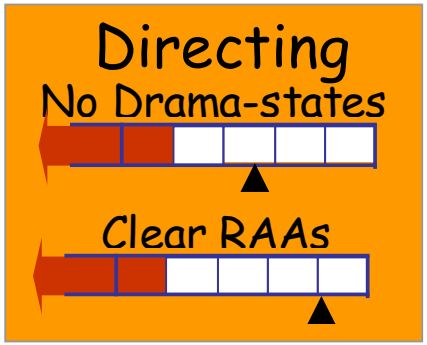




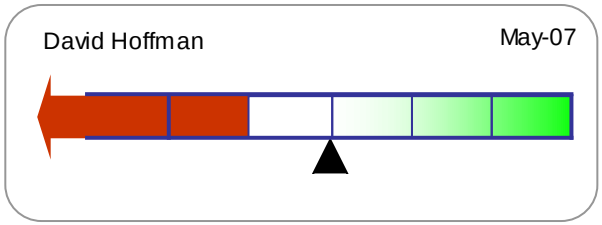


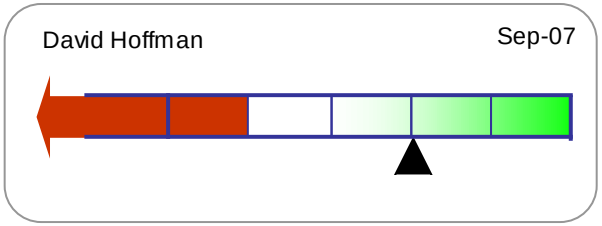


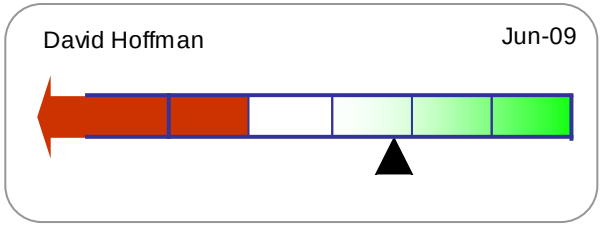




Past Assessments







Earliest Earlier Previous

We *are* part of Space History!!!

(Always end with a Green story line!)