

Also provided is a system for producing made-to-order designs on a surface of an extraterrestrial body. The system comprises a communication system for transmitting a control signal to a device on the extraterrestrial body; and a computer-implemented system comprising: a request module for receiving a request to create a design on the surface of the extraterrestrial body; a command module for preparing the control signal causing the device to create the design; and an imaging module for receiving from the device an image signal providing an image of the design created on the surface.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of example with the reference to the following drawing in which:

FIG. 1 is a diagrammatic view of a system for producing made-to-order designs on the surface of an extraterrestrial body in accordance with an exemplary embodiment of the present invention;

FIG. 2 is a schematic view of the system of FIG. 1;

FIG. 3 is a flow diagram depicting a method for producing made-to-order designs on the surface of an extraterrestrial body in accordance with an exemplary embodiment of the present invention;

FIG. 4 is an exploded view of an exemplary embodiment of a tread head of a configurable-tread rover wheel compatible with the rover shown in FIG. 3;

FIG. 5 is the exemplary tread head of FIG. 4, shown assembled to create a tread head;

FIG. 6 is a perspective view of an exemplary wheel hub of a configurable-tread rover wheel in accordance with the present invention;

FIG. 7 is a partial cross-sectional view of the wheel hub of FIG. 6, showing an exemplary channel into which a respective tread head is inserted during assembly;

FIG. 8 is an exploded view of an exemplary configurable-tread rover wheel, shown without the tread heads for illustrative clarity;

FIG. 9 is an image of an exemplary textual message created with a configurable-tread rover wheel in accordance with the present invention; and

FIG. 10 is a cross-sectional view of the grooved insert of FIG. 4, shown flattened for illustrative clarity.

DETAILED DESCRIPTION

Generally, the present invention involves providing a device on the surface of an extraterrestrial body, such as the Earth's moon. The present invention further involves receiving on Earth a request to create a design on the body, causing the device to create the design and to send an image of (or data representing) the created design back to Earth, and then delivering the image, or a product incorporating the image, to a recipient on Earth.

Referring now to FIGS. 1 and 2, an exemplary system 100 for producing made-to-order designs on the surface of an extraterrestrial body includes an Earth-bound portion 40 and an extraterrestrial portion 80. The Earth-bound portion 40 includes input devices 102 by which an entity 104, such as an individual, organization, business, or group of people, may interact with the system to enter a request for creation of a specific design. Examples of such input devices include a personal computer 102a (e.g., via e-mail or a web site), a mobile telephone/smartphone 102b, a fax machine 102c, or a telephone 102d. Requests may also be received via mail or courier and be entered by a system operator.

The input devices 102 are used to provide the request to a service provider 106. More specifically, the input devices are operatively connected for communication with the service provider 106's computerized system 108 via a communications network 110, such as the Internet. The computer-implemented system 108 may include conventional hardware and software, and further includes in accordance with the present invention at least a request module for receiving a request to create a design on the surface of the extraterrestrial body, a command module for preparing the control signal causing the device to create the design, and an imaging module for receiving from the device an image signal providing an image of the design created on the surface.

By way of example, the input device 102 and the system 108 may communicate in a client/server relationship. The service provider's system 108 may process the request to perform one or more of the following functions: to identify the desired design, prioritize the request as a function of a specified desired delivery date, integrate and sequence the request with existing requests, and prepare and send a control signal to the extraterrestrial portion 80 via a communication station 120.

The communication station 120 may include an antenna for radio communication or a telescope-laser system for laser communication. In some cases direct communication between the communication station 120 and the device 150 on the extraterrestrial body may not be possible—such as when the device 150 is on the far side of the body. Optionally, the system 100 includes one or more relay satellites (not shown) in Earth orbit, and/or in orbit around the extraterrestrial body to facilitate communication in such cases.

The transmitted control signal is received by a device 150 deployed on the extraterrestrial body in an extraterrestrial portion 80 of the system. The device includes a surface altering tool 160a, 160b carried about by a transport vehicle 190. In one embodiment, the transport vehicle 190 is a motorized "rover" capable of traversing the body's surface. The rover may be operated autonomously, telerobotically as controlled from a remote location, by an on-board operator, or by a combination of the above. Technology for developing and controlling a suitable transport vehicle, and providing it on the surface of an extraterrestrial body, are well-known in the art and thus are not discussed in detail herein.

The surface altering tool 160a, 160b is configured to physically alter the surface of the extraterrestrial body so as to impart a desired design (see design 6, FIG. 1), and may have any suitable form. By way of example, the surface altering tool may include components for rearranging the body's surface material by: mechanical means, such as, brushing, blowing, excavating, drilling, stamping, molding, extruding, sorting, raking, or sifting; altering the composition of the surface material by the application of energy, such as, heat, radio frequency energy, or light; applying a coating material; mixing the surface material with material brought or collected from another place or places; applying a magnetic field; or using explosives.

In one embodiment, a robotic arm 160a, either with appropriate end effector(s), or wielding the appropriate tool(s), provides the desired surface altering using any of the techniques and/or tools described previously. In embodiments in which the desired surface altering consists of symbols for which the robotic arm's motions can be preprogrammed and stored locally on the device 150, the amount of communication traffic between the Earth and the extraterrestrial body can be significantly reduced. Robotic arms capable of various sorts of fine and gross altering have been built for use on Earth in industry, and various arms have been included on rovers