***Claims***

1. A system for monitoring survey reflectors (1; 21; 31; 41; 51; 5101; 5102; 5103; 61; 71) arranged at a plurality of locations on an object (3), the system comprising:

a camera (7; 27; 37; 47; 57; 67A, 67B; 77), comprising:

- one or more first light sources (22; 321; 42; 521; 72; 102) each for emitting a first divergent beam (5; 25; 351; 45; 551; 75) having a solid angle (Ω1) larger than zero, wherein said one or more first light sources are arranged such that a field in space corresponding to at least 10% of a field of view of the camera is illuminated by said one or more first light sources;
- an image sensor (24; 34; 44; 54; 74; 120) for receiving reflected light beams (26; 361; 46) comprising reflections of said first divergent beam by said plurality of survey reflectors and for providing image sensor data; and
- a body (28; 38; 48; 58; 78) provided with an optical entry system (23; 33; 43; 53; 73), said body having a first side facing an interior space of said camera and a second side facing away from said interior space, wherein said image sensor is located in said interior space and said one or more first light sources are located on said second side of said body, wherein said one or more first light sources are arranged at a first distance (D1; d) from said optical entry system;

and

a processing unit (9; 29; 79) configured for processing said data;

wherein said processing unit is configured to determine a location of each survey reflector from said data and to detect a movement of one or more of said plurality of survey reflectors based on a comparison of the determined location of each survey reflector with previously determined locations of the survey reflectors, wherein said processing unit is further configured for applying a first code to said first divergent beam by modulation of said first divergent beam, and for applying filtering techniques during image processing of the recorded data, and

wherein the system further comprise one or more second light sources (322) emitting a second divergent beam (352), wherein said one or more second light sources are arranged at a second distance (D2) from said optical entry system which is larger than said first distance, wherein said second distance is such that reflections (362) of the second divergent light beams from the survey reflectors do not enter the camera through the optical entry system, and wherein said processing unit is further configured to apply a second code to the second divergent beam, wherein the second code is different from the first code.

2. The system of claim 1, wherein said optical entry system comprises a non-refractive optical element (101) forming the objective of the camera.

3. The system according to claim 1 or 2, wherein said field in space corresponds to at least 50% of the field of view of the camera, wherein preferably said field in space is substantially equal to or larger than the field of view of the camera.

4. The system according to claim 1, further comprising one or more third light sources (522) configured to emit a third divergent beam (552), wherein said one or more third light source are arranged at a third distance (d) from said optical entry system which is substantially similar to said first distance (d), and wherein the processing unit is further configured to apply a third code to said third divergent beam, wherein said third code is different from the first code, and, if used, is different from the second code.

5. The system according to any one of the preceding claims, wherein the processing unit is further configured for applying a command code to said first divergent beam, the command code comprising instructions, information and/or requests to be sent to the survey reflectors.

6. The system according to any one of the preceding claims, further comprising a survey reflector identification unit (761) to be provided at or included in a survey reflector, the survey reflector identification unit comprising:

- A light receiver (71) for receiving the first divergent beam;
- A microcontroller (719) coupled to said light receiver; and

- An identification unit light emitter (712), configured to emit a unique identification signal in response to said microcontroller receiving a command therefore.

7. Method for monitoring a plurality of survey reflectors (1; 21; 31; 41; 51; 5101; 5102; 5103; 61; 71) provided at locations on an object, the method comprising:

monitoring, at a first camera position, said locations by:

- emitting, by each one of one or more first light sources (22; 321; 42; 521; 72; 102), a first divergent beam (5; 25; 351; 45; 551; 75), having a solid angle larger than zero, towards said plurality of survey reflectors, wherein said plurality of survey reflectors are irradiated substantially simultaneously by said one or more first divergent beams, wherein said one or more first light sources are maintained in a substantially fixed position;
- recording, by an image sensor (24; 34; 44; 54; 74; 120), data representing reflected light beams comprising reflections of said first divergent beam by said plurality of survey reflectors; and

determining, by image processing of said data, a location of each survey reflector from said data and detecting a movement of one or more of said plurality of survey reflectors based on a comparison of the determined location of each survey reflector with previously determined locations of the survey reflectors, further comprising applying a first code to said first divergent beam by modulation of said first divergent beam, and applying a filtering technique when image processing said data, thereby distinguishing light originating from reflections of said first beam from other light sources and/or other reflections, and

wherein the method further comprises

- providing a body (28; 38; 48; 58; 78) provided with an optical entry system (23; 33; 43; 53; 73) allowing passage of light, said body having a first side and a second side, and arranging said body such that said first side faces an interior space of said camera and said second side faces away from said interior space, such that said image sensor is arranged in said interior space of said body and said one or more first light sources are arranged on said second side of said body;

- arranging said one or more first light sources at a first distance (D1, d) from said optical entry system;
- arranging one or more second light sources (322) at a second distance (D2) which is larger than said first distance, wherein said second distance is such that reflections of the second divergent light beams from the survey reflectors do not enter the camera through the optical entry system, and emitting a second divergent beam by each of said one or more second light sources; and
- applying a second code to said second divergent beam by modulation of said second divergent beam, wherein said second code is different from said first code.

8. Method according to claim 7, wherein said optical entry system comprises a non-refractive optical element (101) forming a camera objective.
9. Method according to any one of claims 7 or 8, further comprising:
   - Generating (1002a) a first image from reflected light having the first code;
   - Generating (1002b) a second image from reflected light having the second code; and
   - Subtracting (1003) the second image from the first image, and determining (1004) the positions and/or movements of one or more of the survey reflectors from resulting image.
10. Method according to any one of claims 7 to 9, further comprising:
    - providing one or more third light sources (522), each emitting a third divergent beam (552), wherein said one or more third light source are arranged at a third distance (d) from said optical entry system which is substantially similar to a first distance (d) at which said one or more first light sources are arranged, and applying a third code to the third divergent beam by modulation of said third divergent beam, wherein said third code is different from the first code, and, if present, from said second code; and
    - determining the distance between the camera and a survey reflector from a distance between a first point, p1, on the image sensor originating from a reflection of light emitted from the first light source from the survey

reflector and a second point, p2, on the image sensor originating from a reflection of light emitted from the third light source from the survey reflector.

11. Method according to any one of claims 7 to 10, the method further comprising:

- monitoring said locations at a second camera position which is positioned at a distance from said first camera position, a first viewing line between said first camera position and a reference survey reflector oriented at an angle with respect to a second viewing line between said second camera position and said reference survey reflector; and
- determining three dimensional coordinates of said survey reflectors based on said monitoring at said first camera position and said second camera position;

wherein said monitoring at said second camera position is performed similar to said monitoring at said first camera position.

12. System according to any one of claims 1-6, further comprising a plurality of survey target units, each comprising a plurality of survey reflectors (21; 31; 41; 51; 5101; 5102; 5103; 61; 71; 111; 11101; 11102; 11103) arranged in one single plane (p1, p2).

13. The system according to claim 12, wherein the survey reflectors are arranged in an array having one of said survey reflectors (111c) arranged in a centre of said array, said centre representing a point of symmetry of said array.

14. The system according to claim 12 or 13, wherein the plurality of survey reflectors are realized by a plurality of survey prisms (21; 31; 41; 51; 61; 71; 111), the prisms preferably being substantially identical, and wherein a surface of the prisms configured for receiving an incoming light beam are arranged in said one single plane.

15. The system according to any of claims 12-14, wherein the plurality of survey reflectors are realized by a plurality of hollow mirrors (5102; 5103; 11102; 11103) each having a centre point (c), the hollow mirrors preferably being substantially identical, and wherein the centre point of all mirrors are arranged in said one single plane (p1, p2).