What is claimed is:

1. A method, comprising:

(a) providing a vessel comprising a lumen and a wall, wherein the lumen comprises optically detectable analytes and wherein the wall is transparent to the optically detectable analytes;

(b) providing a detection apparatus comprising a preload apparatus, a rigid body, a detector and an objective, wherein a reference surface is located on a first side of the rigid body, the objective is located on a second side of the rigid body and the objective is positioned to transmit radiation from the first side of the rigid body to the detector; and

(c) optically scanning the vessel by

(i) sliding a length of the vessel along the reference surface such that the reference surface is in direct contact with only a portion of the length of the vessel at any time during the sliding,

(ii) detecting, by the detector, the optically detectable analytes including by acquiring signals transmitted from the optically detectable analytes through the wall of the vessel and through the objective to the detector, and

(iii) applying force from the preload apparatus to urge the vessel to contact the reference surface during the detecting.

2. The method of claim 1, wherein the preload apparatus pushes the vessel toward the reference surface during the detecting.

3. The method of claim 2, wherein the preload apparatus comprises a ball bearing that contacts the vessel during the detecting.

4. The method of claim 3, wherein the ball bearing is urged toward the vessel by a spring.

5. The method of claim 1, wherein a first contact area between the preload apparatus and the vessel is complementary to a second contact area between the reference surface and the vessel.

6. The method of claim 1, wherein the detection apparatus further comprises a rotating gear, wherein the vessel further comprises one or more perforations, and wherein the translating further comprises contacting the rotating gear of the detection apparatus with the one or more perforations.

7. The method of claim 1, wherein the vessel is urged to the reference surface by the preload apparatus during the translating.

8. The method of claim 1, wherein the objective observes the vessel through an opening in the reference surface.

9. The method of claim 8, wherein the preload apparatus has a contact area with the vessel that is opposite an area of the reference surface that surrounds the opening.

10. The method of claim 1, wherein the optically detectable analytes are attached to an interior surface of the wall that is in contact with the lumen.

11. The method of claim 10, wherein the optically detectable analytes form an array of distinguishable sites on the interior surface of the wall.

12. The method of claim 11, wherein the array comprises a density of at least 1000 sites per cm^2 and wherein the detecting comprises acquiring an image of the array at a resolution that distinguishes each site within the array.

13. The method of claim 10, further comprising: sequencing, based at least on the scanning of the vessel, nucleic acids at the array of distinguishable sites.

14. The method of claim 13, wherein the sequencing of the nucleic acids includes delivering, to the vessel, polymerases and nucleotides.

15. The method of claim 14, wherein the polymerases and nucleotides are delivered in each cycle of a plurality of repeated cycles, and wherein the vessel is scanned during each cycle of the plurality of cycles.

16. The method of claim 14, wherein the sequencing of the nucleic acids includes labeling sites of the array with fluorescent labels.

17. The method of claim 16, wherein the fluorescent labels are excited via radiation passing through the objective and wherein the signal comprises fluorescent emission from the labels.

18. The method of claim 1, wherein the position of the reference surface is fixed relative to the position of the detector during the optical scanning of the vessel.

19. The method of claim 1, wherein the reference surface comprises a planar surface that forms a flat ring surrounding a window through the rigid body and wherein the signals acquired during the detecting are transmitted through the window after being transmitted through the wall and before being transmitted through the objective.

20. The method of claim 1, wherein the objective comprises an array of lenses, wherein each of the lenses is configured to collect signals from different areas of the location within the length of the vessel.