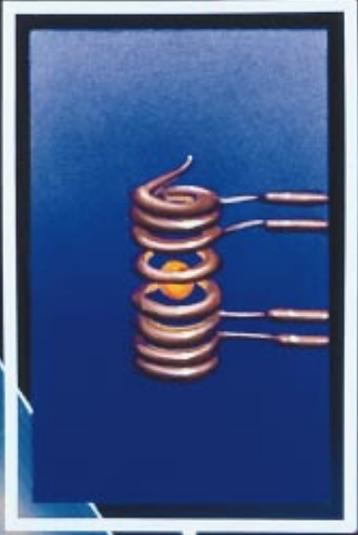


NASA's  
Microgravity  
Science  
Laboratory:  
Illuminating the Future





**James D. Halsell, Jr., Commander**  
Lieutenant Colonel James Donald Halsell, Jr., (USAF) earned his Bachelor of

Science degree in Engineering from the United States Air Force Academy in 1978, a Master of Science degree in Management from Troy University in 1983, and a Master of Science degree in Space Operations from the Air Force Institute of Technology in 1985. He has served as an F4-D aircraft commander and his graduate thesis, sponsored by the Johnson Space Center Crew Systems Division, prototyped a space rescue transfer vehicle using off-the-shelf equipment. He served as the pilot on STS-65, the Second International Microgravity Laboratory mission in July 1994 and as the pilot on STS-74, the second Space Shuttle mission to rendezvous and dock with the Russian Space Station MIR.



**Susan Leigh Still, Pilot**  
Lieutenant Commander Susan Leigh Still (USN) received her Bachelor of Science

degree in Aeronautical Engineering from Embry-Riddle University in 1982 and a Master of Science degree in Aerospace Engineering from the Georgia Institute of Technology in 1985. She is a Distinguished Naval Graduate of the Aviation Officer Candidate School and a Distinguished Graduate of the United States Naval Test Pilot School, and she has been awarded the Navy Commendation Medal, the Navy Achievement Medal, and the National Defense Service Medal. Still has more than 2,000 flight hours in more than 30 types of aircraft. MSL-1 will be her first spaceflight.



**Dr. Michael L. Gernhardt, Ph.D., Mission Specialist**  
Dr. Michael Gernhardt received a Bachelor

of Science degree in Physics from Vanderbilt University in 1978 and Master of Science and Doctor of Philosophy degrees in Bioengineering from the University of Pennsylvania in 1983 and 1991, respectively. Before joining NASA in 1992, Dr. Gernhardt worked as a professional deep-sea diver and developed sub-sea robotics equipment and new astronaut- and robot-compatible tools for Space Station maintenance, as well as portable life support systems and decompression procedures for extravehicular activity. After becoming an astronaut, he was a Mission Specialist on STS-69, during which he performed a spacewalk to evaluate future Space Station tools and hardware. Dr. Gernhardt will serve as Flight Engineer on the MSL-1 mission.



**Dr. Janice Voss, Ph.D., Payload Commander**  
Dr. Janice Voss received her Bachelor of Science degree in

Engineering Science from Purdue University in 1975 and a Master of Science degree in Electrical Engineering and a Doctorate in Aeronautics and Astronautics from the Massachusetts Institute of Technology in 1977 and 1987, respectively. Dr. Voss first flew on STS-57 in 1993, a mission to capture and return the European Retrieval Carrier (EURECA). More recently, she flew on STS-63, which rendezvoused with the Russian Space Station MIR and deployed and retrieved SPARTAN 204. Dr. Voss has logged more than 438 hours in space and will be the Payload Commander for MSL-1.



**Dr. Donald A. Thomas, Ph.D., Mission Specialist**  
Dr. Donald Thomas graduated with Honors and a

Bachelor of Science degree in Physics from Case Western Reserve University in 1977. He received a Master of Science degree and a Doctorate in Materials Science from Cornell University in 1980 and 1982, respectively, after which he joined AT&T Bell Laboratories to develop advanced materials and processes for high-density interconnections of semiconductor devices. He was a Principal Investigator for the Microgravity Disturbances Experiment, a middeck crystal growth experiment that flew on STS-32 in 1990, investigating the effects of orbiter- and crew-induced disturbances on the growth of crystals in space. Dr. Thomas became an astronaut in 1991 and flew as a Mission Specialist on STS-65 in 1994 and on STS-70 in 1995.



**Dr. Roger K. Crouch, Ph.D., Payload Specialist**  
Dr. Roger Crouch earned a Bachelor of Science in

Physics from Tennessee Polytechnic Institute in 1958 and a Master of Science in Physics and a Doctor of Philosophy from Virginia Polytechnic Institute in 1968 and 1971, respectively. As Chief Scientist of NASA's Microgravity Science and Applications Division (MSAD) since 1985, he has been the manager for a research program supporting materials science, fluid physics, low-temperature microgravity physics, combustion science, and biotechnology. He served as Program Scientist for the Spacelab J, First and Second International Microgravity Laboratory, and First United States Microgravity Laboratory missions. In addition, Dr. Crouch trained as the Alternate Payload Specialist on STS-42.



**Dr. Gregory Linteris, Ph.D., Payload Specialist**  
Dr. Greg Linteris received a Bachelor of

Science degree with Honors in Chemical Engineering from Princeton University in 1979, a Master of Science degree from the Design Division of the Mechanical Engineering Department at Stanford University in 1984, and a Doctorate in Mechanical and Aerospace Engineering from Princeton in 1990. Since 1992, he has been at the National Institute of Standards and Technology, where he has been developing a research program on advanced fire suppressants and studying the restraining mechanisms of chemical inhibitors.



**Dr. Paul D. Ronney, Sc.D., Payload Specialist**  
Dr. Paul Ronney received a Bachelor of

Science degree in Mechanical Engineering from the University of California, Berkeley in 1978, a Master of Science in Aeronautics from the California Institute of Technology in 1979, and a Doctor of Science in Aeronautics and Astronautics in 1983 from the Massachusetts Institute of Technology. Dr. Ronney has been at the University of Southern California since 1993, where he currently holds a joint appointment as an Associate Professor in the Departments of Mechanical and Aerospace Engineering. He is Principal Investigator for the Structure of Flame Balls at Low Lewis-number (SOFBALL) experiment, which will be part of the MSL-1 payload.

## MSL-1 Management

Program Manager:

Mr. James McGuire,  
NASA Headquarters  
Dr. Mark Lee,  
NASA Headquarters

Program Scientist:

Mission Manager:

Ms. Teresa B. Vanhooser,  
NASA MSFC

Assistant Mission Manager:

Mr. Randy K. McClendon,  
NASA MSFC  
Dr. Michael B. Robinson,  
NASA MSFC

Mission Scientist:

Assistant Mission Scientist:

Dr. James Patton Downey,  
NASA MSFC

Chief Engineer:

Mr. Allen S. Bacskey,  
NASA MSFC

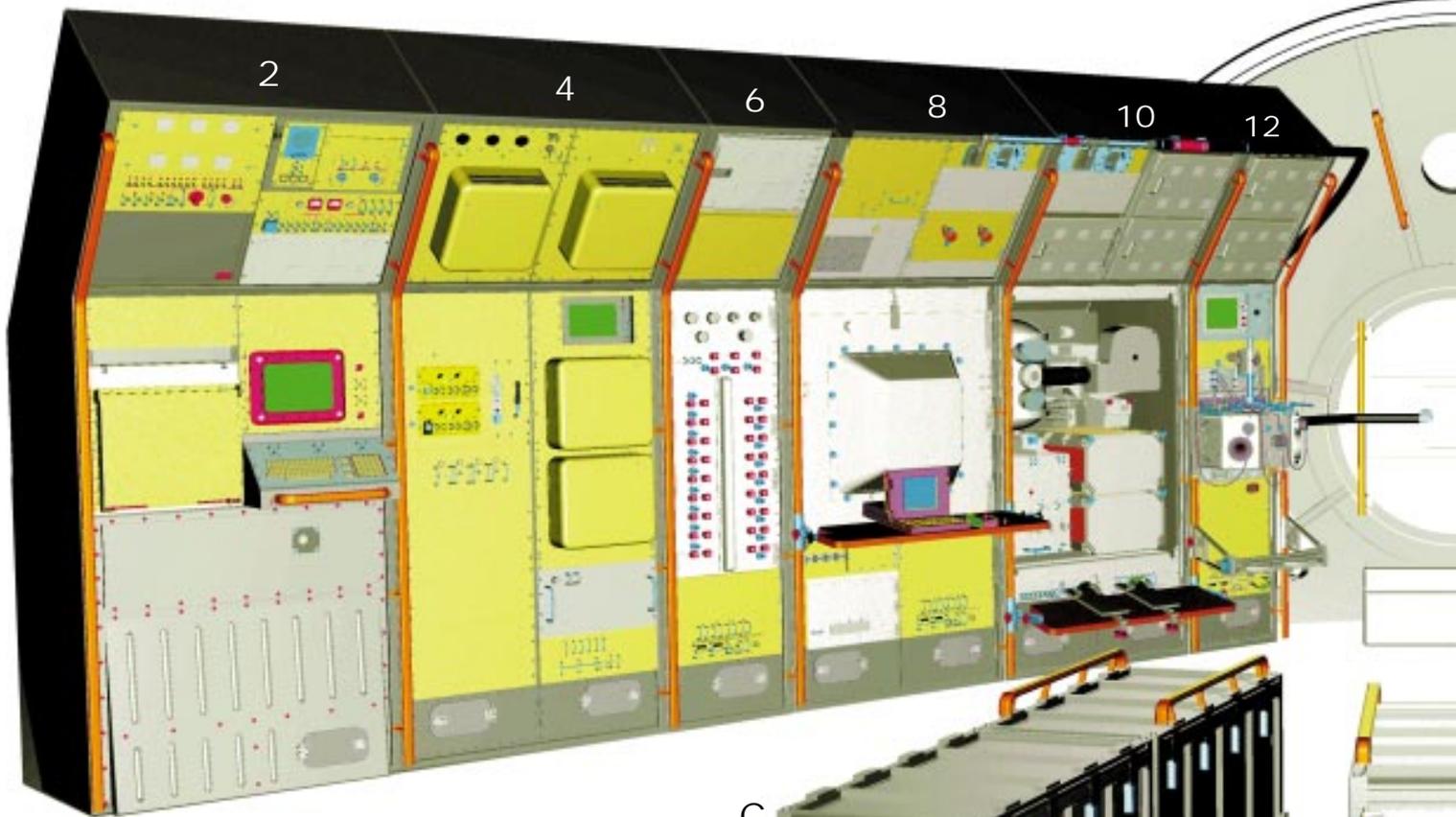
Payload Operations Director:

Mr. Robert P. Little,  
NASA MSFC



For More Information, Contact:  
Public Affairs Office  
National Aeronautics and Space  
Administration  
Washington, DC 20546

# MSL-1 RACK CONFIGURATION



## CENTER AISLE

A: SPACE ACCELERATION MEASUREMENT SYSTEM (SAMS): an electronics package with remote accelerometers placed in three locations in Spacelab to measure accelerations in the 0.01- to 100-Hz range,

C: STOWAGE: composed of center-aisle stowage containers and one middeck locker



## STARBOARD SIDE

### Rack 2

**CONTROL CENTER:** houses the Payload General Support Computer, intercom, and the High Data Rate recorder, as well as monitors for managing data and for operating laboratory systems and certain experiments

### Rack 4

**STANDARD SPACELAB SUBSYSTEMS:** contains a fluid loop pump that supports experiment cooling, video recorders that support all payload data, and an experiment heat exchanger

### Rack 6

**CM-1 FLUID SUPPORT PACKAGE:** contains the Video Cassette Recorder package and the Fluid Supply Package for the Combustion Module-1

### Rack 8

**COMBUSTION MODULE-1 (CM-1):** a facility that accommodates a variety of combustion experiments through the use of experiment-unique chamber inserts

### Rack 10

**DROP COMBUSTION EXPERIMENT (DCE) APPARATUS:** an enclosed chamber in which helium-oxygen fuel mixtures are injected and single droplets are burned

### Rack 12

**MIDDECK GLOVEBOX (MGBX):** a facility that provides a sealed work area, offering a clean working space and minimizing contamination risks to Spacelab and to experiment samples

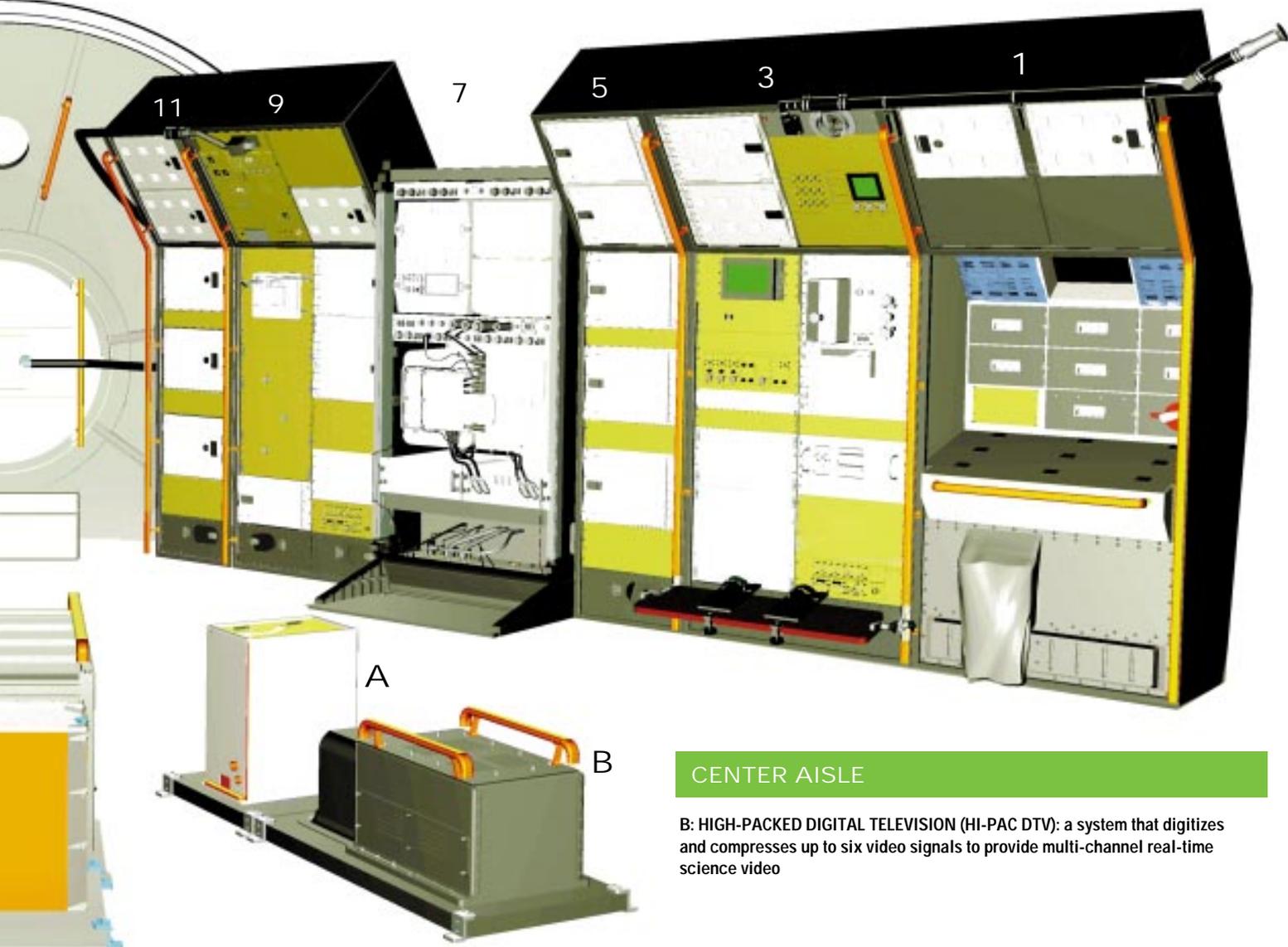
## MIDDECK EXPERIMENTS

PROTEIN CRYSTAL GROWTH WITH THE PROTEIN CRYSTALLIZATION APPARATUS FOR MICROGRAVITY (PCAM)

SECOND GENERATION VAPOR DIFFUSION APPARATUS (VDA-2)

HAND-HELD DIFFUSION TEST CELLS (HHDTCS)

# CONFIGURATION



## CENTER AISLE

**B: HIGH-PACKED DIGITAL TELEVISION (HI-PAC DTV):** a system that digitizes and compresses up to six video signals to provide multi-channel real-time science video

## PORT SIDE

### Rack 11

**STOWAGE:** areas where experiment equipment and samples are stored

### Rack 9

**LARGE ISOTHERMAL FURNACE (LIF):** a vacuum-heating furnace designed to heat large samples uniformly.

### Rack 7

**EXPRESS RACK ASTRO/PLANT GENERIC BIOPROCESSING APPARATUS (Astro/PGBA):** a facility equipped with fluorescent lighting and an atmospheric control system, which supports plant growth for commercial research; mounted in the middeck for launch and landing

**PHYSICS OF HARD SPHERES EXPERIMENT (PHaSE):** allows scientists to investigate the behavior and physical properties of hard colloidal spheres

### Rack 5

**STOWAGE:** areas where experiment equipment and samples are stored

### Rack 3

**ELECTROMAGNETIC CONTAINERLESS PROCESSING FACILITY (TEMPUS):** an electromagnetic levitation facility that allows containerless processing of metallic samples

**MICROGRAVITY MEASUREMENT ASSEMBLY (MMA):** a microgravity monitoring system capable of providing real-time display of accelerations detected by seven sensor heads that measure accelerations in the 0.1- to 100-Hz range in three axes.

**QUASI-STEADY ACCELERATION MEASUREMENT (QSAM) SYSTEM:** an instrument with four rotating sensors designed to detect steady, very low-frequency, residual accelerations between 0 and 0.02 Hz within Spacelab. An additional package with three stationary sensors has an upper bandwidth of 50 Hz.

### Rack 1

**WORKBENCH:** an area equipped with stowage containers, tools, and small equipment for carrying out general activities, such as recording data in logs or preparing for an experiment

