

rotating cup **216** to slide back into grooved insert **218** after rotating a partial turn. Just how far into grooved insert **218** rotating cup **216** descends depends upon the depth of the grooves in grooved insert **218** it is pushed into by spring **215**. Accordingly, a single push on the push pin **217** may move a tread head to an extended or to a retracted position.

Control software in control module **200** stores the state (extended or retracted) of each tread element **210** on each rover wheel **160b**. The control software analyzes a message intended to be imprinted upon the surface of the extraterrestrial body and determines which solenoids need to be actuated, and when, to cause the individual tread elements **210** to collectively form portions of the message that in turn will cause a corresponding impression on the surface of the extraterrestrial body as the rover **150** traverses its surface. For example, the message "YOUR NAME" may be mapped to a grid of tread heads 7 rows high, so that appropriate corresponding solenoids can be extended or retracted as necessary to cause a corresponding tread configuration (having selected extended solenoids mapping out a "YOUR NAME" message) that will form a corresponding impression ("YOUR NAME") on the extraterrestrial body as the rover traverses its surface.

In one embodiment, the transport vehicle's wheels are provided with a set of front wheels that are laterally offset from a set of rear wheels so that a front wheel will not disturb a rear wheel's surface impressions while the vehicle is travelling over the surface in a straight-forward direction (see FIG. 1). This embodiment provides a particularly efficient and productive way to generate multiple lines of impressions in the surface. Examples of designs that might be implemented include, but are not limited to: text; representations of written music; symbols, such as, hieroglyphics, language characters; logos; trademarks; and representations created by molding or shaping the surface material so as to produce an intaglio or bas relief image, such as of a face, hand, or foot print.

The device **150** further includes an imaging device **170** configured for capturing an image of the surface. The imaging device may include one or more still and/or video cameras. Technology for developing and controlling a suitable imaging device are well-known in the art and thus are not discussed in detail herein. The imaging device may optionally capture time and date information. The imaging device may also be used to capture images of other areas of the extraterrestrial body, such as the surrounding terrain as it would appear to someone standing on the extraterrestrial body at the location of the design.

The device **150** further includes a communication system **194** configured to complement and communicate with the communication station **120**, such as a radio antenna for radio communication or a telescope-laser system for laser communication. Suitable communication systems are well-known in the art and thus are not discussed in detail herein.

Optionally, the device **150** further includes one or more laser or white light scanners **180**. As well-known in the art, such scanners are capable of capturing data relating to a surface. The scanner **180** is used here to capture geometry data representing the design as it exists on the surface, and for creating a corresponding data signal for transmission to Earth. Suitable scanners are well-known in the art and thus are not discussed in detail herein.

Optionally, the device **150** further includes a navigation system **205**. The navigation system is configured to produce data identifying a location (e.g., longitude and latitude coordinates) of the design on the extraterrestrial body. Suitable navigation systems are well-known in the art and thus are not discussed in detail herein.

The device **150** further includes a control module **200** configured to control operation of the other components of the device. For example, the control module may provide for computerized control of the vehicle, the surface altering tool (including wheels **160b**), imaging system, navigation system, scanning system, and communication system. For example, data from the imaging, laser and navigation devices are transmitted back to the Earth portion of the system **100** via the communication system **190** on the transport vehicle **150**.

Signals received from the extraterrestrial portion **80** of the system **100** are received on Earth via the communication station **120**. For example, these signals may be communicated to the service provider **106**. The service provider, or more specifically its system **108**, receives the data relating to the production on the extraterrestrial body of the requested design, formats the data and relays it to one or more manufacturing facilities **140**.

Along with such information, the service provider also sends data relating to merchandise that the entity has requested. The request for such merchandise may have been provided by the entity along with the request to produce the design. Examples of merchandise that the entity may request include: a copy of some or all of the raw data (including for example an electronic image file in \*.jpg or other format) collected directly transmitted to the entity (e.g., via an e-mail), a copy of some or all of the data collected, either raw or formatted, delivered on data recording media such as a DVD, posting of their design images or video, or other data on a website, images of their design on products such as framed or unframed images, greeting cards, coffee mugs, apparel, and wall paper. Any requested merchandise that cannot be delivered electronically, may be loaded onto a transport vehicle (e.g., vehicle **11**, FIG. 1) for delivery of the merchandise to the entity.

An example of merchandise that may be requested is a set of data and images that document the creation of the design on the extraterrestrial body. Such documentation, framed or unframed, may contain one or more of the following non-limiting examples: a panoramic image of the location where the design was implemented, including the design as imported to the location; image(s) of the implemented design; image(s) of the transport vehicle containing the surface altering device that implemented the design; image(s) of the launch of the transport vehicle to the extraterrestrial body; statistics and information regarding the transport vehicle; statistics and information regarding the launch vehicle; date and time stamp of when the design was implemented; geographical coordinates on the extraterrestrial body on which the design was implemented; and/or image(s) and/or text selected and supplied by the entity. Items could be manufactured according to some predefined format, or permit customization based upon input from the requesting individual or entity. An example of the latter would be to permit the individual to select from a choice of frame styles when ordering a framed image of their design imparted on the surface of the extraterrestrial body.

The data collected from the laser or white light scanner(s) **180** along with the image data collected from the imaging device(s) **170** can be used to generate three-dimensional replicas of the implemented design. Conventional rapid prototype machines can make such replicas from a variety of materials at different scales and resolutions. These replicas may be colored to match the actual design on the surface of the extraterrestrial body using the image data collected by the imaging device(s) **170**. The service provider **106** may outsource any or all aspects of this process to other entities.