CLAIMS

1. A method for training an airfield ground lighting inspection system comprising:

moving a housing having an image acquisition means attached thereto to capture image streams of a plurality of lights of an airfield ground lighting system, each image stream comprising successive images of a light;

using a location sensor to detect the positional information of the image acquisition means capturing the image streams;

processing the image streams to detect and associate a plurality of points in a specified arrangement in an image with an item to be checked, wherein the associating is performed by storing operator selection of a plurality of points in a sample image and a subsequent sample image from an image stream of a light of the airfield ground lighting system.

2. The method for training an airfield ground lighting inspection system according to claim 1 wherein the operator specifies the location, orientation and region of the plurality of points in the sample image and subsequent sample image of the sample stream.

3. The method for training an airfield ground lighting inspection system according to claim 2 wherein the location in three dimensional space of the image acquisition means is determined from the analysis of a point from a first sample image and at least one subsequent sample image and location information of the image acquisition means.

4. The method for training an airfield ground lighting inspection system according to claim 3 wherein the reference locations for the one or more points of the item of the light being checked of the images of the image stream are determined from the depiction of those one or more points in the sample image and subsequent sample image.

5. The method for training an airfield ground lighting inspection system according to claim 4 wherein the reference location is determined by epipolar geometry.

6. The method for training an airfield ground lighting inspection system according to claim 1 wherein for the images in the sample stream after the sample image and subsequent image, the locations of the points of the item to be checked are determined by:

detecting the locations of the scene points for the images of the sample image stream, wherein the scene points are the location of the points comprising the item to be checked relative to the three dimensional frame of reference of the light,

projecting said scene points into the images of the sample image stream from the identified reference location for that scene point and from the location information of the image acquisition means,

processing the images of the image stream to detect location of the points comprising the item to be checked,

comparing the location of the projected scene point in the images with the location of the detected points in the images and calculating the proximity therebetween,

verifying presence of a point in the item to be checked where the calculated proximity exceeds a threshold value.

7. The airfield ground lighting defect detection system according to claim 1 wherein determination of the existence of points in an image is made using a discriminative classifier.

8. An airfield ground lighting inspection system comprising:

a housing having an image acquisition means attached thereto configured for capturing a plurality of image streams of the plurality of lights comprising an airfield ground lighting system upon movement of the housing across the airfield;

a location sensor for detecting positional information for the image acquisition means capturing the plurality of images comprising the image streams;

an image processor coupled to the image acquisition and the location sensor for processing the image stream of a light of the airfield ground lighting system by:

(a) associating characteristics of a plurality of points in an image with an item in the light to be checked, and using this association for extraction of the points from the images of an image stream;

(b) analysing a plurality of randomly selected pairs of sample images to determine a plurality of tentative reference locations for each extracted point relative to the three dimensional coordinate frame of the light;

(c) assessing the tentative reference locations determined for each extracted point, to determine a reference location for each extracted point;

(d) projecting each extracted point into the images of the image stream based upon the determined reference location and location information of the image acquisition means for each image;

(e) analysing the images of the image stream by comparing the location in the images of the extracted points and the projected points and calculating the proximity therebetween;

(f) verifying existence in an image of the point of item being checked by comparing the calculated proximity against a threshold value;

(g) repeating steps (a) to (f) to determine existence of each point in the plurality of points associated with an item to be checked; and

(h) determining the state of the item to be checked based upon analysis of verified points.

9. The airfield ground lighting inspection system of claim 8 wherein associating of the plurality of points in an image with an item of the light depicted in that image to be checked is performed according to the method of claims 1-6.

10. The airfield ground lighting inspection system according to claim 8 wherein the system is configured to verify any one or more of the presence of a crack; the absence of any one or more of a bolt, a nut, a ring, and an inset light; the orientation of any one or more of a bolt, a

nut, a ring, an inset light and a crack; and predetermined markings identifying the light at a predetermined location on said light.

11. The airfield ground lighting inspection system according to claim 8 wherein the images are acquired under ambient lighting conditions.

12. The airfield ground lighting inspection system according to claim 8 wherein an additional illumination means is attached to the movable housing for lighting the lights for image acquisition.

13. The airfield ground lighting inspection system according to claim 8 wherein a tentative reference location for a point in each pair of images analysed is determined using the positional information of the image acquisition means for that pair of images and the detected location of that point in the pair of images.

14. An airfield ground lighting inspection system comprising:

a movable housing having an image acquisition means attached thereto configured for capturing a plurality of image streams of the plurality of lights comprising an airfield ground lighting system upon movement of the housing across the airfield;

a location sensor for detecting positional information for the image acquisition means capturing the plurality of images comprising the image streams;

an image processor coupled to the image acquisition and the location sensor for processing the image stream of a light of the airfield ground lighting system by:

(a) associating characteristics of a plurality of points in an image with an item in the light to be checked, and using this association for extraction of the points from the images of an image stream;

(b) verifying each extracted point by comparing a projected location of that point based upon analysis of plurality of pairs of images with an extracted location of that point;

(c) determining the state of the light of the image stream by processing the verified extracted points comprising an item to be checked.

15. The airfield ground lighting inspection system according to claim 14 wherein the points extracted in an image of the image stream are extracted using an algorithm selected from the histogram of oriented gradient algorithm and normalised gradient analysis algorithm.

16. The airfield ground lighting inspection system of claim 14 wherein associating of the plurality of points in an image with an item of the light depicted in that image to be checked is performed according to the method of claims 1-6.

17. The airfield ground lighting inspection system according to claim 14 wherein items to be checked include predetermined markings at predetermined locations.

18. The airfield ground lighting inspection system according to claim 14 wherein the images are acquired under ambient lighting conditions.

19. The airfield ground lighting inspection system according to claim 14 wherein an additional illumination means is attached to the movable housing for lighting the lights for image acquisition.

20. The airfield ground lighting inspection system according to claim 14 wherein the system is configured to verify any one or more of the presence of a crack; the absence of any one or more of a bolt, a nut, a ring, and an inset light; the orientation of any one or more of a bolt, a nut, a ring, an inset light and a crack; and predetermined markings identifying the light at a predetermined location on said light.