FACT SHEET

Science Goals & Objectives:

▪Overall Goal: Explore the geological, physical, and biological aspects of Europa and search for habitable environments for past or present life.

▪**Objectives**:

▪Study the structure and composition of the surface, near-surface, and interior.

▪Investigate the geologic activities that encompass Europa, and the processes that drives it.

▪Search for traces of past or present life in a habitable environment.

▪**Engineering Goal:**

▪To satisfy the science goals.

▪To design a cost efficient Spacecraft Mission to Europa under $800M PI cost.

▪Design a lander, that will include the telecommunication systems, command data handling system, thermal, propulsion, and power subsystems.

CRETE

Collaborative Research of Europa Through Exploration

Mission Overview:

▪Launch on Atlas V 551 (C3 of 12.8 kg^2/s^2, 4790 kg)

▪ Perform Venus-Earth-Earth Gravity Assist (VEEGA) trajectory

▪Arrival at Jupiter/Europa ; Perform Braking

▪Europa orbit insertion (EOI) in July 2028

▪Initial, circular 200 km altitude orbit, 95° inclination

▪Detach lander and safely land on Europa.

▪Gather data and communicate results.

Key Spacecraft Characteristics:

▪4551 kg wet mass (orbiter + lander)

▪581 kg dry mass for lander (with 30% contingency)

▪709 kg dry mass for orbiter (with 30% contingency)

▪Payload (orbiter + lander):

- ▪Total Mass: 100 kg
- ▪Total Power Required: 173 W

▪ 3 m High Gain Antenna (orbiter)

▪Two-way Doppler at both X-/Ka-band capability and USO for radio science gravity investigation

▪Data rate of ~ 150 kb/s to DSN 34m at Ka-band

- ▪Up to 7.3 Gb/day during Europa Science phase

▪Data rate of ~ 180 uplink from lander to orbiter.

▪Mono-propellant (MR-80B) Lander

▪Bi-propellant (HiPAT) Orbiter

▪Rad-hardened electronics

▪ 2 ASRG + Battery (Orbiter + Lander)

▪9-year lifetime

Mission Management and Participating Organizations

UAH THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

LANDER AND ITS SUBSYSTEMS

DWITI PATEL
PROJECT MANAGER

COLLEGE OF CHARLESTON FOUNDED 1770 CHARLESTON, SOUTH CAROLINA

SCIENCE

CAMERON SELF
PRINCIPLE INVESTIGATOR

BOB JONES or AUSTIN DECATUR
PAYLOAD

ESTACA ÉCOLE D'INGENIEURS

ORBITER AND ITS SUBSYSTEMS

FLORENT COACHIN
PROJECT MANAGER

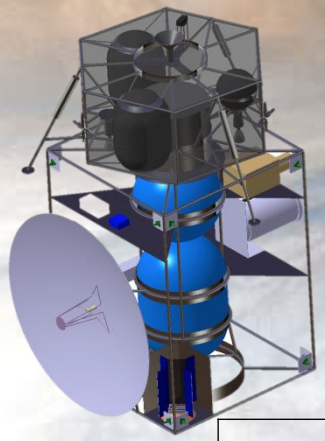
SPARKMAN HIGH SCHOOL ESTABLISHED 1956

MAGNETOMETER BOOM

MARY ROBINSON
PROJECT MANAGER

Lander Instruments

Instrument	Mass (kg)	Power (W)	Purpose
Raman	3	18	Study vibrational, rotational, and other low-frequency modes in a system.
Thermal Emission Spectrometer	3	6	Collect Infrared Data and Measurements
Mass Spectrometer	3	5	Measure mass to charge ratio of charged particles in determining masses and elemental composition of a molecule
Panoramic Camera	1	4	Imaging of local environment.
TOTAL	10	33	



CRETE

Cost in Millions	
Orbiter	$664
Lander	$616
Launch Vehicle Upgrades	$68
NEPA	$22
Total	$1,370
Total PI Mission Cost Cap	$800
Over Budget	$570
% Over Budget	71%

Orbiter Instruments

Instrument	Mass (kg)	Power (W)	Purpose
Ice Penetrating Radar	26	45	Characterize the structure and composition of the crust down to 5km. Aid in determining interior structure and processes.
Laser Altimeter	5	15	High resolution mapping tool, determine the origin of various surface geological structures. Aid in determining interior processes.
Nephelometer	5	12	Measures the amount of particulate matter in the air.
Magnometer	3	4	Study the induced magnetic field.
UV Spectrometer	6	5	Plume composition and regional mapping to surface vents. Detect and characterize biotic and prebiotic compounds.
Thermal Emission Spectrometer	3	6	Collect Infrared Data and Measurements
IR Spectrometer	16	25	Composition of organic and inorganic surface materials, effects of radiation sputtering, nature of exogenic materials, Presence and characterization of biotic and prebiotic compounds.
Narrow Angle Camera	11	14	Take science pictures.
TOTAL	72	120