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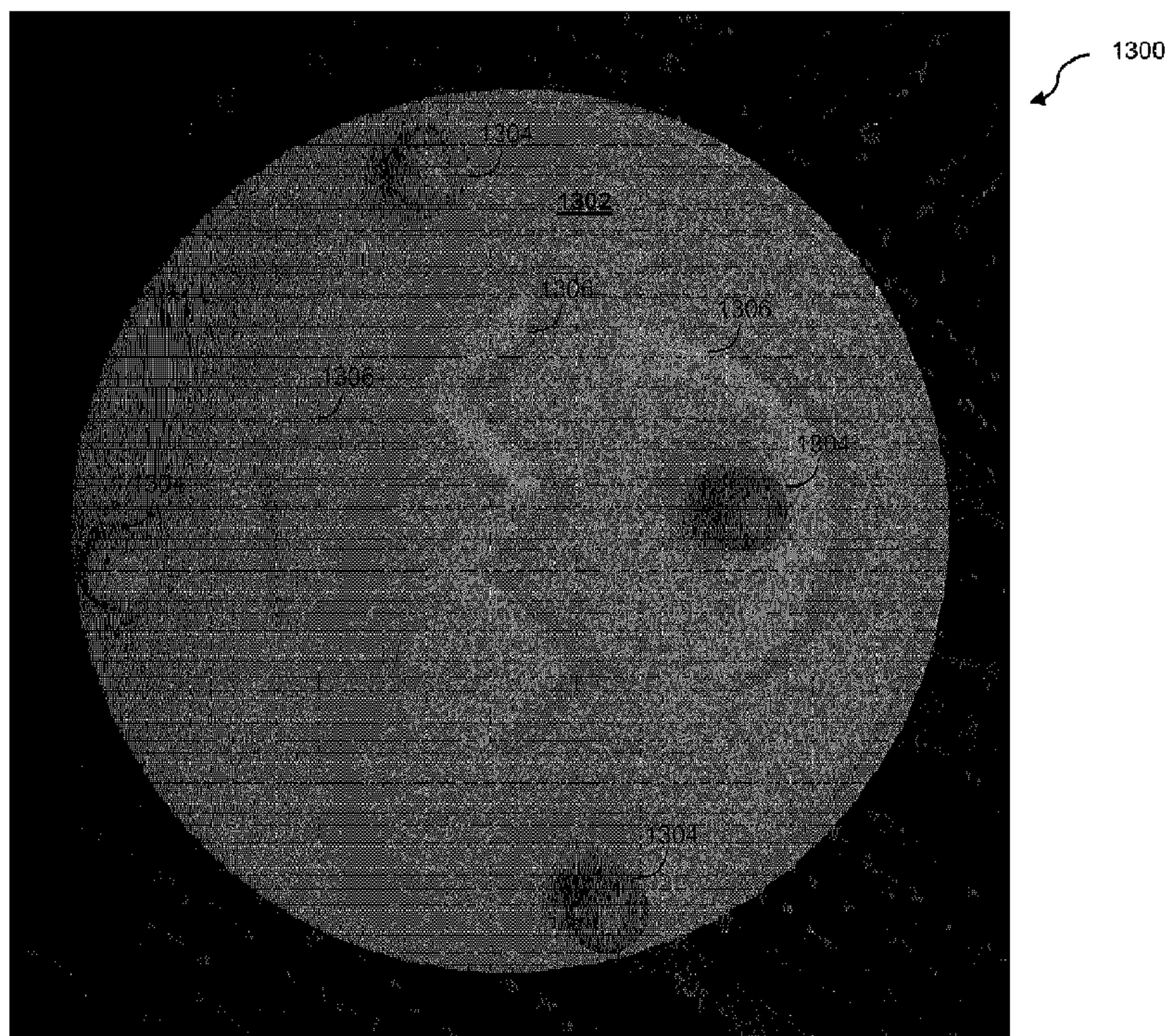


FIG. 13

(57) **Abrégé/Abstract:**

An apparatus is provided that is at least partially visible by both a three dimensional (3D) scanner system of a medical navigation system and a tracking system of the medical navigation system. The apparatus includes a rigid member, a plurality of identifiable



(57) **Abrégé(suite)/Abstract(continued):**

features attached to the rigid member and visible by the tracking system, a distinct identifiable portion visible by the 3D scanner system, and a connector mechanism attached to the rigid member to connect the apparatus to a location. The apparatus is in a field of view of the 3D scanner system and the tracking system within a timeframe of the 3D scan.

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(54) Title: PATIENT REFERENCE TOOL FOR RAPID REGISTRATION

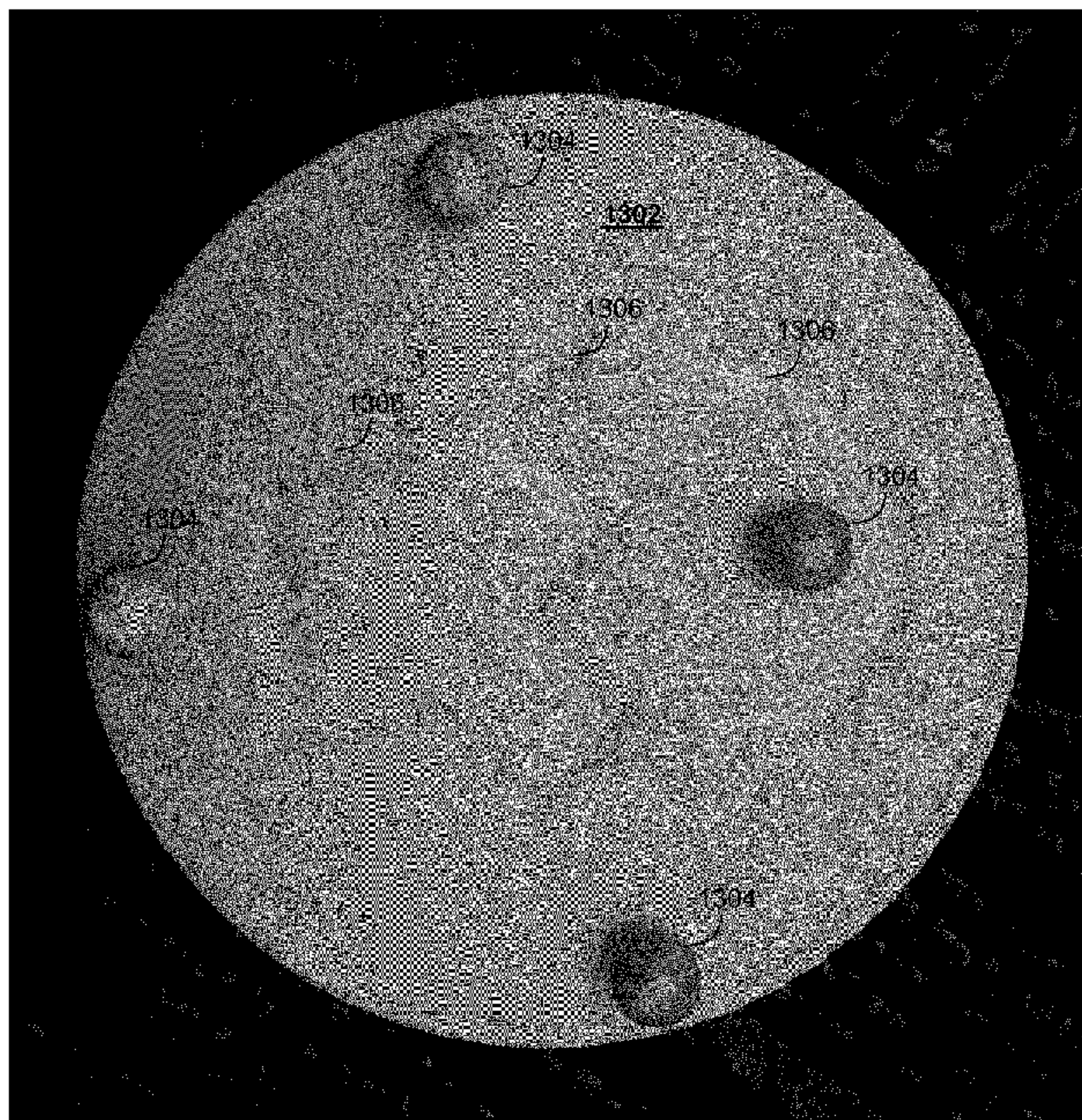


FIG. 13

(57) Abstract: An apparatus is provided that is at least partially visible by both a three dimensional (3D) scanner system of a medical navigation system and a tracking system of the medical navigation system. The apparatus includes a rigid member, a plurality of identifiable features attached to the rigid member and visible by the tracking system, a distinct identifiable portion visible by the 3D scanner system, and a connector mechanism attached to the rigid member to connect the apparatus to a location. The apparatus is in a field of view of the 3D scanner system and the tracking system within a timeframe of the 3D scan.

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We Claim:

1. A patient reference device for use during a medical procedure, the patient reference device comprising:
 - a housing having a back side and a front side;
 - a plurality of tracking markers attached to the front side of the housing;
 - a three dimensional indicator formed on the front side of the housing;
 - the housing extending around the at least three tracking markers and beyond a horizontal plane defined by tops of the at least three tracking markers, the housing terminating at a substantially continuous edge; and
 - a sterile cover attached to the substantially continuous edge of the housing for covering the housing and the tracking markers.
2. The patient reference device according to claim 1, wherein the housing is attachable to a patient reference arm that is attachable to a Mayfield head clamp.
3. The patient reference device according to any one of claims 1 and 2, wherein there are at least three tracking markers attached to the front side of the housing.
4. The patient reference device according to any one of claims 1-3, wherein the tracking markers are selected from the group consisting of passive reflective tracking spheres, active infrared markers, active light emitting diodes, and a graphical pattern.
5. The patient reference device according to any one of claims 1-4, wherein the three dimensional indicator is formed on the front side of the housing.
6. The patient reference device according to any one of claims 1-5, wherein the three dimensional indicator is engraved on the front side of the housing.
7. The patient reference device according to any one of claims 1-5, wherein the three dimensional indicator includes a raised surface portion on the front

side of the housing.

8. The patient reference device according to any one of claims 1-7, wherein the three dimensional indicator includes at least three separate unique indicators.

9. An apparatus having at a subset of an area visible by both a three dimensional (3D) scanner system of a medical navigation system and a tracking system of the medical navigation system, the apparatus comprising:

a rigid member;

a plurality of tracking markers attached to the rigid member and visible by the tracking system;

a three dimensional indicator formed on a front side of the rigid member and visible by the 3D scanner system; ;

a connector mechanism attached to the rigid member to connect the apparatus to a location; and

a sterile cover attached to the rigid member for covering the rigid member and the tracking markers,

wherein the apparatus is in a field of view of the 3D scanner system and the tracking system within a timeframe of the 3D scan.

10. The apparatus according to claim 9, wherein the tracking markers include reflective markers attached to the front side of the rigid member and the tracking system includes a camera.

11. The apparatus according to any one of claims 9-10, wherein the rigid member is substantially rigid in shape.

12. The apparatus according to any one of claims 9-11, wherein the three dimensional indicator includes a three dimensional graphical pattern formed on the rigid member.

13. The apparatus according to claim 12, wherein the three dimensional

graphical pattern is at least one of engraved and etched in the rigid member.

14. The apparatus according to claim 12, wherein the three dimensional graphical pattern includes a raised surface portion on the rigid member.

15. The apparatus according to any one of claims 9-14, wherein the apparatus further comprises:

a strap connected to the rigid member for securing the apparatus to a patient.

16. The apparatus according to claim 15, wherein the strap is attachable around a head of the patient.

17. The apparatus according to any one of claims 9-16, wherein the apparatus is securable to a patient using a medical adhesive.

18. The apparatus according to any one of claims 9-17, wherein the timeframe is at least one frame of the 3D scan.

19. The apparatus according to claim 9, wherein the location is a reference location comprising at least one of a fixed location on a Mayfield clamp, a bed, and a stretcher and the connector mechanism is attached to the rigid member.

20. The apparatus according to anyone of claims 9-19, wherein the reference location includes being attached onto a patient.

21. The apparatus according to anyone of claims 9-20, wherein the apparatus is wearable.

22. The apparatus according to anyone of claims 9-21, wherein the apparatus is sterilizable.

23. The apparatus according to anyone of claims 9-22, wherein the field of view includes a patient reference.

24. The apparatus according to claim 9, wherein the apparatus is spherical in shape.