

INTERNATIONAL LUNAR ORBITER FLEET - A COMPARATIVE DATABASE - JULY 2005

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
SMART-1 (Small Missions for Advanced Research and Technology)	Europe	European Space Agency	Swedish Space Corporation	Giuseppe Racca (Transfers to LISA Pathfinder 1 Apr '05)	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
TrailBlazer 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-05	2001	Dnepr	Baikonur Cosmodrome	~415 kg	>10 kg	Octagonal prism with 93.2 cm d, 120.6 cm w, 237.4 cm l
Lunar-A Lunar Exploration Satellite	Japan	Japan Aerospace Exploration Agency	Space Science Research Division of JAXA	Takashi Nakajima	Hitoshi Mizutani (Retiring Apr '05)	>\$173,897,292 (19.2B Yen)	2006	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
SELENE (SELenological and Engineering Explorer)	Japan	Japan Aerospace Exploration Agency	Space Science Research Division of JAXA	Yoshisada Takizawa	Hitoshi Mizutani (Retiring Apr '05)	\$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)
Chang'e-1	People's Republic of China	China National Space Administration	CNSA	Luan Enjie (Sun Jiadong, Chief Architect)	Ouyang Ziyuan	\$169,153,634 (1.4B Yuan)	Dec-06	2007	Long March 3A	Xichang Space Launch Center, Sichuan	2,350 kg	130 kg	Cylinder (measurements undisclosed)
Chandrayaan-1 (1st Journey to Moon)	India	India Space Research Organization	Physical Research Laboratory / ISRO Satellite Center	Mylswamy Annadurai	Jitendra Nath Goswami	\$88,633,759 (Rs 386 Crore - 100 for Deep Space Network Establishment)	Sep-07	2008	modified Polar Satellite Launch Vehicle (PSLV)	Satish Dhawan Space Centre, Sriharikota	1,050 kg (523 kg dry)	55 kg	1.5 meter cuboid
Lunar Reconnaissance Orbiter	United States of America	National Aeronautics and Space Administration	Goddard Space Flight Center	Craig Tooley	Gordon Chin	\$400,000,000	15-Oct-08	NLT Dec-08	Delta 2 (2925-10)	Kennedy Space Center, Cape Canaveral	1,210 kg (600 kg dry)	100 kg	3-axis stabilized pointed platform

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ORBITER MISSION	INSTRUMENTS/PAYLOAD	ENTERS LUNAR ORBIT	BEGINS LUNAR SCIENCE OPERATIONS	DURATION	ORBIT	FINAL OPERATION ALTITUDE	MISSION OBJECTIVES	WEBSITE	PROJECT CONTACT EMAIL
SMART-1	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; Smart Infrared Spectrometer (SIR); plasma diagnostic experiments (EPDP, SPEDE); X-Ka transponder (KaTE); radio science (RSIS)	15-11-2004	Jan/Feb 2005	>6 months (1-yr extended mission to Aug 2006)	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	http://sci.esa.int/science/www/object/index.cfm?fobjectid=33593	Bernard.Foining@esa.int
TrailBlazer	Two high-rez 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; Radiometro Lunare Italiano (radiometer)	5-8 days after launch	previous to arrival	3-6 months	~Circular	1st phase: 50 km; 2nd phase: 10 km	Photograph/videotape LV-spacecraft separation, Earth, Moon, EarthRise, historic sites and "barnstorming;" map entire surface; deliver commercial and scientific projects/experiments to lunar orbit; deposit personal items; study farside radio silence	http://www.transorbital.net/TB_mission.html	pblase@transorbital.net
Lunar-A	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	http://www.jaxa.jp/missions/projects/sat/exploration/lunar_a/index_e.html	nakajima.takashi@jaxa.jp
SELENE-A	Rstar (relay sat), Vstar (VLBI sat), high-definition terrain TV camera, X-ray and G-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	http://www.jaxa.jp/missions/projects/sat/exploration/selene/index_e.html	takizawa.yoshisada@jaxa.jp
Chang'e-1	CCD camera, imaging spectrometer, laser altimeter, X-ray/G-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	http://www.cnsa.gov.cn (no specific site)	cnsa@cnsa.gov.cn
Chandrayaan-1	Terrain Mapping Camera (TMC), Hyper Spectral Imager (HySI), Lunar Laser Ranging Instrument (LLRI), Solar X-ray Monitor (SXM), High Energy X-ray spectrometer (HEX), 25-kg impactor, mini Synthetic Aperture Radar (SAR), Smart Infrared Specrometer (SIR-2), Radiation Dose Monitor, Sub-keV Atom Reflecting Analyzer (SARA), Compact Imaging X-ray Spectrometer (CIXS), Moon Mineralogy Mapper (M3)	5.5 days after launch	2 weeks after arrival	2 years	Circular Polar	100 km	Complete high-rez 3D topographical mapping; conduct mineralogical and elemental chemical mapping (He-3 search); search for water ice (mainly at poles); observe X-ray spectrum .5-10 keV, 10-250 keV and stereographic coverage; observe dust, conduct surface detections; inspire youth; experience for more Moon missions	http://www.isro.org/chandrayaan-1 and www.isro.org/chandrayaan-1/announcement.htm	madurai@isac.ernet.in
Lunar Reconnaissance Orbiter	Lunar Orbiter Laser Altimeter (LOLA) Measurement Investigation, Lunar Reconnaissance Orbiter Camera (LROC), Lunar Exploration Neutron Detector (LEND), Diviner Lunar Radiometer Experiment, Lyman-Alpha Mapping Project (LAMP) and Cosmic Ray Telescope for the Effects of Radiation (CRaTER)	TBD	TBD	1 year, may receive up to 5-yr extended mission	Circular Polar, then higher elliptical	50 km (+/- 20 km)	Map topography at high-rez, measure landing site slopes, search for polar water ices, acquire targeted small-scale feature images, document changing illumination conditions and potential resources at poles, measure radiation environment, map temperature at 300 m horizontal scales, observe entire surface in far ultraviolet, image permanent shadows, investigate effect of cosmic rays on tissue-equivalent plastics	http://lunar.gsfc.nasa.gov/missions.html	Craig.R.Tooley@nasa.gov