

# INTERNATIONAL LUNAR ORBITER FLEET - A COMPARATIVE DATABASE - MAY 2004

ORBITER MISSION	COUNTRY	SPACE AGENCY	PRIME DEVELOPER / CONTRACTOR	PROJECT MANAGER / DIRECTOR	HEAD PROJECT SCIENTIST	ESTIMATED COST (US\$)	LAUNCH DATE (PROJECTED)	ORIGINAL LAUNCH DATE	LAUNCH VEHICLE	LAUNCH LOCATION	LAUNCH WEIGHT	PAYLOAD WEIGHT	DIMENSIONS
<b>SMART-1</b> (Small Missions for Advanced Research and Technology)	Europe	European Space Agency	Swedish Space Corporation	Giuseppe Racca	Bernard Foing	\$131,164,000 (110M in 2000-2003 Euros)	27-Sep-03	Oct-02 - Oct-03	Ariane-5	Guiana Space Center, Kourou, French Guiana	366.5 kg	19 kg	one cubic meter, 14-m solar panels
<b>TrailBlazer</b> Lunar Orbiter	United States of America	None (Private - TransOrbital)	TransOrbital, Inc.	Paul Blasé (CTO)	None	<\$20,000,000 (includes Dec 2002 engineering launch)	NET Dec-04	2001	Dnepr	Baikonur Cosmodrome	~415 kg	>10 kg	Octagonal prism with 93.2 cm d, 120.6 cm w, 237.4 cm l
<b>Lunar-A</b> Lunar Exploration Satellite	Japan	Japan Aerospace Exploration Agency	Space Science Research Division of JAXA	Takashi Nakajima	Unknown	>\$173,897,292 (19.2B Yen)	2005	Early 1997	M-5-2	Kagoshima Space Center	540 kg	>26 kg (weight of 2 penetrators)	Cylinder with 2.2 m maximum d, 1.7 m h, 3.8-m solar array
<b>SELENE-A</b> (SELenological and Engineering Explorer)	Japan	Japan Aerospace Exploration Agency	Space Science Research Division of JAXA	Yoshisada Takizawa	Unknown	\$373,891,008 (41.3B Yen)	2006	2004	H-2A	Tanegashima Space Center	2,885 kg (1,720 kg dry)	~270 kg	2.1 x 2.1 x 4.2 m (Subsats: 1 x 1 x .65)
<b>Chang'e-1</b>	People's Republic of China	China National Space Administration	CNSA	Luan Enjie (Sun Jiadong, Chief Architect)	Ouyang Ziyuan	\$170,000,000 (1.4B Yuan)	Dec-06	2007	Long March 3A	Xichang Space Launch Center, Sichuan	2,350 kg	130 kg	Cylinder (measurements undisclosed)
<b>Chandrayaan-1</b>	India	India Space Research Organization	Physical Research Laboratory / ISRO Satellite Center	Mylswamy Annadurai	J.N. Goswami	\$100,000,000 (Rs 386 Crore - 100 for Deep Space Network Establishment)	NLT 2007	2008	modified Polar Satellite Launch Vehicle (PSLV)	Satish Dhawan Space Centre, Sriharikota	1,050 kg (523 kg dry)	55 kg	1.5 meter cuboid
<b>Lunar Reconnaissance Orbiter</b>	United States of America	National Aeronautics and Space Administration	Goddard Space Flight Center	James Garvin (NASA Lead Scientist for Moon and Mars)	TBD	<\$120,000,000	NLT Dec-08	Same	Delta 2	Kennedy Space Center, Cape Canaveral	TBD	<120 kg	TBD

# INTERNATIONAL LUNAR ORBITER FLEET - A COMPARATIVE DATABASE - MAY 2004

ORBITER MISSION	INSTRUMENTS/PAYLOAD	ENTERS LUNAR ORBIT	BEGINS LUNAR SCIENCE OPERATIONS	DURATION	ORBIT	FINAL OPERATION ALTITUDE	MISSION OBJECTIVES	WEBSITE	PROJECT MANAGER CONTACT
<b>SMART-1</b>	Visible/near infrared Advanced Moon micro-Imager (AMIE) supporting Laserlink, On Board Autonomous Navigation (OBAN) investigations; Compact Imaging X-ray Spectrometer (D-CIXS) and X-ray Solar Monitor (XSM) demos; infrared spectrometer (SIR); plasma diagnostic experiments (EPDP and SPEDE); deep space X-Ka transponder (KaTE); radio science (RSIS)	Nov/Dec 2004	Jan/Feb 2005	>6 months	Polar Elliptical	300 km - <4,000 km	Test solar electric propulsion engine, determine presence of water-ice at south pole, conduct crust/composition studies to test current formation theories, investigate way Moon wobbles, take color images of lunar surface, conduct mineralogical mapping, study solar X-ray emission	<a href="http://sci.esa.int/science/www/object/index.cfm?fobjectid=33593">http://sci.esa.int/science/www/object/index.cfm?fobjectid=33593</a>	Giuseppe.Racca@esa.int
<b>TrailBlazer</b>	Two high-resolution video cameras and lenses: one medium field-of-view for lunar surface mapping and one narrow field-of-view for high-resolution imaging of specific targets; high data-rate X-band transmitter with narrow-beam parabolic antenna	5-8 days after launch	previous to arrival	3-6 months	Circular	1st phase: 50 km; 2nd phase: 10 km	Photograph and videotape LV-spacecraft separation, Earth, Moon, EarthRise, Apollo / Russia landing sites and "barnstorming;" map entire surface; deliver commercial and scientific projects and experiments to lunar orbit; deposit personal items on surface	<a href="http://www.transorbital.net/TB_mission.html">http://www.transorbital.net/TB_mission.html</a>	pblase@transorbital.net
<b>Lunar-A</b>	Two penetrators with short-period seismometers, accelerometers, temperature sensors, heat flow/thermal conductivity probes, tiltmeters; monochromatic camera	~1 year after launch	upon arrival	>12 months	Near-Circular (Elliptical to drop penetrators)	200 km (40 km to drop penetrators)	Image lunar surface, monitor Moonquakes, measure near-surface thermal properties and heat flux, study core and interior structure	<a href="http://www.jaxa.jp/missions/projects/sat/exploration/lunar_a/index_e.html">http://www.jaxa.jp/missions/projects/sat/exploration/lunar_a/index_e.html</a>	nakajima.takashi@jaxa.jp
<b>SELENE-A</b>	Rstar (relay sat), Vstar (VLBI sat), high-definition terrain TV camera, X-ray and Gamma-ray spectrometers, multi-band imager, spectral profiler, lunar radar sounder, laser altimeter, differential VLBI radio source, lunar magnetometer, charged particle spectrometer, plasma analyzer, radio science instrument, plasma imager	5 days after launch	upon arrival	At least 1 year	Circular Polar (Subsats: elliptical)	100 km	Study Moon's origin, evolution and tectonics (elemental and mineral composition, geography, surface and sub-surface structure), measure gravitational field, conduct observation, study magnetic field, study Earth's ionosphere	<a href="http://www.jaxa.jp/missions/projects/sat/exploration/selene/index_e.html">http://www.jaxa.jp/missions/projects/sat/exploration/selene/index_e.html</a>	takizawa.yoshisada@jaxa.jp
<b>Chang'e-1</b>	CCD camera, imaging spectrometer, laser altimeter, X/Gamma-ray spectrometer, Shincou 4 (microwave locator/meter), solar high-energy-particle detector, low-energy-ion detector	8-9 days after launch	upon arrival	>12 months	Circular Polar	200 km	Conduct 3D mapping, measure soil properties (14 elements), gauge thickness/depth of lunar soil, probe space environment between Moon and Earth, measure lunar solar radiation	<a href="http://www.cnsa.gov.cn">http://www.cnsa.gov.cn</a> (no specific site)	cnsa@cnsa.gov.cn
<b>Chandrayaan-1</b>	Terrain Mapping stereo Camera (TMC), Hyper Spectral Imager (HySI), Lunar Laser Ranging Instrument (LLRI), collimated Low Energy X-ray spectrometer (LEX), Solar X-ray Monitor (SXM), High Energy X-ray/Gamma-ray detector/spectrometer (HEX), 15 kg out-of-agency payload TBD	5.5 days after launch	2 weeks after arrival	2 years	Circular Polar	100 km	Complete high resolution 3D mapping of topographical features; conduct mineralogical mapping and elemental chemical mapping (helium-3 search); search for water-ice (mainly at poles); observe X-ray spectrum >10 keV and stereographic coverage; inspire youth; gain experience for further India Moon missions	<a href="http://www.isro.org/chandrayaan-1/announcement.htm">http://www.isro.org/chandrayaan-1/announcement.htm</a>	madurai@isac.ernet.in
<b>Lunar Reconnaissance Orbiter</b>	TBD (Possibly: lidar altimeter, collimated neutron imager, collimated HEND or LP NS, INSAR, bolometer "imager," MOC, MARCI and/or CTX class imager)	TBD	TBD	At least 1 year	Circular Polar	30-50 km	Conduct global hydrogen mapping, determine global geodetic topography with emphasis on locating safe future landing sites (especially polar), determine level of radiation in lunar orbit, test radiation shielding techniques, temperature mapping and surface imaging of polar shadowed regions, identify putative near-surface water ice in polar cold traps, characterize polar lighting environment	<a href="http://centauri.larc.nasa.gov/LRO/">http://centauri.larc.nasa.gov/LRO/</a>	james.b.garvin@nasa.gov