CLAIMS

1. A method for the mapping of a crane spreader and a crane load target, the method comprising the steps of:

   capturing scan data of static reference structures using one or more backreach range scanning sensors located on a backreach area of the crane to determine the calibration parameters of the backreach range scanning sensors;

   capturing scan data of the crane spreader and the crane load target using the backreach range scanning sensors and translating same by the calibration parameters to obtain corrected backreach scan data;

   capturing scan data of reference features using one or more boom range scanning sensors located on the crane boom to determine calibration parameters of the boom range scanning sensors;

   capturing scan data of the crane spreader and the crane load target using the boom range scanning sensors and translating same by the calibration parameters to obtain corrected boom scan data; and

   aligning and combining the corrected backreach scan data and the corrected boom scan data to generate a mapping of the crane spreader and the crane load target.

2. The method according to claim 1, wherein the one or more backreach range scanning sensors capture contour scan data of the static reference structures, the crane spreader and the crane load target.

3. The method according to claim 1 or 2, wherein the one or more boom range scanning sensors capture contour scan data of the reference features, the crane spreader and the crane load target.

4. The method according to any one of the preceding claims, the method further comprises mapping of a crane spreader load, the method comprising the steps of:

   capturing scan data of the crane spreader load using at least one of the backreach range scanning sensors or the boom range scanning sensors and translating same by the calibration parameters to obtain corrected scan data; and

   generating a mapping of the crane spreader load.

5. The method according to any one of the preceding claims, wherein the mapping is a three dimensional mapping.

6. The method according to any one of the preceding claims, wherein at least one of the backreach range scanning sensors are Light Detection and Ranging (Lidar) devices.

7. The method according to any one of the preceding claims, wherein the static reference structures include one or more static crane structures.

8. The method according to any one of the preceding claims, wherein the step of capturing scan data of static reference structures, more specifically comprises:

    conducting a yaw sweep of the backreach range scanning sensor to capture raw scan data;

    calculating a plane of the loading bay from the raw scan data; and

    rotating and translating the raw scan data to generate the scan data.

9. The method according to any one of the preceding claims, wherein the step of determining the calibration parameters of the backreach range scanning sensors, more specifically comprises calculation of the orientation and position of each backreach range scanning sensor with respect to a global origin.

10. The method according to any one of the preceding claims, wherein at least one of the boom range scanning sensors are Light Detection and Ranging (Lidar) devices.

11. The method according to any one of the preceding claims, wherein at least one of the boom range scanning sensors is located at the distal end of the crane boom.

12. The method according to any one of the preceding claims, wherein the reference features comprise one or more of the static reference structures or one or more supplementary reference features.

13. The method according to any one of the preceding claims, wherein the step of determining the calibration parameters of the boom range scanning sensors, more specifically comprises calculation of the orientation and position of each boom range scanning sensor with respect to a global origin.

14. The method according to any one of the preceding claims, wherein the method further comprises the step of tracking rotation and/or displacement of the backreach range scanning sensors to determine dynamic calibration parameters of the backreach range scanning sensors and rotating and translating the backreach range scanning sensors scan data by the dynamic calibration parameters.

15. The method according to any one of the preceding claims, wherein the method further comprises the step of tracking rotation and/or displacement of the boom range scanning sensors to determine dynamic calibration parameters of the boom range scanning sensors and rotating and translating the boom range scanning sensors scan data by the dynamic calibration parameters.

16. A system for the mapping of a crane spreader and a crane load target, the system comprising:

    a crane;

    one or more backreach range scanning sensors located on a backreach area of the crane;

    one or more boom range scanning sensors located on a crane boom of the crane; and

    a processing unit adapted to align and combine scan data from the backreach range scanning sensors and the boom range scanning sensors to generate a mapping of the crane spreader and the crane load target.

17. The system according to claim 16, wherein the processing unit is adapted to compare scan data from backreach range scanning sensors and boom range scanning sensors against a global plane to determine calibration parameters for each backreach range scanning sensors and boom range scanning sensors.

18. The system according to claim 16 or 17, wherein the processing unit is further adapted to translate the scan data from each of the backreach range scanning sensors and boom range scanning sensors against the calibration parameters to obtain corrected backreach scan data and corrected boom scan data.

19. The system according to claim 18, wherein the processing unit is further adapted to align and combine the corrected backreach scan data and the corrected boom scan data to generate the mapping of the crane spreader and the crane load target.

20. A method for the operation of a crane, the method comprising the steps of:

    generating a mapping of a crane spreader and the crane load target using the method of any one of claims 1 to 15;

    operating the crane; and

    continuously tracking the crane spreader and the crane load target.