EXAMPLE MMS WORK BREAKDOWN STRUCTURE 460-REF-0031

1.0 MMS Mission 8/23/02

- 1.1 Project Management
  - 1.1.1 Management
  - 1.1.2 Science Support
  - 1.1.3 Performance Assurance
  - 1.1.4 Project Support
    - 1.1.4.1 Schedule
    - 1.1.4.2 CM
    - 1.1.4.3 Risk Management
    - 1.1.4.4 Special Studies (Sparing)
    - 1.1.4.5 Mission Validation
  - 1.1.5 IV&V
  - 1.1.6 EPO

2.0 System Engineering

- 2.1 Special Studies
  - 2.1.1 Trajectory Analysis
  - 2.1.2 Boom Dynamics
- 2.2 Systems Engineering
  - 2.2.1 Requirements Management & Verification
  - 2.2.2 Specification Development

3.0 Science Development and Support

- 3.1 Science Support
- 3.2 Science Investigations

4.0 Instruments

- 4.1 Instruments – Formulation
- 4.2 Instrument Suite
  - 4.2.1 Management
    - 4.2.1.1 Systems Engr.
    - 4.2.1.2 Interface Support
  - 4.2.2 Plasma
    - 4.2.2.1 Management
    - 4.2.2.2 Science Support
    - 4.2.2.3 Systems engineering
      - 4.2.2.3.1 Thermal Model
      - 4.2.2.3.2 Structural Model
    - 4.2.2.4 Mission Assurance
    - 4.2.2.5 Hardware
      - 4.2.2.5.1 Engineering Model
      - 4.2.2.5.2 Flight
      - 4.2.2.5.3 Ground Support Equipment
    - 4.2.2.6 Software
      - 4.2.2.6.1 Flight
      - 4.2.2.6.2 Ground Test
      - 4.2.2.6.3 Data Processing
    - 4.2.2.7 I & T
      - 4.2.2.7.1 I & T

4.2.2.7.2 Post Delivery Support
4.2.2.7.3 Launch & Early Orbit Support
4.2.2.8 Instrument Ops & DA
4.2.3 Energetic Particle
4.2.3.1 Management
4.2.3.2 Science Support
4.2.3.3 Systems Engineering
4.2.3.3.1 Thermal Model
4.2.3.3.2 Structural Model
4.2.3.4 Mission Assurance
4.2.3.5 Hardware
4.2.3.5.1 Engineering Model
4.2.3.5.2 Flight Units
4.2.3.5.3 Ground Support Equipment
4.2.3.6 Software
4.2.3.6.1 Flight
4.2.3.6.2 Ground Test
4.2.3.6.3 Data Processing
4.2.3.7 I & T
4.2.3.7.1 I & T
4.2.3.7.2 Post Delivery Support
4.2.3.7.3 Launch & Early Orbit Support
4.2.3.8 Instrument Ops & DA
4.2.4 Electric Field
4.2.4.1 Management
4.2.4.2 Science Support
4.2.4.3 Systems engineering
4.2.4.3.1 Thermal Model
4.2.4.3.2 Structural Model
4.2.4.4 Mission Assurance
4.2.4.5 Hardware
4.2.4.5.1 Engineering Model
4.2.4.5.2 Flight Units
4.2.4.5.3 Ground Support Equipment
4.2.4.6 Software
4.2.4.6.1 Flight
4.2.4.6.2 Ground Test
4.2.4.6.3 Data Processing
4.2.4.7 I & T
4.2.4.7.1 I & T
4.2.4.7.2 Post Delivery Support
4.2.4.7.3 Launch & Early Orbit Support
4.2.4.8 Instrument Ops & DA
4.2.5 Magnetometer
4.2.5.1 Management
4.2.5.2 Science Support
4.2.5.3 Systems engineering
4.2.5.3.1 Thermal Model
4.2.5.3.2 Structural Model

4.2.5.4 Mission Assurance
4.2.5.5 Hardware
4.2.5.5.1 Engineering Model
4.2.5.5.2 Flight Units
4.2.5.5.3 Ground Support Equipment
4.2.5.6 Software
4.2.5.6.1 Flight
4.2.5.6.2 Ground Test
4.2.5.6.3 Data Processing
4.2.5.7 I & T
4.2.5.7.1 I & T
4.2.5.7.2 Post Delivery Support
4.2.5.7.3 Launch & Early Orbit
4.2.5.8 Instrument Ops & DA
4.3 Ranging System

5.0 Spacecrafts/Observatories
5.1 Management
5.1.1 Interface Mgt/Definition
5.1.2 Science Support
5.2 Accommodations
5.2.1 Instrument Accommodations (Thermal, etc)
5.2.2 Electrostatically clean Solar Array
5.3 S/C Bus
5.4 I&T
5.5 MO&DA

6.0 Mission Operations (Phase A-D)
6.1 Management
6.2 Mission Analysis
6.3 Simulation and Testing
6.4 Flight Operations

7.0 Launch Vehicle
7.1 Basic
7.2 Mission Unique
7.3 Launch Services

8.0 Contingency
8.1 Project
8.2 Instrument Suite
8.3 Spacecraft
8.4 MO & DA

9.0 MO & DA (Phase E)
9.1 Mission Operations
9.2 Data Analysis