

# **The development of the CHANG/E-1 lunar explorer laser altimeter**

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According to Chinese fable, CHANG/E is the name of a peri who lives in the moon with a white rabbit. The CHANG/E-1 lunar explorer will be launched in April 2007. The Lunar Explorer Laser Altimeter (LELA) is one of the 6 payloads in Chang/E-1, which is developed by Shanghai Institute of Technical Physics, Chinese Academy of Sciences. The data of LELA will be used with the Optical Imager for acquiring the three dimension image of the moon surface.

The LELA transmits laser pulses, determines their round trip times to the surface of the moon using a time interval counter, and measures ranges between CHANG/E-1 lunar explorer and the lunar surface in the nadir direction with 5m accuracy every 1 second for 1 year's mission period. The acquired range data are transformed to the topography of the moon with the aid of position and attitude data of the CHANG/E-1 lunar explorer obtained from the ground-based tracking and on board star sensor respectively. The mean distances between Chang/E-1 and the surface of moon is 200Km.

The LELA utilizes a laser diode (LD) pumped Q-switched Nd:YAG laser that has a wavelength of 1064nm, a pulse width of <10ns. The output beam divergence is improved to 0.6mrad by Galileo refractor-type collimator, which resulted in a moon surface spot size (foot print) of 120m. The return pulses are captured by Cassegrain-type reflector and detected by Si-APD detector.

The prototype began from 2003. Until now, the engineering model had been finished.