

1

**SYSTEM AND METHOD FOR PRODUCING
MADE-TO-ORDER DESIGNS ON THE
SURFACE OF AN EXTRATERRESTRIAL
BODY**

**CROSS-REFERENCE TO RELATED
APPLICATION**

This application claims the benefit of priority under 35 U.S.C. §119(e) of U.S. Provisional Patent Application No. 61/385,184, filed Sep. 22, 2010, the entire contents of which are hereby incorporated herein by reference.

FIELD OF THE INVENTION

The invention pertains to the surface alteration of extraterrestrial bodies.

BACKGROUND OF THE INVENTION

People are always looking for a unique way to commemorate some event, for example, birthday, bar mitzvah, graduation, wedding, anniversary, death, athletic victory, etc.; or send a greeting or gift to others at a holiday such as Valentines day or Christmas.

Even before the landing of Apollo XI in 1969, which returned images from that expedition of the first boot prints of humans on the surface of the Moon, human beings have dreamed about leaving their own mark on other worlds. While the actual rate of deterioration of these foot prints and wheel tracks left in the lunar soil will remain unknown until humans or their robotic explorers can return to study them, the general scientific consensus is that these marks will remain discernible for possibly many millennia. They may be longer lasting evidence of human civilization than the pyramids of ancient Egypt.

Advances in astronautics and aerospace engineering over the past 50 years have made it possible to offer equipment which will permit people to reach out and touch, figuratively speaking, surfaces of other bodies in our solar system. Twin, telerobotically operated, Soviet Lunokhod moon rovers of the early 1970s collectively traveled almost 47 km during a combined 15 months of operation; and also by the success of the American Mars Exploration Rovers, Spirit and Opportunity, which operated for over 5 years on the surface of Mars collectively traveling over 21 kilometers by the end of 2008 using a combined telerobotic and autonomous mode of operation.

SUMMARY OF THE INVENTION

This opens the door to offering a service to people on Earth that would permit them to place an incredibly long-lasting design, message, image, etc. on the surface of the Moon, an asteroid, or some other extraterrestrial body by means of a proxy manipulator that rearranges the surface material. This invention presents a method for offering and delivering such a service and the related Earth-based products that can be produced and delivered based upon such a service.

Not all extraterrestrial bodies are suitable for creating long-lived designs on their surfaces. The absence of such things as an atmosphere, significant seismic activity, thermal cycling, volcanic activity, ongoing extensive asteroid bombardment, flowing liquids, etc. are some of the factors needed for the surface of an extraterrestrial body to remain unaltered for extremely long periods of time.

2

The Moon is an example of one body in the solar system that is very suitable for making long-lived designs in the surface material. A design, once made in the lunar surface, has a very low probability of being altered by natural, human, or robotic activity.

This ability to land spacecraft on another planet and move them about the surface opens up the possibility of sending such a spacecraft outfitted with a means of altering the surface material in order to implement designs based upon instructions relayed from people on Earth.

The present invention relates to using a device on the surface of an extraterrestrial body outfitted with a means for altering the surface of the extraterrestrial body so as to implement a desired design on the surface in accordance with an entity's instructions; and to the use of data collected and transmitted back to Earth about the created design to produce images and reproductions of the implemented design to be delivered per the entity's instructions.

One embodiment of the present invention provides a method for producing made-to-order designs on a surface of an extraterrestrial body. The method comprises receiving from an entity a request to create a design on the surface of the extraterrestrial body; transmitting a control signal to a device on a vehicle on the extraterrestrial body, the control signal causing the device to create the design; and receiving an image signal sent from the vehicle, the image signal providing an image of the design created on the surface.

Another embodiment of the present invention provides a device for producing made-to-order designs on a surface of an extraterrestrial body. The device comprises a surface altering tool configured to rearrange material on the surface; a motorized vehicle capable of traversing the surface of the extraterrestrial body, the vehicle supporting the surface altering tool; an imaging device supported on the vehicle, the imaging device being configured for capturing an image of the surface; a communication system for receiving a control signal transmitted from Earth, and for transmitting an image signal to Earth; and a control module configured to control operation at least one of the vehicle and the surface altering tool to produce a design in accordance with the control signal.

In a certain embodiment, the surface altering tool comprises a configurable-tread rover wheel. The configurable-tread rover wheel comprises a wheel hub comprising a plurality of radially-extending channels; a plurality of tread elements, each tread element being supported in a respective one of said plurality of radially-extending channels, each tread element comprising: a tread head supported on an elongated post; a rotating cup having a central opening for receiving said post, a radially-extending flange and a plurality of longitudinally-extending ridges spaced about its periphery, said rotating cup terminating in a pin; a spring supported about said post and abutting said flange to bias said tread head toward a retracted position; an elongated push pin having a central opening for receiving said pin of said rotating cup; a grooved insert having an internal channel admitting passage of said elongated push pin and a plurality of longitudinally-extending grooves spaced about its channel, the grooved insert further comprising a plurality of angled surfaces configured to guide the ridges of the rotating cup and cause incremental rotation of the rotating cup about an axis in response to reciprocation of the rotating cup within the grooved insert along the axis; and a plurality of solenoids supported within said wheel hub, each of said plurality of solenoids being operatively connected to said control module to permit actuation of each said solenoid upon receipt of a control signal from said control module.