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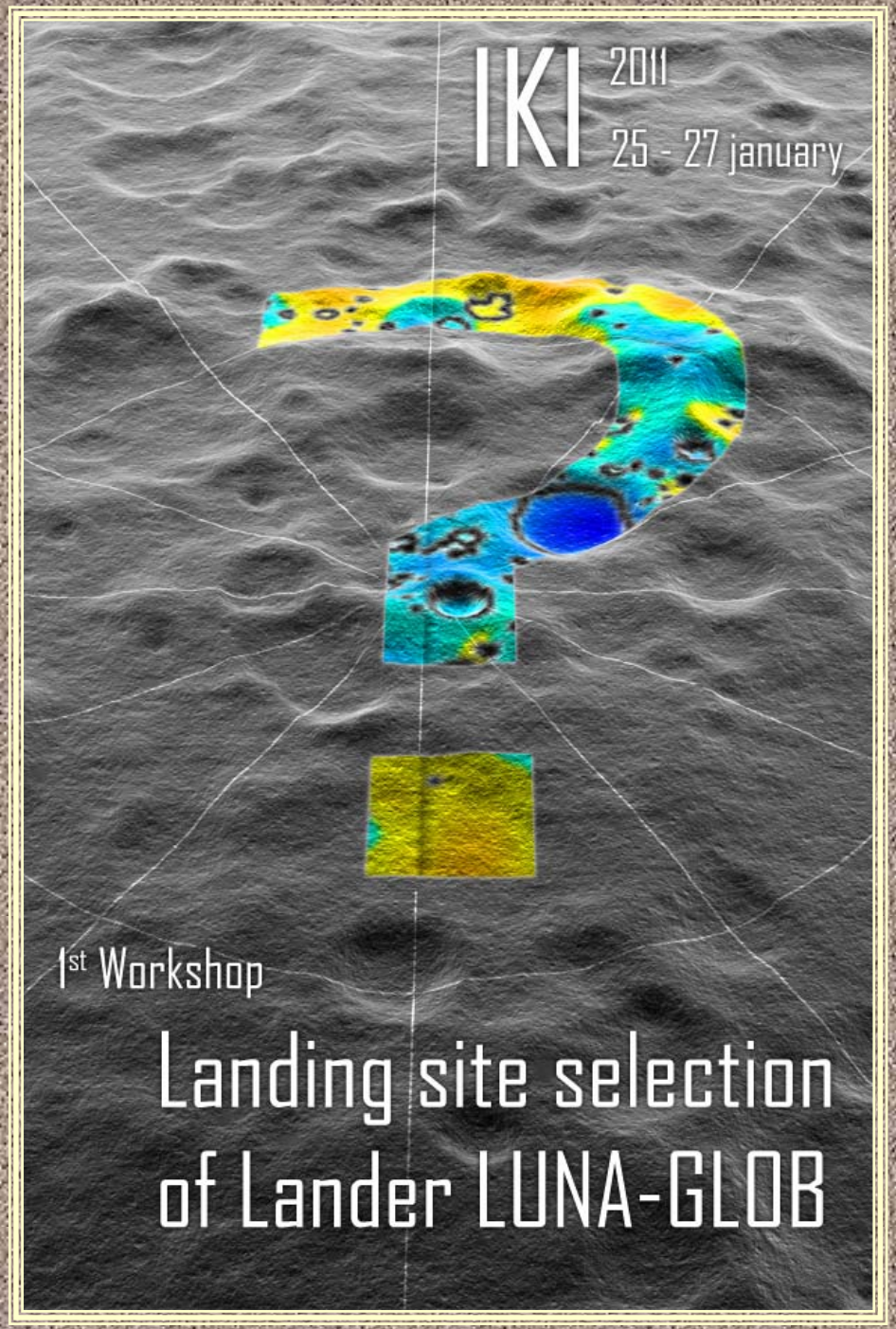


Welcome, All Participants!

Some practical comments for this meeting:

(1) Registration, please

(2) Goal of the meeting is creation of "short list" of candidates for Luna-Glob lander for both lunar poles

(3) This "short list" will be created at joint discussion in afternoon session of January 27th

(4) It is bi-language meeting, we will translate all talks; all presentations could be available

(5) Pizza service is suggested to all participants for lunch, cost is 100 RUB per person

(6) Tea and coffee are available during the meeting, no special coffee brakes

(7) Please, contact with Aleksey Varenikov today for arrangement of transportation service to airport

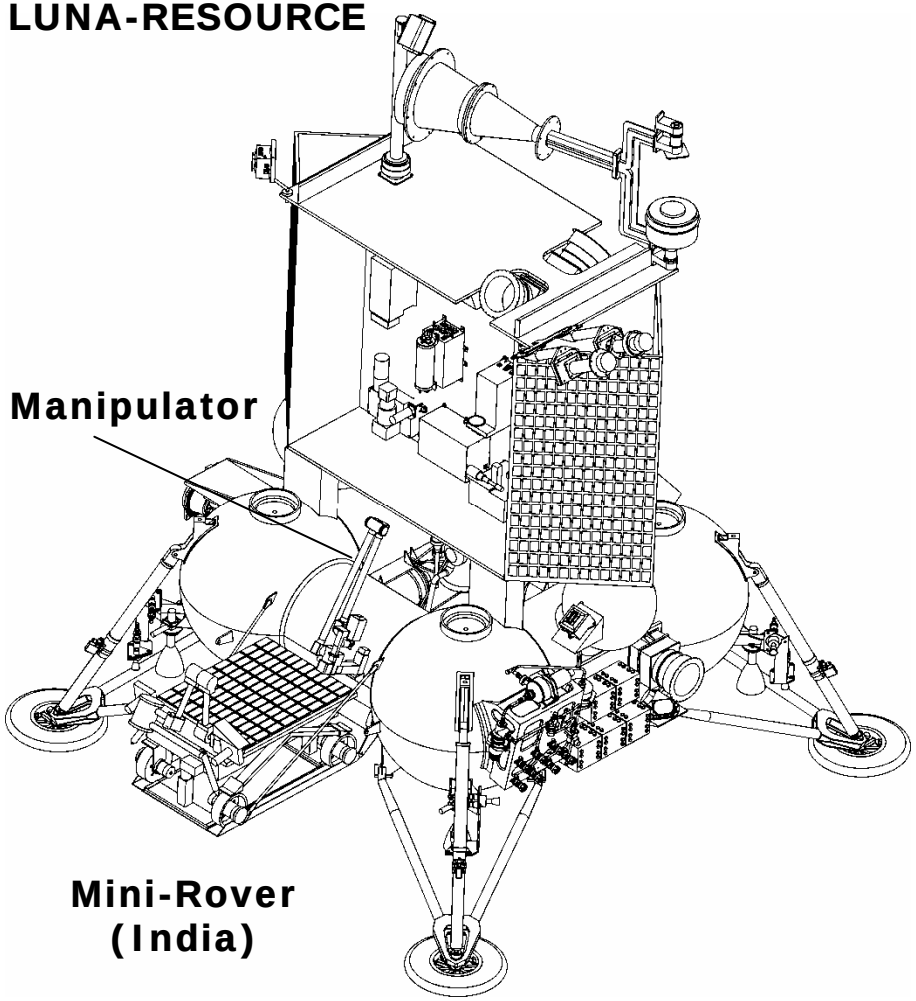
(8) All participants are invited to two non-official evening events with buffet tables after today afternoon (for greetings) and tomorrow afternoon (for non-official discussions)

Overview of science experiments onboard Landers of Luna-Glob and Luna-Resource missions and process of landing site selection

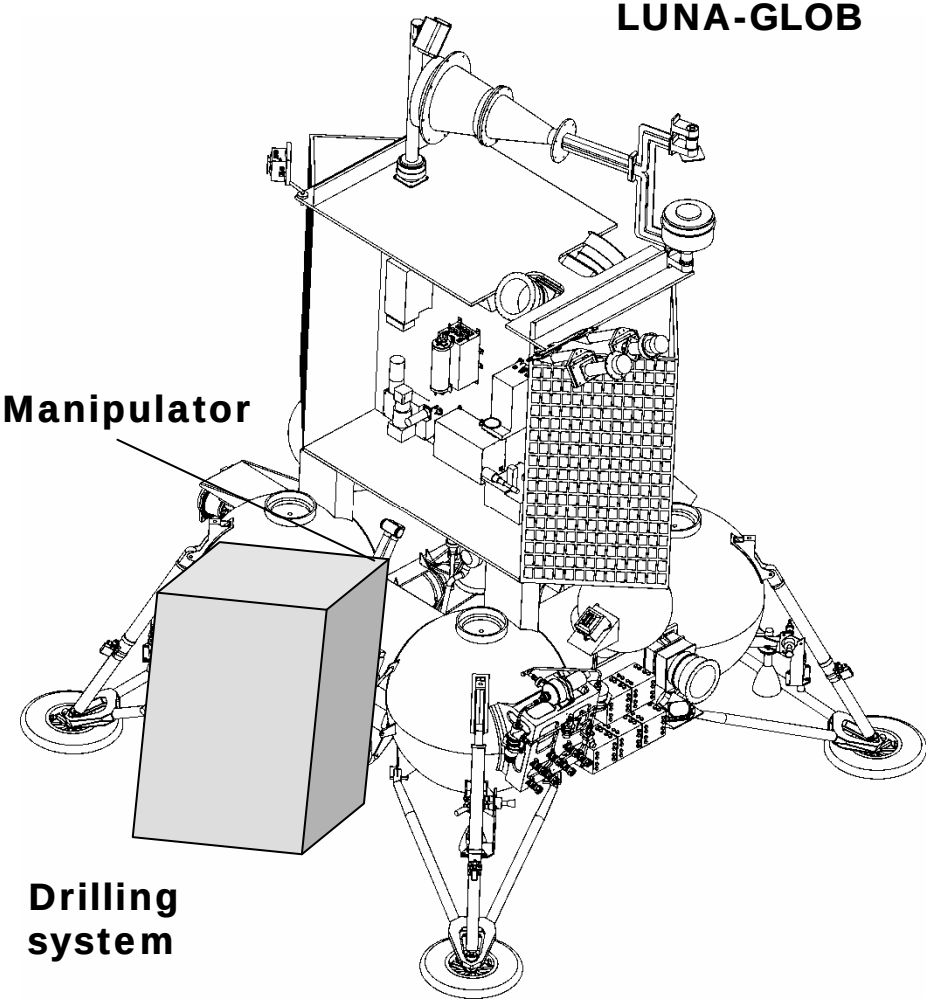
I.G.Mitrofanov

Landers configuration

LUNA-RESOURCE



LUNA-GLOB



Main Scientific Tasks of Landers:

TASK 1: Investigation of composition of subsurface and processes of its formation at Lunar Poles (volatiles, H_2O, layering, etc.)

TASK 2: Investigation of interaction between cosmic plasma and surface and processes of exosphere at Lunar Poles (solar wind, neutrals, dust)

Main Criteria for payload Selection

1) Correspondence to TASKS 1 or 2

2) High TDR Level $\geq$ 6

The 1st landing site selection workshop of Luna-Glob

Instrument	Measurements/Operations	Mass (kg)	PI
Navigation			
Radio-Beacon	Radio signal with good stability	1.1	A.S.Kosov, IKI
Instruments for remote studies of regolith on Manipulator			
TV for Field of Operations	Imaging of Field of Operation with Pointing Capability	0.5	A.V.Bondarenko, IKI
LIS_IR	IR spectra of minerals	1.0	O.I.Korablev, IKI
Instruments for analysis of regolith served by Manipulator			
Gas Analytic Complex	Analysis of volatiles content and isotopic ratios	10.4	M.V.Gerasimov, IKI and Vernadsky Institute +Bern University (Switzerland)
LASMA	Laser mass-spectrometer	2.6	G.G.Managadze, IKI +Bern University (Switzerland)
Instruments for remote sensing			
Optical Spectrometer-Imager	Optical imaging of minerals with UF exitation	0.5	A.N.Lipatov
ADRON	Active neutron and gamma-ray analysis of nuclei composition	6.7	I.G.Mitrofanov, IKI
Radiometer-Thermometer	Measurements of temperature of subsurface regolith	0.5	D.P.Skulachev, IKI
Contact Thermometer	Measurements of temperature of regolith on surface and in drilling hole (for L-G only)	0.4	L.P.Moskaleva, Vernadsky Institute
PmL	Measurements of dust	1.5	G.G.Dolnikov, IKI
LINA(G) and ARIES(R)	Measurements of plasma and neutrals	3.8	O.L.Vaisberg, IKI+ Swedish Institute of Space Physics
Seismometry			
SEISMO	Measurements of seismic activity	1.0	A.B.Manukin, Institute of Physics of Earth

Radio-Beacon Transmitter

Two transmitters X and K band 0.2 Wt

Frequency stability 5 x 10^{-13} for <100 s or 1 x 10^{-13} for <10^3 s

Flight prototype for Phobos-Soil-Return mission

Science Task 1:

Study of internal motions of the Moon by the phase-referencing method with support of ground radio telescopes for investigations of internal structure of the Moon

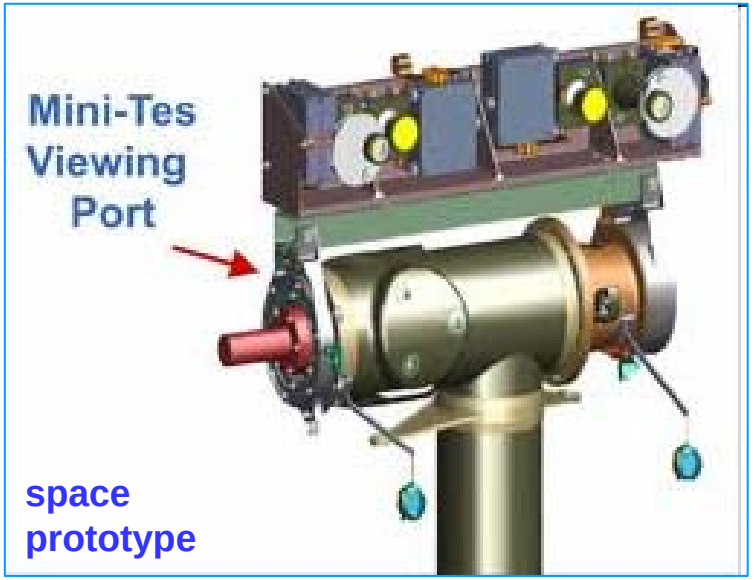
Science Task 2:

Study of relative motion between Lander and Orbiter of Lunar-Glob for investigation of lunar gravity field

Service Task:

To provide radio-beacon service for future landers and orbiters

LIS – Lunar IR Spectrometer



Spectral range 1.4 – 3.5 microns

Spectral resolution 15 – 25 nm

Field of View about 1°, or 17 cm at 10 m

Science Task 1:

Measurements of OH and H_2O content in polar regolith on the surface and within a shallow subsurface

Science Task 2:

Testing for daily variations of hydratation and for decay of hydratation after removing of the upper-most layer

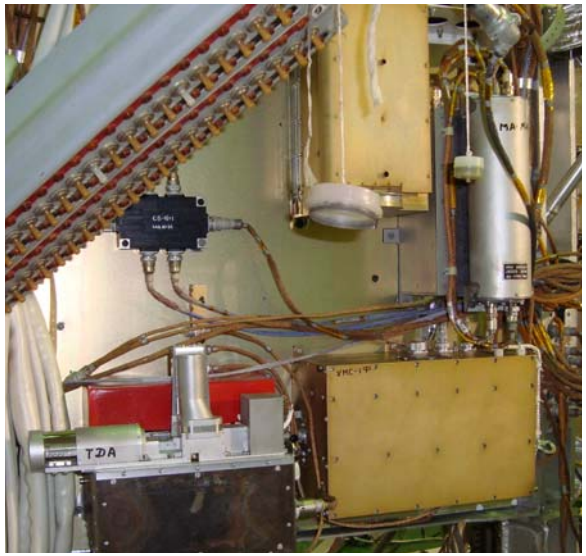
Gas Analytic Complex

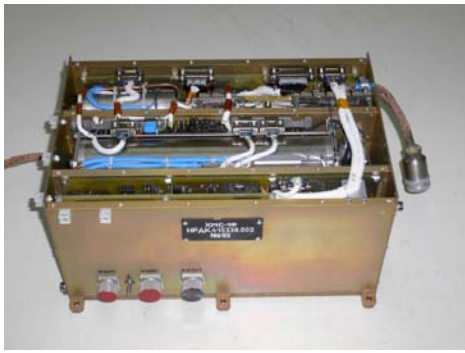
- Thermal Differential Analyzer

- Gas Chromatograph

- Mass Spectrometer (Switzerland)

Instrument for Phobos-Soil-Return, as Flight prototype





Science Task 1:

Measurements of volatiles in lunar regolith from the surface and within a shallow subsurface

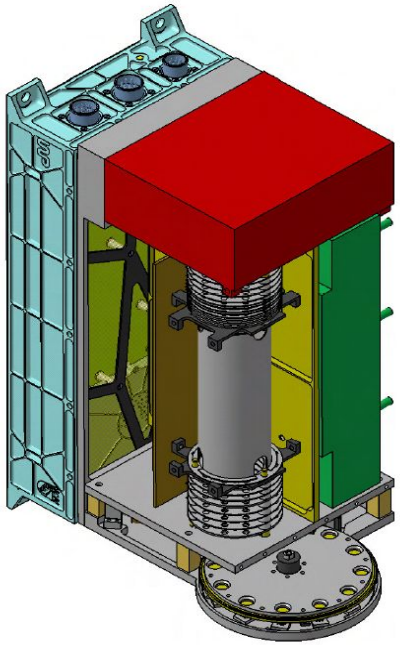
Science Task 2:

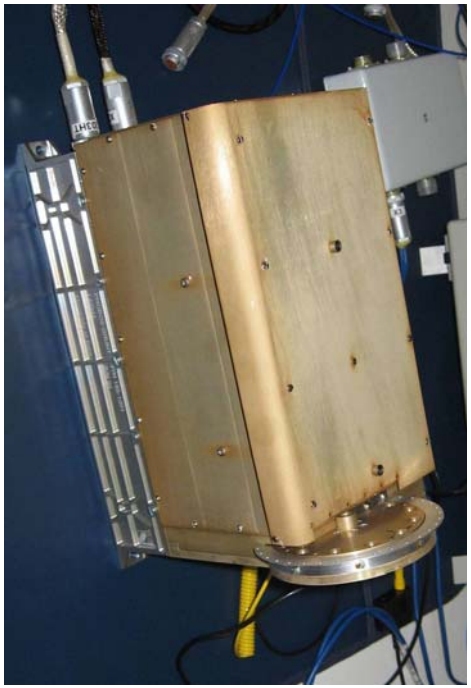
Testing for isotopic ratios of particular elements of volatiles in lunar regolith

LASMA – Laser Mass Analyzer

- Laser-evaporation system of testing samples

- Mass Spectrometer





Instrument for Phobos-Soil-Return, as flight prototype

Science Task 1:

Measurements of volatiles in lunar regolith from the surface and within a shallow subsurface

Science Task 2:

Testing for isotopc ratios of particular elements of volatiles in lunar regolith

Optical Spectrometer-Imager

Imaging of surface at three optical spectral bands

Photometry of surface at 9 narrow spectral bands from 278 to1052 nm

UV-luminescent analysis

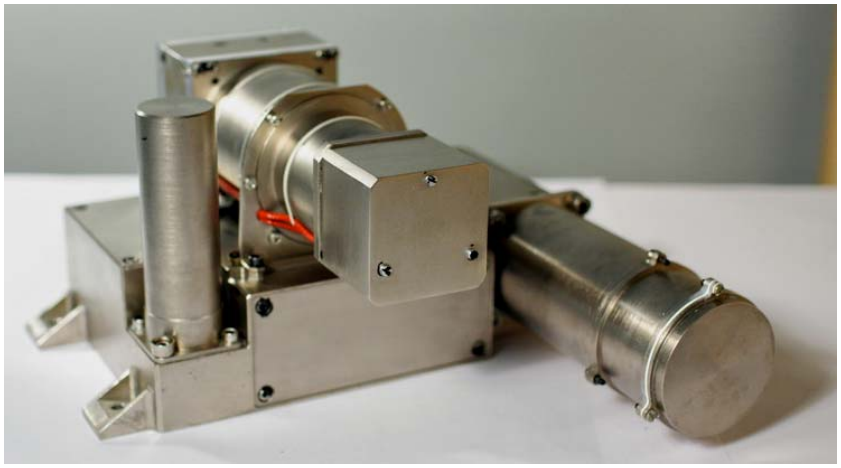
Science TASK 1:

Mineralogical composition of polar regolith and separate stones on the surface and within a shallow subsurface

Science/Service TASK 2:

Imaging of Field of Manipulator Operations in 3 optical spectral bands

ADRON



- Pulsing neutron generator to study composition of subsurface regolith

- Detector of post-pulse neutrons

- Detection of post-pulse gamma-rays

Instruments for Phobos-Soil-Return and NASA MSL, as prototype

<u>Science TASK 1:</u>

Measurements of neutron post-pulse emission to study content of hydrogen and layering structure of shallow subsurface

<u>Science TASK 2:</u>

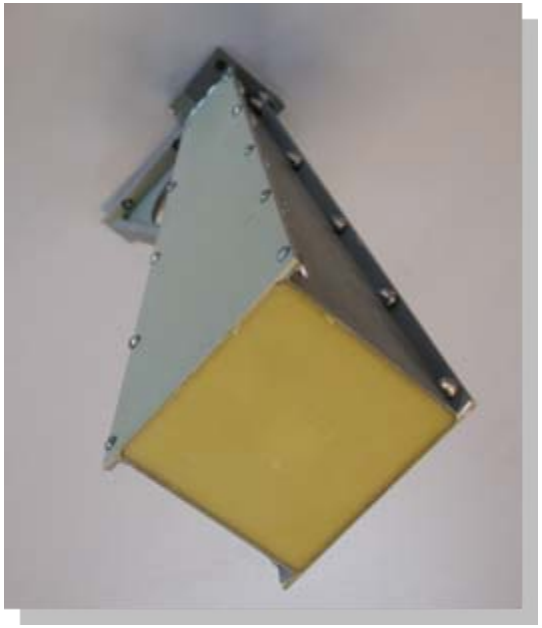
Measurements of gamma-rays post-pulse emission to study composition of regolith and layering structure of shallow subsurface

Radiometer-Thermometer

- Measurements of radiation from subsurface at 2.5, 3.3 and 5.0 cm

- 1 meter depth temperature variation with 15 cm discreetness and accuracy about 1 degree

Instrument for Relict project is used, as flight prototype



Science TASK 1:

Measurements of diurnal and annual variations of subsurface temperature

Science TASK 2:

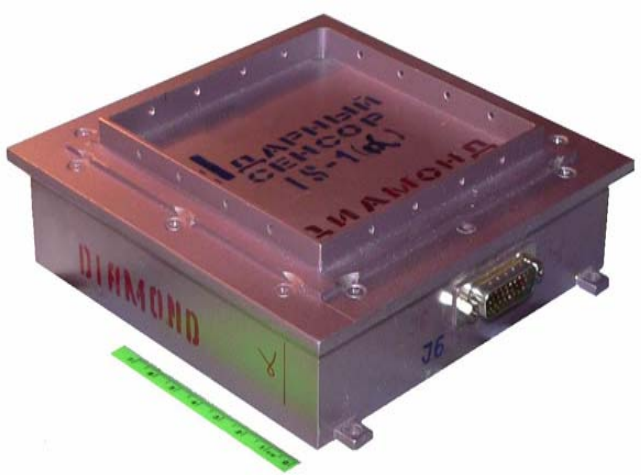
Measurements of complex dielectrical parameter of regolith

PmL – Dust Detector

- Measurements of impacts from dust grains with accuracy of 10^{-12} – 10^{-14} N sec

- Measurements of charge about 10^{-12} Qulomb

Instrument for Phobos-Soil-Return mission is used, as prototype



Science TASK 1:

Measurements of flux, distribution of mass and distribution charge of lunar dust

Science TASK 2:

Detection of micro-meteorites and secondary particles of regolith

ARIES – Panoramic energy-mass spectrometer of ions

- Measurements of ions 1 - 100 amu of solar wind 3 and exosphere 3 eV – 5 keV

- Directional measurements of of impact particles 7.5° x 15°

Instrument for Phobos-Soil-Return mission is used, as prototype

Science TASK 1:

Interaction of solar wind with lunar surface at poles

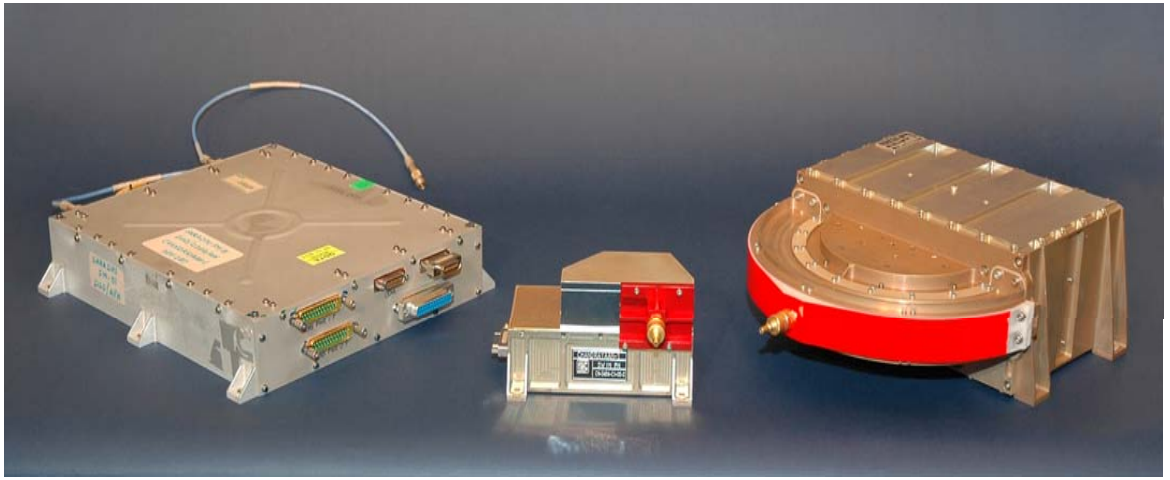
Science TASK 2:

Creation and transport of charged particles in lunar exosphere

LINA – Detector of charge particles and neutrals

- Measurements of ions <40 amu of solar wind 10 eV – 15 keV

- Measurements of neutral particles 1 – 56 amu with energy 10 eV – 3.2 keV



Instrument for Phobos-Soil-Return mission is used, as prototype

<u>Science TASK 1</u>:

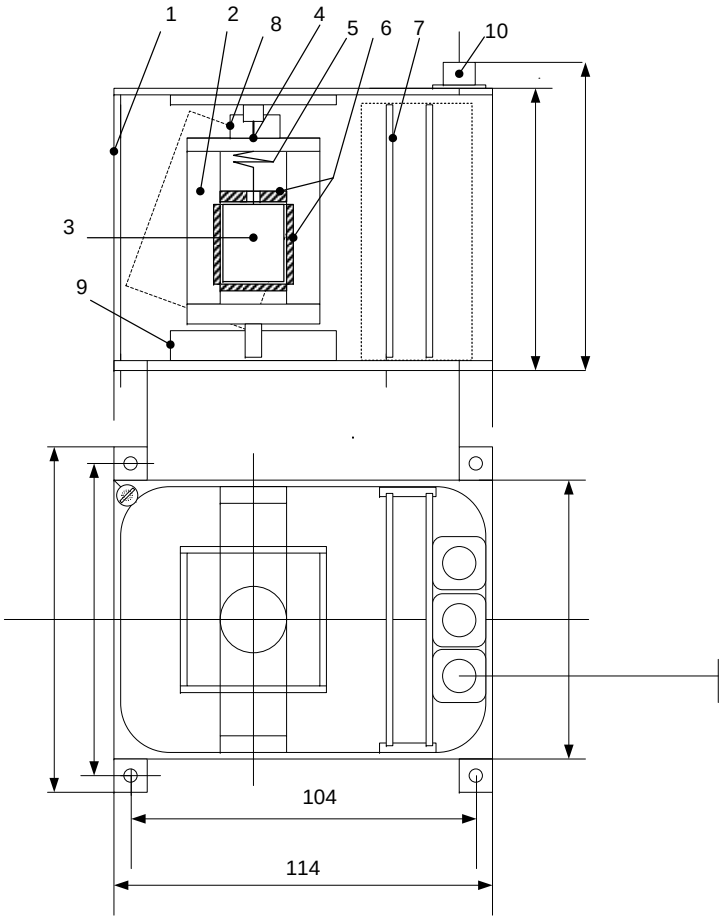
Interaction of solar wind with lunar surface at poles

<u>Science TASK 2:</u>

Creation and transport of charged and neutral particles in lunar exosphere

SEISMO-LG – Monitor of seismic activity

- Measurements of seismic vibrations of surface at landing site



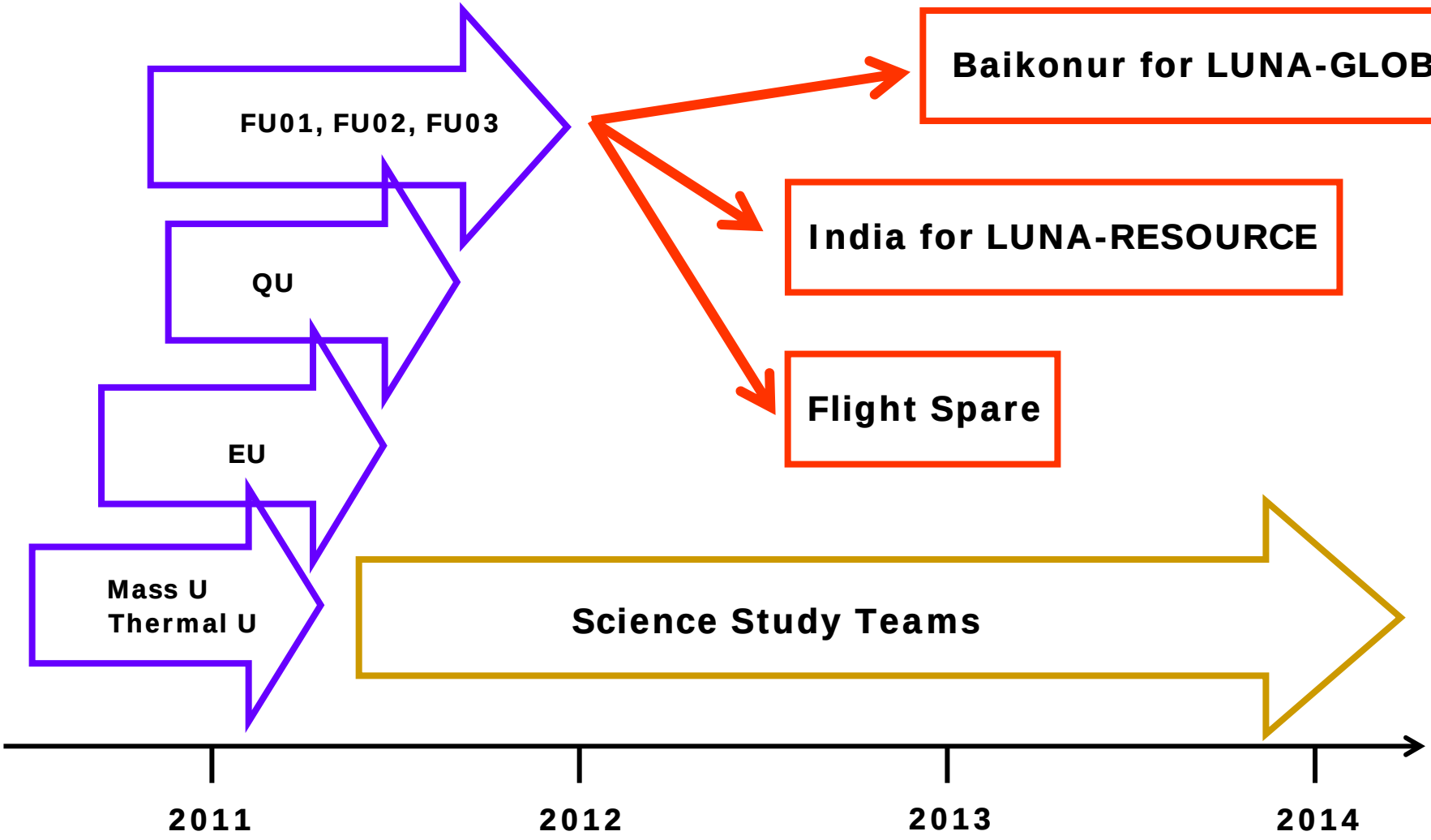
Science TASK 1:

Measurements of lunar seismic activity at lunar poles

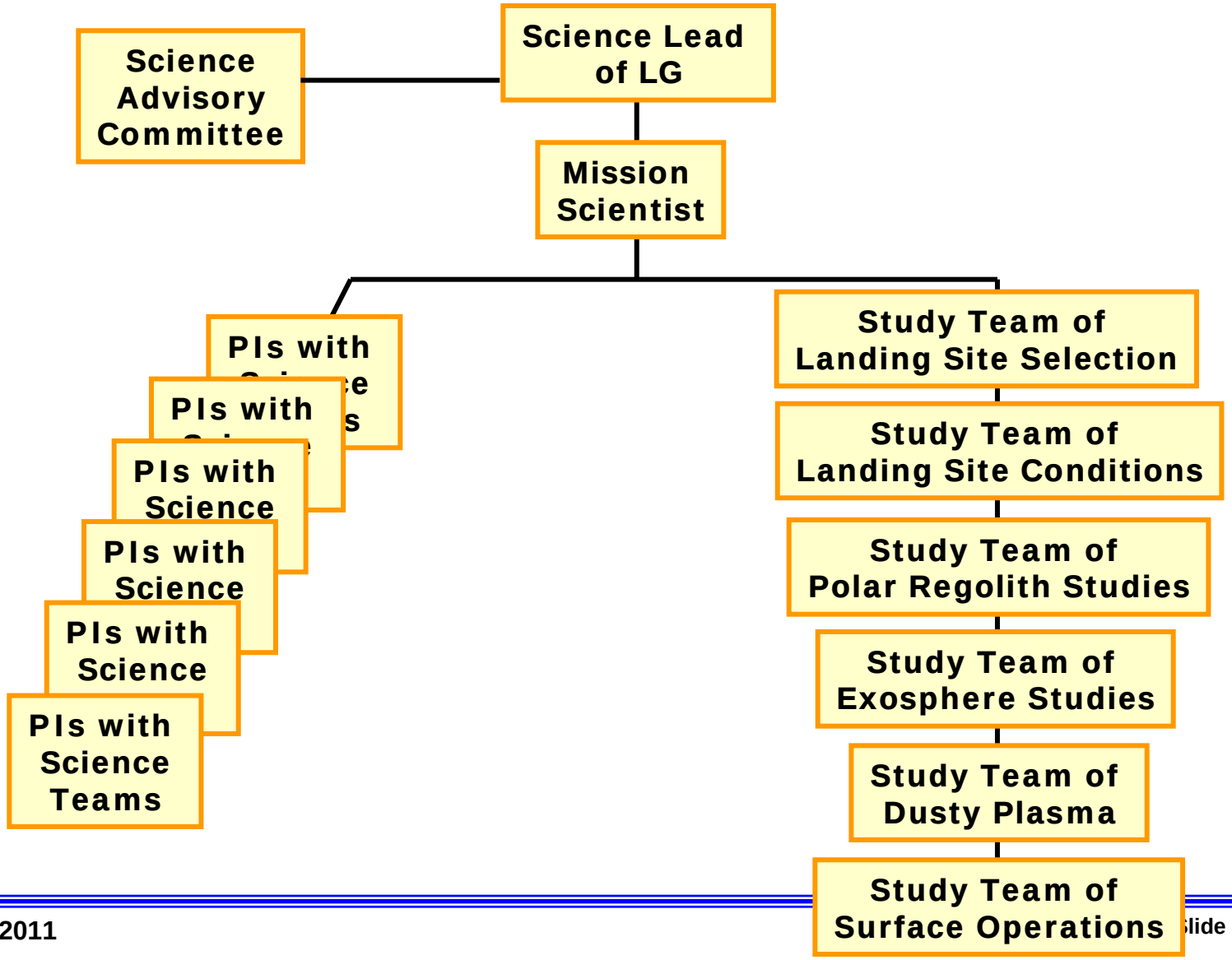
Science TASK 2:

Participation on Lunar Network mission for study of lunar interior

Strategy and time of missions implementation (Landers)



Structure of science program of lander of Luna-Glob



Tasks of Study Team of landing site selection

1. Pre-landing operations and landing conditions
2. Surface characterization and risk assessment for landing sites
3. Thermal and illumination conditions of landing sites
4. Surface operations program for landing sites
5. Long-term mission scenario for landing sites

F I R S T A N N O U N C M E N T

International Conference

"Lunar science from Luna-Glob and Luna-Resource"

with the special Session of

the 2nd Workshop "Landing site selection for Luna-Glob Lander"

Institute for Space Research
Moscow
May-June 2011

Goal of the 2nd Workshop:
Definition of 1st and spare landing sites candidates for Lander of "Luna-Glob" Mission

Program of the 2nd Workshop:
Results of detailed studies of candidates from "short list" – Engineering characterization of sites of the "short list" – programs of investigations with selected instruments of the Lander – definition of final selected sites

Applications
for participation with Abstracts of presentations should be submitted to
Igor Mitrofanov (imitrofa@space.ru) or Maxim Litvak (mlitvak.iki@gmail.com)
with deadline of March 15, 2011

Workshop Organizers:
Academician Lev Zelenyi, Scientific Lead of "Luna-Glob" mission
Dr. Igor Mitrofanov, Mission Scientist of Lander of "Luna-Glob"