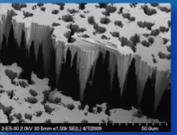




# Materials International Space Station Experiment (MISSE) Science

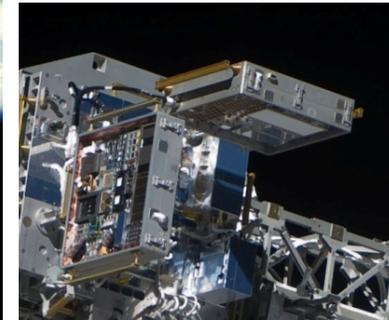
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MISSE 1 being examined during an EVA in January 2003



Glenn Research Center

MISSE 7A & 7B on-orbit with Glenn's MISSE Science experiments

## Objective:

- To fly material experiments on the exterior of ISS to evaluate the long-duration environmental durability of materials for spacecraft applications

## Relevance/Impact:

- Space environment exposure experiments enables:
  - Prediction of material and component lifetimes in space, e.g. MISSE 2 data has had a direct impact on materials design choices for: Operational Land Imager, Global Precipitation Measurement-Microwave Imager, Standard Interface Vehicle & WorldView-2
  - Development of predictive tools, e.g. atomic oxygen erosion yield for polymers
  - Correlation factors between space-exposure & ground-facilities, enabling more accurate in-space performance predictions based on ground-testing, e.g. MISSE data directly impacted EVA decision for Hubble Space Telescope (HST) 5th servicing mission
  - Provides long-duration environmental data to the space community, e.g. 30+ requests for MISSE 2 PEACE data: ARC, GSFC, JSC, Aerospace Corp., AFRL, Ball Aerospace, Boeing, DARPA, Lockheed Martin, SpaceX, United Solar Ovonic LLC., etc.
  - MISSE Science experiments progress the SOA in durability understanding

MRS Bulletin highlights MISSE experiments on the cover & in numerous articles



## Development Approach:

- Conduct post-flight analyses of Glenn's MISSE 1-8 fundamental science experiments
- Publish MISSE based Handbook under the NASA Tech Standards Program
- Develop and publish an Atomic Oxygen Erosion Yield Predictive Tool
- Add MISSE data to environmental durability databases
- Student collaboration

## Project Life Cycle Schedule

Milestones	MISSE Science Experiments	Launch	Return	Reports
MISSE 1 & 2	7 (80 samples)	8/2001	7/2005	2009
MISSE 3 & 4	8 (71 samples)	8/2006	8/2007	2010-2011
MISSE 5	4 (105 samples)	8/2005	9/2006	2011
MISSE 6A & 6B	7 (93 samples)	3/2008	6/2009	2010-2011

Milestones	MISSE Science Experiments	SCR	RDR	PDR	CDR	VRR	Flt Safety	FHA	Launch	Ops	Return	Reports
MISSE 7A & 7B	7 (107 samples)	N/A	N/A	6/2007	6/2008	N/A	N/A	N/A	11/2009	N/A	11/2010+	2012
MISSE 8	1 (40 samples)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11/2010+	N/A	TBD	2013