



Tommaso (Tom) P. Rivellini

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Education: Undergraduate Degree: Aerospace/Mechanical Engineering
Syracuse University
Masters Degree: Aerospace Engineering
Univ. of Texas at Austin

Apple Inc.

Engineering Director, iPod/iPhone Product Design

JPL Flight Projects:

(LDSD) Low Density Supersonic Decelerators Chief Engineer: 2010 - 2013

Responsible for overall technical execution of the \$160M high altitude supersonic decelerator test program. Team consists of JPL, NASA LaRC, NASA Ames, NASA WFF, China Lake Naval Weapons Center, Pacific Missile Range Facility, Columbia Scientific Balloon Facility. Project aims to develop advanced parachutes and inflatable aerodynamic decelerators for future Mars missions.

(GS) Group Supervisor of the Entry, Descent, and Landing group in section 352: 2009-2011

Supervised the EDL mechanical group.

(MSL) Mars Science Laboratory Entry Descent and Landing Mechanical Systems Engineer: 2003-Present

Responsible for the design, development and test of all of the cruise, entry, descent, and landing hardware on the Mars Science Laboratory. Co-inventor of the sky crane landing system.

(MER) Deputy Mechanical Systems Architect, Mars Exploration Rover Mission (Spirit & Opportunity): August 01 - March 2003.

Primary areas of responsibility were; airbag design modifications and test program, spacecraft critical clearances, lander rock protection system design, redesign of descent rate limiting device, and rover egress system development (invented the "Batwing" egress design).

(MSR) Mars Sample Return, Sample Transfer Chain (STC) System Architect: Jan 99 - Feb 00

STC included all of the elements responsible for storing, transferring, sealing, protecting and capturing the samples on orbit around Mars and return to Earth. Responsible for system engineering all of the STC elements mounted on 5 different spacecraft (lander, rover, MAV, orbiter, EEV) so that they would all work together.

(MSR) Mars Sample Return Mechanical System Engineer: Jan 98 – Jan 99

Responsible for the conceptual design and development of the Mars Sample Return mechanical flight system. Developed overall configuration of the flight systems as well as the mechanical hardware concepts that composed of the STC.

(DS2) Deep Space 2 Mars Micro-Probe Project Element Manager: Sept 96 - Dec 98

Project Element Manager/Mechanical Systems Engineer for Mechanical Systems Division. Responsible for leading a team in developing and delivering the mechanical subsystem for Deep

Space 2 Mars landers and Interfacing structure. Responsible for the mechanical design, analysis, test, fabrication and delivery of all mechanical flight hardware and electronics packaging. The Deep Space 2 Micro Probe project pioneered the use of high G (>50,000 g's) penetrators for planetary exploration.

(MPF) Mars Pathfinder: Feb 93 – Dec 96

Invented the Mars Pathfinder spacecraft configuration and Entry Descent and Landing approach as a member of a 4 man Entry Descent and Landing tiger team. Subsequently assumed role of :

Airbag Subsystem Cognizant Engineer. Directly responsible for the design and development of the airbag subsystem.

1991 through 1993

MSTI: Cognizant engineer for all telecommunications interface hardware. Designed, analyzed, tested and delivered the mounting/interface hardware for all of the flight antennas.

Pluto Fast Flyby: Mechanical systems lead structure and configuration engineer. Generated concept designs for structures and configuration subsystem.

Rocky IV: Designed, analyzed and tested all of the suspension linkages and body components on Rocky IV.

Advanced Projects: Sec 352 lead mechanical engineer on multiple advanced project proposals, including; Europa lander/Subsurface Explorer (Cryobot), Lunar Surveyor, Sub Millimeter Infrared Measurement Telescope, Comet Lander.

JPL Mission Proposals

Low Density Supersonic Decelerators
Galahad asteroid sample return
SAGE Venus lander
Naiades Rough Lander ; Mars Lander
Moonrise Step 1; Lunar Lander
Gulliver Phobos Sample Return
Mars Pathfinder

JPL and NASA Research And Development

Second Generation Mars Lander, Mechanical Prototype Task Leader: Feb 00-Jul 01.

Principal Investigator. Responsible for designing, fabricating and testing two 3/8 scale proof of concept test landers (Pallet Lander and Large Airbag self righting system). These were two novel landing system concepts being developed for possible use by the MSL mars mission.

Europa Lander Study 2005

Principal Investigator. Responsible for a JPL internally funded (R&TD) study aimed at identifying viable landing systems and payloads for a Europa lander.

Brushwheel Sampler R&TD: 2003-4

Principal Investigator. Invented, developed and tested the brushwheel sampling system aboard the KC-135 aircraft.

Touch and Go Sampling R&TD: 2008

Co Investigator. Supported a team of engineers developing the techniques to perform touch and go sampling on small bodies.

(TDT) Touchdown Dynamics Testbed: Project Lead 2004-2006

Technical Lead. Lead the team developing the MSL large scale motion simulator up through PDR and key subsystem CDRs. ~\$10M activity.

Major Review Boards

Rosetta Lander (ESA)

Beagle 2 Lander (ESA)
Netlander (ESA)
Genesis EDL Red Team Review
Genesis Failure Review Board
Phoenix Sample Handling review board
Orion EDL/Parachute Tiger Team
MSL ShaSpa re-architecture tiger team
Mars Formulation A-Team member

NASA Boards

NASA Human and Robotic Technology (H&RT) Formulation Plan Team member 2004
NASA EDL Roadmap Team 2010
JPL's EDL Vision Board

Honors and Awards

NASA Awards:

NASA Exceptional Service Medal (2011): For the invention of enabling mechanical systems for a planetary landing on Mars.

NASA Exceptional Achievement Medal (1998): for the outstanding achievement in the development of the Mars Pathfinder airbag subsystem.

NASA Space Act Award for the invention of the Mars Pathfinder Lander System.

JPL Awards:

JPL Explorer Award (2011): For leadership in concept generation, proposal and execution of the Supersonic Inflatable Aerodynamic Decelerator (SIAD) project.

JPL Bonus Award (2010) Mars 2018 Mechanical Design Team: This team executed a fundamental part of the design and presentation work to successfully conduct the Mars 2018 (MAX-C) Concept Feasibility Review.

JPL Bonus Award (2009) MSL Skycrane Working Group: Evaluation of mission-critical risks during the Skycrane maneuver portion of the MSL Entry, Descent, and Landing mission phase.

JPL Bonus Award (2008) MSL Prop Line Tiger Team: For rapid response, outstanding collaboration, and technical acumen demonstrated in the successful resolution of unprecedented stress and fatigue.

JPL Bonus Award (2007) EDL/RCS Reconfiguration Team : For accomplishing a stellar EDL CDR and rapidly resolving RCS impingement issue.

JPL Bonus Award (2004) Spirit DRL Anomaly: Conducted investigation of Spirit DRL anomaly

JPL Level B Award (2002): For the development of a novel sampling device for small body exploration.

JPL Individual Award for Excellence (1997): received for outstanding technical performance in the design of the Mars Pathfinder Airbag Subsystem

JPL Team Award for Excellence (1998): received for outstanding technical performance in the design of the Mars Pathfinder Entry, Descent and Landing System

NOVA Award (2001): Development of a 3/8 scale prototype of the Pallet landing system.

JPL Team Award for Excellence (1999): Team leader of the DS2 Microprobe mechanical and packaging team, received award: for significant achievement in the design, development, packaging and assembly of the Deep Space Two spacecraft

Award For Excellence, Individual (1996): Individual award for work on Mars Pathfinder Airbags.

Outside Awards:

2012 Americans of the Year (one of 15) Esquire Magazine

National Academy of Engineering Best Gilbreth Lecture Award 2005

AIAA Engineer of the Year Award (1998): Received for technical achievement made on the Mars Pathfinder Airbag subsystem design. (American Institute of Aeronautics and Astronautics is the worlds largest professional organization for aerospace professionals).

Chrysler Award for Innovation in Design (1998): National award for work done on the Mars Pathfinder EDL and airbag design
Design News Magazine Excellence in Design Award: National award received for the design of the Mars Pathfinder Airbag subsystem.
Sandia National Laboratory Meritorious Achievement Award: extended to the Mars Pathfinder Airbag development team.
New Millennium Team Leadership Award: For outstanding team leadership of the mechanical design team for the DS2 micro-penetrator spacecraft.

Publications

Entry, Descent and Landing Systems analysis study: Phase 2 Report on Mars Science Laboratory Improvement; Ivanov et al, NASA TM 2011-216988 Jet Propulsion Laboratory

Mars Science Laboratory's Parachute Qualification Approach; D Adams, T. Rivellini AIAA Aerodynamic Decelerator Conference, Seattle 2009

Mars Science Laboratory Parachute Inversion Phenomenon and Flight Risk Assessment; D Adams, T. Rivellini AIAA Aerodynamic Decelerator Conference, Seattle 2009

MSL V&V CEDL Mechanical Systems test program: Eremenko, A.; Hoffman, P.; Rivellini, T.; Aerospace conference, 2009 IEEE

Mars Science Laboratory Entry, Descent, and Landing System Overview: Prakash et al, Aerospace Conference, 2008 IEEE

Mars Science Laboratory entry, descent and landing system verification and validation program: Aerospace Conference, 2006 IEEE

Mars Science Laboratory Entry Capsule Aerothermodynamics and Thermal Protection System: Edquist, K.T.; Hollis, B.R.; Dyakonov, A.A.; Laub, B.; Wright, M.J.; Rivellini, T.P.; Slimko, E.M.; Willcockson, W.H.; Aerospace Conference, 2007 IEEE

Dynamic Simulations of Mars Science Laboratory EDL Landing Loads and Stability: Chia-Yen Peng; Ortiz, G.; Rivellini, T.; Lee, D.; Shyh-Shiuh Lih; Waydo, J.; White, C.; Haggart, S.; Voorhees, C.; Rainen, R.; Aerospace Conference, 2007 IEEE

Preliminary Design of the Cruise, Entry, Descent, and Landing Mechanical Subsystem for MSL, Hoffman, Rivellini, Slimko, Dahya, Agajanian, Knight, Sengupta, Thoma, Webster, Gallon, Gradziel. IEEAC paper #14, 16 January 2007

Mars Science Laboratory Entry, Descent and Landing System. Steltzner, Kipp, Chen, Burkhardt, Guernsey, Mendeck, Mitcheltree, Powell, Rivellini, San Martin, Way. IEEAC paper #1497

The Challenges of Landing on Mars. Rivellini, Tommaso. Frontiers of Engineering, National Academy of Engineering. The National Academies Press 2005.

To Land on Europa: Shirley, J. H.; Carlson, R. W.; Zimmerman, W. F.; Rivellini, T. P.; Sabahi, D. 36th Annual Lunar and Planetary Science Conference, 2005 Texas

Simultaneous Separation, Seaming, And Sealing Using Brazing (S3B) For Sample Containerization And Planetary Protection: Yoseph Bar-Cohen, Jiunnjenq Wu, Ayoola K. Olorunsola, Tommaso P. Rivellini, Susan Bley, James Winccentsen, and Robert Gershman; Proc. SPIE 5762, 261 (2005)

Rough Lander Concept for Mars Exploration, Sam Thurman, Tom Rivellini.
IEEE 2002 Space Systems Conference

Safe Landing in Extreme Terrain: Rivellini, Ortiz, Steltzner, LPI Workshop Houston TX, July 2000

Second Generation Mars Landed Missions, James Graf, Howard Eisen, Dara Sabahi, Sam Thurman, Tommaso Rivellini. IEEE 2001 Space Systems conference.

Configuration Evolution of the DS2 Penetrator, James A Stone, Rivellini, Tommaso.
IAA Conference on Low Cost Spacecraft 1998.

Overview of the mars pathfinder mission : launch through landing, surface operations, data sheets, and science results: Golombek et al, Journal of Geophysical Research 1999

Simulation of the Airbag Impact Dynamics for mars Landing, M. Salama, G, Davis, CP Kubo, T. Rivellini, D. Sabahi., AIAA Dynamics Conference 1996.

Analysis-test correlation of airbag impact for Mars landing: Salama, M, Davis, G, Kuo, C P, Rivellini, T, Sabahi, D, International Conference on Nonlinear Problems in Aviation and Aerospace, 1st, Daytona Beach, FL; UNITED STATES; 9-11 May 1996. pp. 611-617. 1996

Development Testing of the Mars Pathfinder Inflatable Landing System, Tommaso Rivellini, American Society of Civil Engineers (aerospace div), Engineering Construction and Operations in Space conference, 1996.

Mars Pathfinder Airbag Impact Attenuation System; Tommaso Rivellini, Don Waye, Ken Cole, AIAA 13th Aerodynamics Decelerator Conference 1995.

MESUR Pathfinder: Spacecraft Design in the Cheaper, Faster, Better era., Mark Webster, Mike Oneal, Tommaso Rivellini, ASME National Design Engineering Conference 1994.

Mars Rover Mechanisms Designed for Rocky IV; Tommaso Rivellini, 27th Aerospace Mechanisms Symposium, May 93.

New Technology Reports

48266	Coupling GNC software modules by way of User Subroutines into ADAMS computer program	25-JUL-2011
48238	Preload Retention Factors for Bolted Joints Using Polymeric Thermal Insulators:	16-JUN-2011
47676	Super Sonic Air Brake	04-JUN-2010
46808	Umbilical Deployment Device	18-DEC-2008
46407	Mars Science Laboratory (Surface System, Descent Stage, PDV, Skycrane) Design	05-OCT-2008
43045	Impact-Landing Planetary Probe Design Principles	
41024	Simultaneous Separation, Seaming and Sealing using Brazing (S3B) for Sample Containerization and Planetary Protection	06-APR-2004
40834	Self Righting Inflatable Airbag Device	10-DEC-2003
40396	Skycrane landing system	16-MAY-2003
40212	Locomotive Airbag Impact Attenuation System	06-MAR-2003
40109	Descent rate Limiting Device	19-FEB-2003
35139	Ridgized Inflatable Structure	
30827	Air-Drop Volcano Monitoring System	18-SEP-2002
30819	Hybrid deployable Foam Antenna	05-SEP-2002
30665	Brush-Wheel Sampler	30-MAY-2002
20295	Penetrator System Tolerant Of Contact Angle	05-AUG-1997
20163	Miniature Side Bore Sample Acquisition Mechanism	03-FEB-1997
19925	Mars Lander Airbags	04-APR-1996

19924 Multi Axis Articulated Landing Legs
19859 Mars Lander

04-APR-1996
15-DEC-1995

Patents

Skycrane Landing System US D505,105 S
Mars Rover US D673,482 S