



National Aeronautics and
Space Administration

EXPLORE MARS

PROGRAM FUNCTIONS & INTERACTIONS

Fuk Li

Mars Exploration Program Manager, Jet Propulsion Laboratory, California Institute of Technology

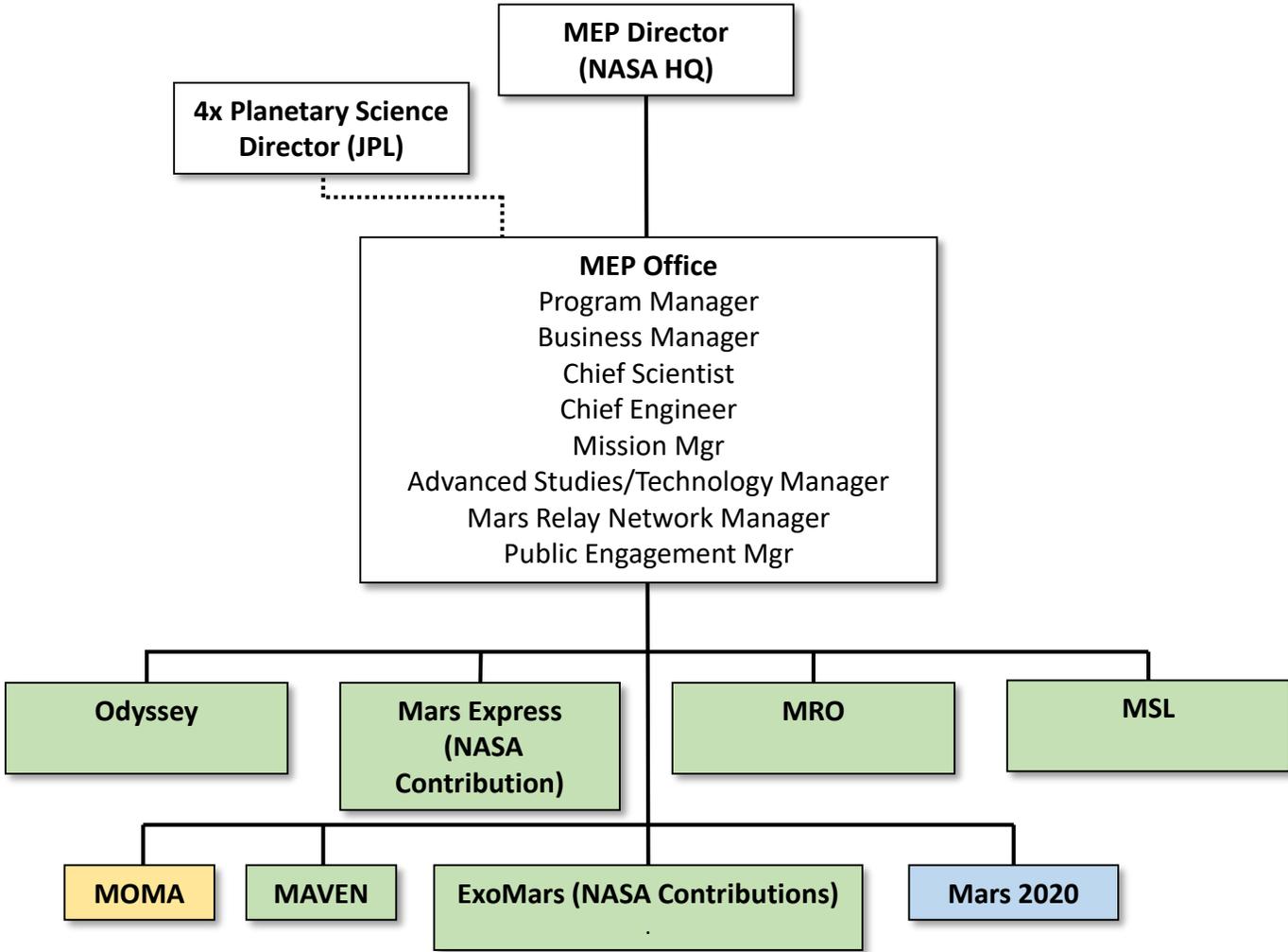
Bobby Braun

Mars Sample Return Program Manager, Jet Propulsion Laboratory, California Institute of Technology

MEP Specific Functions

- Science
 - Advanced Studies
 - Technology
 - Formulation of Future Missions and Strategies
 - Operational Missions
 - Relay Network
 - Public Outreach (for MEP activities)
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- All elements and projects continue to regularly report operational status and plans to the NASA HQ MEP Director
 - The Mars Program Office at JPL reports regularly to the NASA HQ MEP Director
 - MEP retains responsibility for all Mars science requirements

MEP Organization



— Program accountability
 Institutional accountability

Implementation
 Operations
 Extended Operations

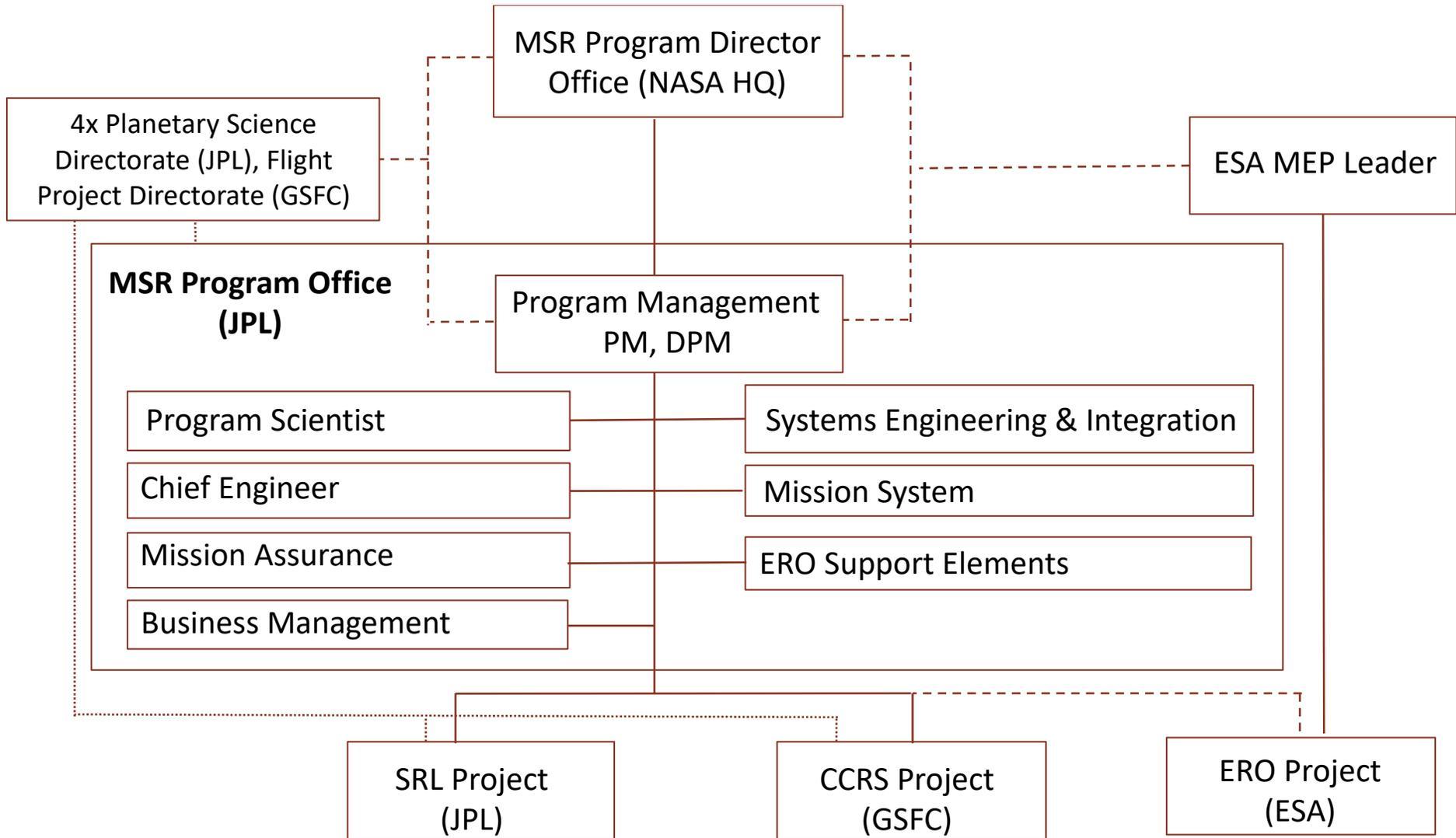
MSR Specific Functions

- Development and implementation of the flight mission elements required to return sealed samples from Mars
- Sample Retrieval Lander Project and its payloads
- Earth Return Orbiter Project and its payload (NASA CCRS)
- MSR is being implemented through a partnership between ESA and NASA and is governed by a signed ESA-NASA MOU
- The MSR Program Office at JPL reports regularly to the NASA HQ MSR Director
- MSR program is responsible for Planetary Protection compliance for the MSR campaign

Mars Operations at JPL

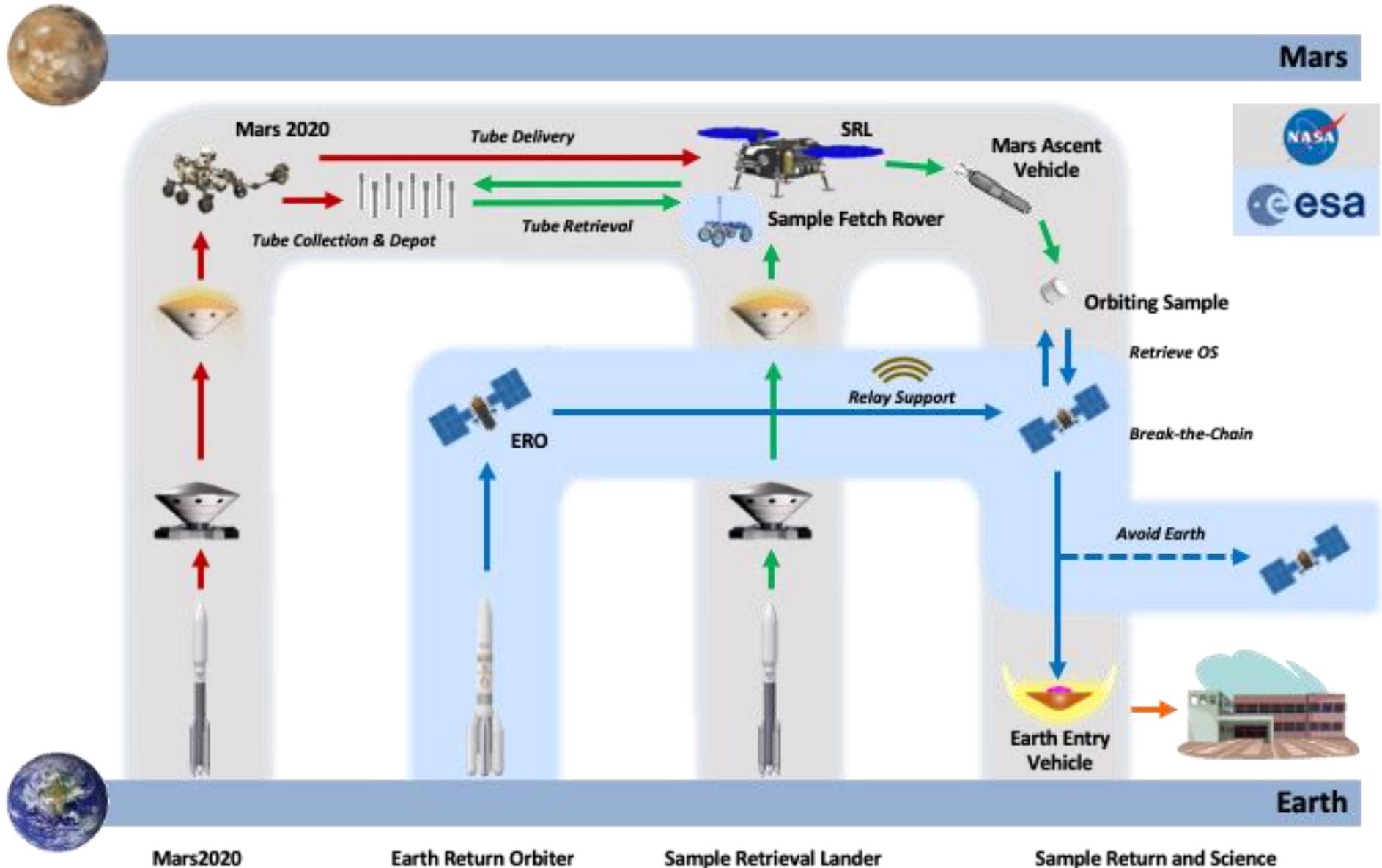
- The NASA Mars Exploration Program Office has been a vibrant aspect of JPL operations for multiple decades
 - This NASA responsibility has always been distinct from internal Directorate operations
- In 2020:
 - JPL merged the Mars and Solar System Exploration Directorates
 - JPL stood up the NASA Mars Sample Return Program Office per direction from NASA HQ
 - MEP programmatic accountability was not changed
- Today, the MEP & MSR Program offices are part of the JPL Planetary Science Directorate
 - Structure parallels that of NASA HQ, providing one-to-one communications for MEP management, MSR management and at the PSD level
 - Internally, integration of the former Mars and Solar System Exploration Directorates enables better workforce planning and management

MSR Program Organization



- Program accountability
- - - Program coordination
- Institutional accountability

MSR Campaign Overview



Primary MEP/MSR JPL Program Offices Interactions

Mars Exploration Program

- Operational missions (Perseverance, Curiosity, ODY, MRO, MAVEN, MSL)
- Mars Relay Network
- Mars Advanced Studies
- Mars Technology
- Missions in Formulation/Pre-Formulation
 - Mars Ice Mapper
 - *Future missions TBD*
- Public Engagement
- Science Community Interaction
- HEO Interface
- Strategic Science Planning & Execution

- Returned Sample Project
 - Sample Receiving Facility
 - Sample Curation Facility
 - Returned Sample Science

Science community coordination

Public outreach

M2020/MSR surface operations coordination

Mars Relay Network support of MSR

MSR feedforward/coordination to MEP MRSP

Mars Sample Return Program

- NASA
 - Program Management
 - Campaign Systems Engineering and Integration
 - Sample Retrieval Lander Project
 - Capture, Containment and Return System
- ESA
 - Earth Return Orbiter Project
 - Sample Fetch Rover
 - Sample Transfer Arm

Summary

- MEP is a long-term, ongoing program; it will continue after Mars sample return
- MSR is a single-project program with a defined beginning and end
- Both programs will collaborate to successfully implement the campaign to return samples from Mars and facilitate scientific investigations of those samples
- Over the coming decade, MEP will focus on science from its existing operational missions including Perseverance, develop a strategy for future scientific exploration of Mars, and implement a plan for the curation of the first samples to be returned from another planet
 - The Perseverance science team was specifically selected to identify and acquire the most compelling suite of samples for eventual return to Earth
 - NASA HQ has emphasized that this is the top priority of Perseverance surface operations
 - The MEP is responsible for Returned Sample Science, including sample curation
- Over the coming decade, MSR will focus on the development and operation of the flight elements required to retrieve the cached samples and return them safely to Earth
 - MSR does not have a science team or science instruments
 - The landing site for the retrieval mission will be determined by the SMD AA, based on recommendations from the MEP and MSR programs and will incorporate science community input
 - Following return of Mars samples to Earth, the MSR Program will be complete

BACKUP

JPL Planetary Science Directorate

Director for Planetary Science 4000
 Deputy Director for Solar System Implementation
 Deputy Director for Mars 2020
 Assistant Director for Mars Sample Return Campaign

Mars Exploration Program 4070

- Science, Engineering
- Advanced Studies
- Relay Network, Outreach

MSR Campaign Program 4080

- Systems Engineering

Chief Scientists
 Chief Engineers
 Chief Technologist
 Strategic Planning

Business Admin 4020

Business Operations 4010

Technology
 - Nuclear
 - Power & Propulsion
 - Robotics
 - GN&C
 - Sampling
 - Ocean Worlds Lander
 - Human/Robotic & Emerging Capabilities
 4040

Formulation
 - Planetary Science & Instruments
 - Lunar Discovery & Exploration
 - Inner Planets
 - Outer Planets
 - Ocean Worlds
 - Small Bodies & Planetary Defense
 4100

M2020 4300 Mars Helicopter 4060
 Europa Clipper MSO 4050
 Type II Projects 4030
 SRL 4700 Lunar Flashlight Lunar Trailblazer
 ERO Components 4800
 Insight 4500 Juno 4400 Psyche 4600

Multi-Mission Extended Operations
 MSL
 MRO
 MEX
 Odyssey
 Cassini 4200

PLANETARY SCIENCE DIRECTORATE

 Keyur Patel Deputy Director, Solar System Implementation	 Bobby Braun Director	 Fuk Li Deputy Director, Mars 2020
	 Katey Velazquez Executive Staff Coordinator	

FLIGHT PROJECT LEADERSHIP

EUROPA CLIPPER PROJECT

 Jan Chodas Project Manager	 Jordan Evans Deputy PM	 Bob Pappalardo Project Scientist
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PSYCHE PROJECT

 Lindy Elkins-Tanton (ASU) Principal Investigator	 Henry Stone Project Manager	 Bob Mase Deputy PM
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PERSEVERANCE

 John McNamee Project Manager	 Matt Wallace Deputy PM	 Jennifer Trosper Deputy PM, Surface Mission	 Ken Farley (Caltech) Project Scientist
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INGENUITY

 MiMi Aung Project Manager	 Bob Balaram Chief Technologist
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JUNO

 Scott Bolton (SwRI) Principal Investigator	 Ed Hirst Project Manager
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INSIGHT

 Bruce Banerdt Principal Investigator	 Chuck Scott Project Manager
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CURIOSITY

 Jim Erickson Project Manager	 Megan Lin Deputy PM	 Ashwin Vasavada Project Scientist
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MARS RECONAISSANCE ORBITER

 Dan Johnston Project Manager	 Rich Zurek Project Scientist
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MARS ODYSSEY

 David Lehman Project Manager	 Jeff Plaut Project Scientist
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DIRECTORATE STAFF AND PROGRAM MANAGEMENT

SCIENCE

 Rosaly Lopes Chief Scientist	 Michael Mischna Deputy CS
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ENGINEERING

 Gentry Lee Chief Engineer	 Howard Eisen Chief Engineer	 Joel Krajewski Deputy CE
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TECHNOLOGY

 Satish Khanna Chief Technologist
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STRATEGY

 Phil Larson Strategic Planner

OPERATIONS

 Janet Shen Manager
--

ADMINISTRATION

 Donna Bonorris Manager
--

MARS EXPLORATION PROGRAM

 Fuk Li Manager	 Rich Zurek Program Scientist
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MARS SAMPLE RETURN CAMPAIGN PROGRAM

 Bobby Braun Program Manager	 Guy Beutelschies Deputy PM	 Tom Hoffman Sample Retrieval Lander Project Manager	 Shawn Goodman CCRS Deputy PM
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FORMULATION PROGRAM

 Tony Freeman Program Manager	 Greg Garner Deputy PM	 Carol Raymond Program Scientist
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TECHNOLOGY PROGRAM

 Satish Khanna Program Manager

TYPE II PROJECTS

 John Baker Manager
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EXTERNAL MISSION SUPPORT

 Annette Sahakian Manager
--

MULTI-MISSION EXTENDED OPS

 Jim Erickson Manager
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