**[0048]** Anthropometric fidelity for the human finger can mean one or more physical properties. A short list of such properties includes:

**[0049]** Finger dimensions: digit length, circumference, etc.

**[0050]** Thermal characteristics

**[0051]** Mechanical Properties

**[0052]** Galvanic skin response

**[0053]** Optical properties unique to the physiology of a human

**[0054]** Structural properties unique to the physiology of a human finger

**[0055]** FIG. **5** illustrates an exemplary pictorial illustration **500** of a blank (i.e., absent test patterns) calibration target cylinder **501** with threading **502**, in accordance with the disclosed embodiments. Based on the finger dimension data, artifact dimensions of 90 mm (length) and 19.1 mm (width/diameter) were selected. The artifact was designed as an exemplary cylinder **501** with a spherical tip, as illustrated in the exemplary pictorial illustration **603** in FIG. **6**. A threaded stud **502** has also been specified to allow for mounting to an optional carrier mechanism. The threaded stud **502** was specified to be 15 mm long with M12×1.75 threads machined on to it. The selection of the artifact's length (i.e., 90 mm) was based on accommodating a representative length of a human finger.

**[0056]** Some fingerprint scanners capture features of a finger by a method utilizing optical properties of the finger surface rather than the topological structure. It is therefore critical to have both 3D topographical structures (and thereby 3D "contrast") as well as optical contrast marking those structures. To achieve this, the target material was prepared by a processed referred to as anodization and thus becomes anodized, where the exposed parts of the aluminum cylinder take on a black or near-black hue. When the anodized cylinder is machined to create a pattern on the outermost surface, the anodized material is removed where the pattern is machined and exposes the lighter hued natural aluminum material allowing for an easily visible contrast gradient between the two materials.

**[0057]** The ability to test the scanner effectively relies heavily on the ability to verify the fidelity of the measurements derived from the capture made by the scanner. Therefore, one of the primary design goals was to build a target that demonstrates fidelity to some of the basic features of a fingerprint while maintaining a primitive geometric shape that can be measured and verified objectively. These basic features for the purpose of this experiment were identified as a basic ridge pattern as well as a basic minutiae pattern.

**[0058]** FIG. **6** illustrates an exemplary pictorial illustration **600** of a simulated ridge/minutiae pattern on a cylindrical target **601**, in accordance with the disclosed embodiments. For the simulated ridge test pattern, a cylindrical target **601** was fabricated with four patches of grid lines **604**. The tip of the cylinder was designed as a perfect hemisphere **602***a* with its radius equal to the radius of the cylinder body. The hemisphere **602***a* is an oblique view of the hemisphere comprising the end of the target. Hemisphere **602***b* is a polar view of the hemisphere **602***a* comprising the end of the target.

**[0059]** For the simulated minutiae test pattern and the scanning resolution test pattern, a cylindrical target with four patches of repeating dot patterns was fabricated, in accordance with FIG. **6**. The tip of the cylinder was designed as a perfect hemisphere with its radius equal to the radius of the cylinder body. A threaded stud was specified in the design for future extensibility/ability to mount the finger into a false palm target.

**[0060]** It will be appreciated that variations of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Furthermore, various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

What is claim is:

**1**. A method for contactless fingerprint scanning with improved identification fidelity, said method comprising:

scanning a fingerprint or a handprint;

providing topographical contrast of a feature of said scanned fingerprint or a feature of said scanned handprint to analyze said scanned fingerprint or said scanned handprint; and

providing optical contrast of said feature of said scanned fingerprint or said feature of said scanned handprint to analyze said scanned fingerprint or said scanned handprint.

**2**. The method of claim **1** further comprising capturing a simulated fingerprint ridge test pattern wherein said simulated fingerprint ridge test pattern comprises a predictable geometric ridge pattern.

**3**. The method of claim **1** further comprising utilizing a simulated minutiae pattern wherein said simulated minutiae pattern comprises a basic point-minutia pattern.

**4**. The method of claim **1** further comprising utilizing a test pattern to verify a captured resolution of a fingerprint or handprint scanner.

**5**. The method of claim **1** further comprising utilizing a reference with known geometric features to verify a captured resolution of a fingerprint or handprint scanner.

**6**. The method of claim **1** further comprising calibrating a fingerprint scanner when said fingerprint scanner scans a test pattern and obtains known geometric features to gauge fidelity of said fingerprint scanner.

**7**. The method of claim **1** wherein said feature comprises at least one of a ridge structure of a finger, where said ridge structure begins and ends, a bifurcation in said ridge structure, a three dimensional feature, an anthropomorphic feature of said finger, a dimension of said finger, a thermal characteristic of said finger, a mechanical property of said finger, a galvanic skin response of said finger, an optical property of said finger, and a structural property of said finger.

**8**. A method for contactless fingerprint scanning for improved, validated, and repeatable image capture, said method comprising:

acquiring at least one of a topographical measurement, contrast of a three-dimensional fingerprint feature, and optical contrast of a three-dimensional fingerprint surface in three-dimensional space; and

capturing a two-dimensional representation of a three dimensional finger by measuring at least one of said three-dimensional fingerprint feature and optical contrast for identification matching, three dimensional fingerprint scanner calibration testing, and three dimensional fingerprint scanner calibration correction.

**9**. The method of claim **8** further comprising ensuring fidelity of a captured image to an original fingerprint sample by utilizing a plurality of calibration targets and tests, wherein