

embodiment the reflectivity at an optical fiber/seawater boundary is compared to that of an optical fiber/air boundary and dynamic measurements made using an optical time domain reflectometer (OillR). These data are then processed using specialized software to yield representation of the dynamics (spatial and temporal) of selected washover events on a surface of interest. The system specifically provides a real-time representation of washover, including two and three-dimensional visualization of washover, as well as recording selected data for future use. Methods of employment of the system are also provided.

*Serial No.:* 10/318,129.

*Date:* 12/13/2002.

8. *Title:* Systems, and Methods of Use, Employing Distorted Patterns to ascertain the Shape of a Surface, for Road or Runway Profiling, or as Input to Control Pro-active Suspension Systems. Provided in a preferred embodiment is an application of phase or "shadow" profilometry to determine a 3-D profile of structure instantaneously. In one application, a vehicle-mounted system captures a 3-D profile while operating normally. The system may use a digital camera, a computer for processing and storage, a broadband light source, and a device positioned between the light and structure that enables strips of light to impinge on the structure. A preferred embodiment uses a single straight edge as the device, casting a straight line shadow. In addition to profiling road surfaces, the bottom of hydraulic models have been profiled even while being disturbed with a wave generator. It may be integrated with other devices such as a pro-active suspension system for civilian, military, and construction vehicles. Further, use with tiltmeters and GPS receivers provides data useful for engineering or construction management.

*Serial No.:* 10/318,214.

*Date:* 12/13/2002.

9. *Title:* Method and Instrument for Electronically Recording, and Imaging Representations of Interactions of an Object With its Environment. Using an array of electrically isolated electrode pairs in combination with a specially configured processor, e.g., a personal computer, continuous real-time acquisition, processing, mapping and visualization of an object's interaction with its environment are provided. In a specific application, washover data are collected on salient electrical characteristics of seawater accumulating between electrodes of an electrode pair, one of which may be a common ground plane. For example, in one embodiment,

the resistance of seawater is measured dynamically at each electrode pair. These data are then processed using specialized software to yield representation of the dynamics of selected washover events on a surface of interest. Described systems specifically provide real-time spatial and temporal representations of interaction, including two and three-dimensional visualization of the interaction, e.g., washover, as well as recording selected data for future use. Methods of employment of the systems are also provided.

*Serial No.:* 10/318,297.

*Date:* 12/13/2002.

10. *Title:* Self-Healing Coating and Microcapsules to Make Same. A liquid self-healing coating, incorporating microcapsules filled with tailored repair formulations, repairs itself upon physical compromise after curing. In one embodiment, a commercially available paint primer is mixed with a pre-specified amount of these microcapsules. After the coating has cured on the substrate to which it is applied, any physical compromise of the cured coating results in the microcapsules bursting to release a liquid that fills and seals the compromised volume of the coating. In applications where paint is used to provide corrosion protection, the liquid contains anti-corrosion material as well as suitable diluents and film-forming compounds. In another embodiment, the microcapsules may be provided separately to enhance commercially available products. For example, if a paint formulation is known *a priori*, specifically configured microcapsules packaged separately from the paint and designed for use with the paint formulation, may be added to the commercially available product just prior to application.

*Serial No.:* 10/377,642.

*Date:* 3/4/2003.

11. *Title:* Fusion of Data From Differing Mathematical Models. A procedure automatically resolves vertical differences commonly found when merging and combining Digital Elevation Models (DEMs) from different collection and production systems. These systems may employ technologies used in single pass Interferometric Synthetic Aperture Radar (IFSAR), Light Detection And Ranging (LIDAR), and photogrammetry, as well as DEMs derived from contour based elevation data and GPS point data. This procedure employs sophisticated software checking routines for automatically identifying horizontal and vertical datums used by the differing systems as well as any geoid models employed by them. Normally, all of these sources use

different vertical datums and may use different horizontal datums. A preferred embodiment of the present invention automatically recognizes the vertical datums, including those that are associated with the geoid models and the 3-D datums that conventional GIS does not support at present.

*Serial No.:* 10/395,168.

*Date:* 3/25/2003.

12. *Title:* Detecting, Classifying, and Localizing Minor Amounts of an Element Within a Sample of Material. Minute amounts of material, such as a contaminant, are detected, identified and located using a single procedure that eliminates the need for using complex and sometimes redundant instrumentation setups, multiple (and sometimes overlapping) analytic processes, or both. In a preferred embodiment, a series of processing steps enables one to detect, identify, and localize minute amounts of particular elements, e.g., contaminants, in material being tested. Data sets, suitable for characterizing components of samples at least spectrally and spatially, are collected from at least one uncontaminated sample of material (the "baseline" or "control") and a sample of material under test (MUT) that may contain contaminants. Comparison of these data sets, using the procedures of the present invention, enables ready identification of minute amounts of material in any sample. The use of existing conventional procedures may require that multiple sets of data be taken or multiple processes be applied.

*Serial No.:* 10/406,159.

*Date:* 4/3/2003.

13. *Title:* Improved Method and System for Dewatering Particulate Materials. A system and method for dewatering particulate materials employs an improved dewatering probe generally including a single non-conducting pipe having a plurality of holes or slots, an anode mounted on the pipe adjacent one end of the pipe, and a cathode mounted on the pipe adjacent the opposite end of the pipe. The pipe serves as both a sonde for mounting the anode and cathode and as a well for extracting water that collects around the outside of the pipe and flows into the interior of the pipe through the holes or slots via gravitational and electro-osmotic forces. A pump may be used to extract both collected water and accumulated electrolytic gases from the pipe's interior. In embodiments, an array of guide electrodes is mounted on the pipe in addition to the anode and the cathode in order to deflect the major current flow out into the body of surrounding particulate materials. The guide electrodes also facilitate rapid