This abstract discusses the design of a deterministic fixture to handle capsule fill-tube assemblies (CFTA) used in Inertial Confinement Fusion (ICF) targets on the National Ignition Facility (NIF)[1]. The CFTA, see Figure 1, consists of a hollow Ge-doped plastic sphere, called a capsule, ranging in outer diameter between 2.2 mm and 2.6 mm and an attached 150 µm diameter glass-core fill-tube that tapers down to a 10 µm diameter at the capsule.

A fixture, see Figure 2, was designed to manipulate the CFTA such that the entire surface of the capsule can be imaged using the 3D Surface Mapping System (3D SMS) [2], while providing a deterministic mounting better than 1 µm.

A detailed discussion of the design of the vacuum chuck and primary wand will be presented, which will include requirements, system functionality, contact mechanics and transport method.

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Figure 1. Schematic diagram of the CFTA.
Figure 2: Cross-sectional view of the CFTA handling fixture.