3sae Technologies, Inc.

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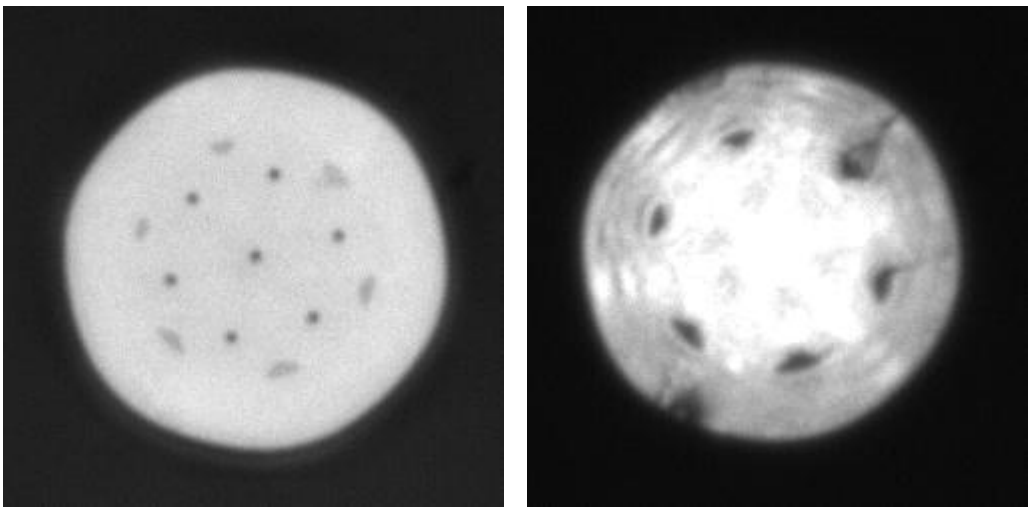
A Brief Introduction to 3SAE Large Diameter Splicer 7x1 Fiber Bundling

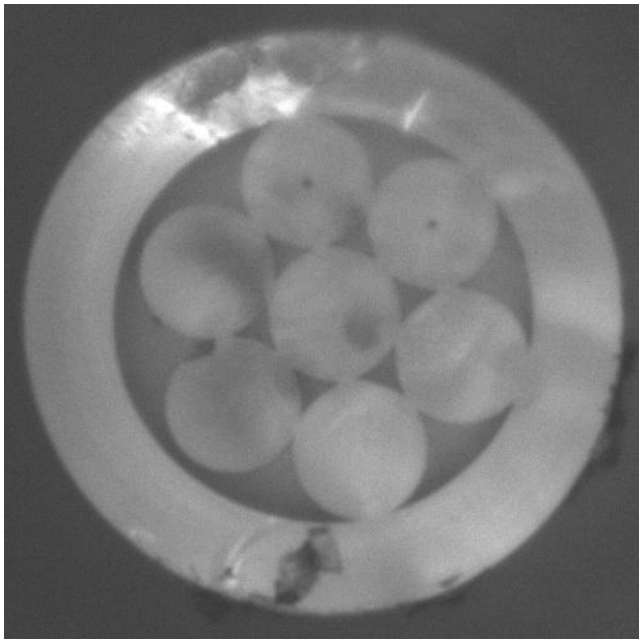
The 3SAE Large Diameter Splicer, LDS, is configurable to produce 7x1 fiber bundles by inserting seven fibers into a capillary that is tapered in the LDS to the appropriate diameter. The fibers and capillary are then tapered together to the desired diameter. The LDS contains an optional built in tension cleaver that will cleave the bundle which conveniently eliminates removing the bundle from for cleaving. With the cleaving option installed, the fiber bundle can be spliced in the LDS without ever removing or handing the bundle.

The following two images are end face images of a 7 fiber bundle tapered down to 110um measured at the outer diameter of the capillary. The outer diameter across the fiber claddings is 91um. The images are the same interface illuminated by two different methods to show different aspects of the fiber bundle.



The above two images are 7 fibers inside a capillary tapered down to an outside diameter of 110um.

Cleaving further upstream from the cleaved interfaces provides greater detail of the original fiber configuration. The outer diameter of the fiber bundle in the following image is 200um measured across the capillary. Note that the fibers are fused together at each intersecting point.



The above picture shows the arrangement of the fibers cleaved upstream from the 110um cleave point.

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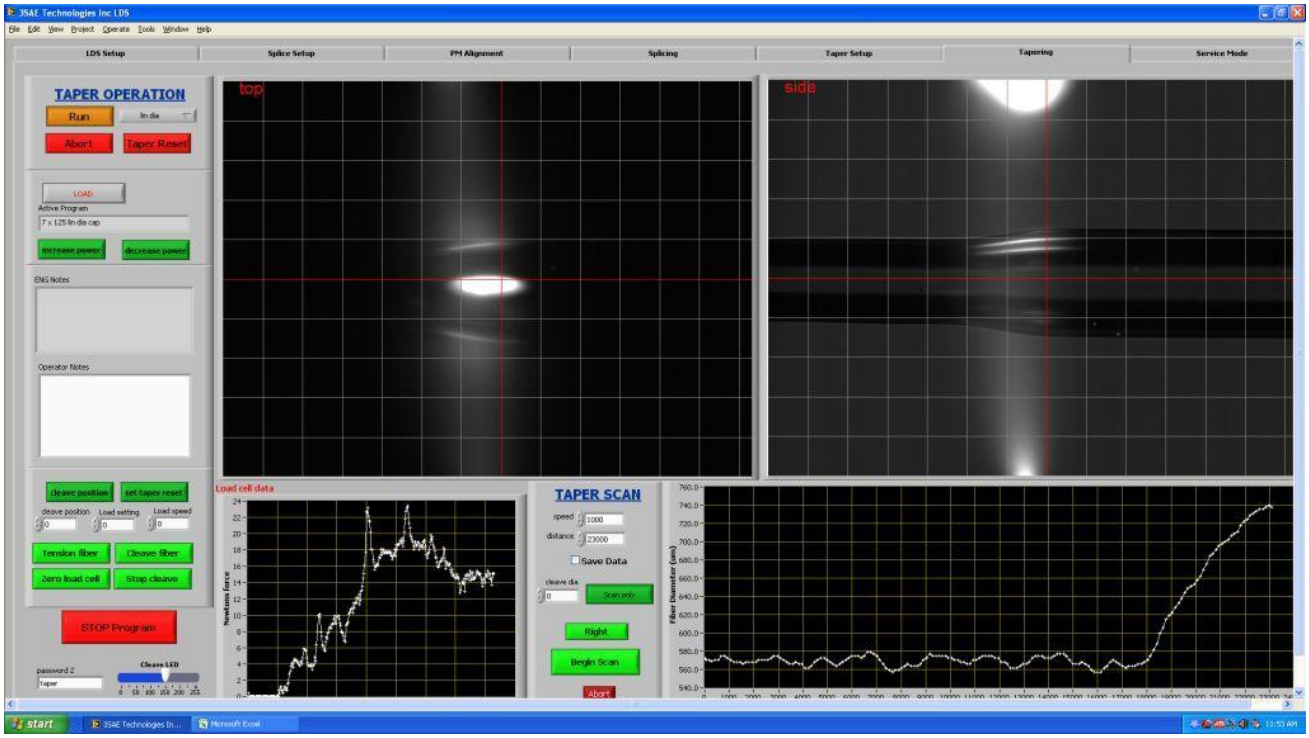
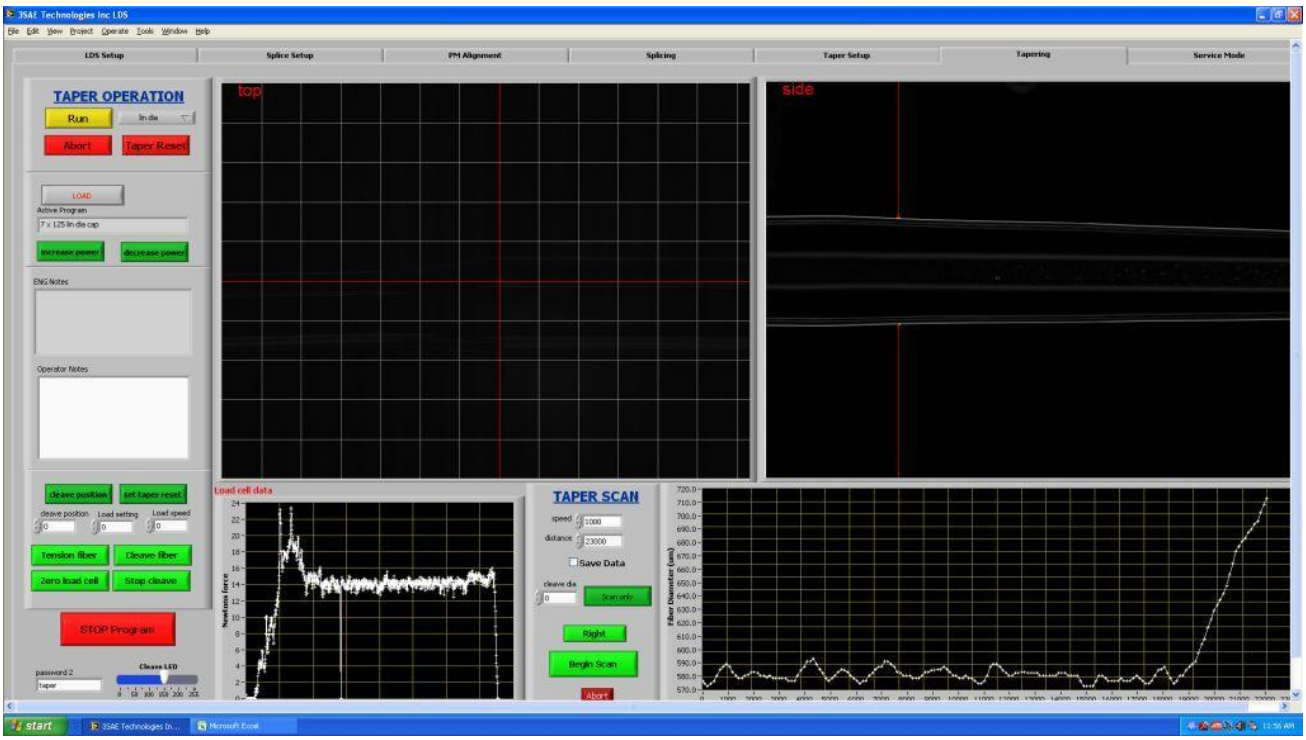
The following image is an “In Sequence” screen capture of the LDS tapering interface while tapering a capillary for use in creating a fiber bundle.



After the taper process is complete, the LDS offers a scanning feature for determining the outside diameter across the length of the tapered surface. The outer diameter scan is useful for determining the profile of the tapered fiber. This same diameter data can then be used to set the cleave point on a capillary or on a fiber bundle. The following image shows the diameter scan in process:



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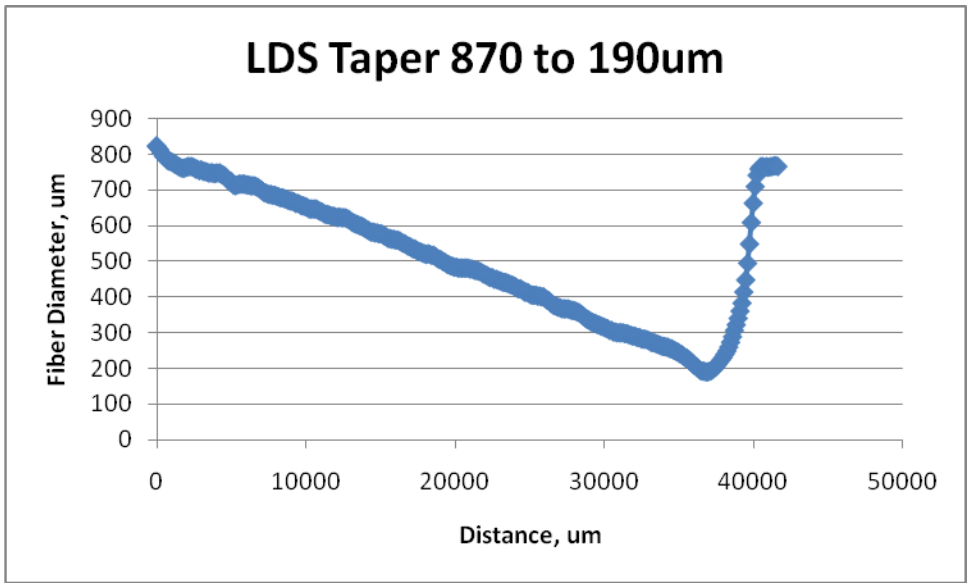
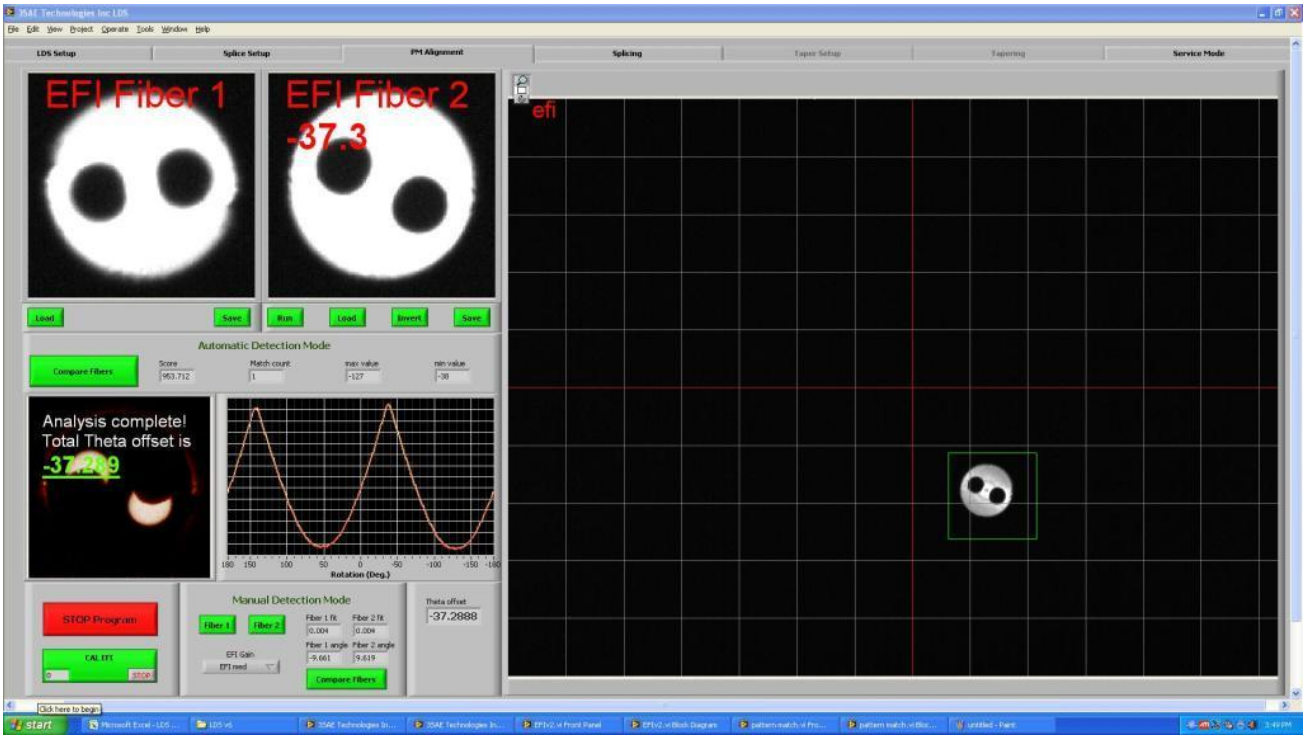
The LDS programming interface allows creation a custom recipe for tapering fibers across a very large diameter and length range. The following chart is the recorded data set for an 800um fiber tapered down to less than 200um in diameter, over a span of 40mm. The LDS tapering control allows for tapering to diameters less than 50um.



The LDS is also configurable with an optional end face camera and PM alignment system that is used for PM alignment and splicing. The end face imaging can also be used for imaging the end of the fiber bundles after cleaving.



In the above image, the top fiber images of the left and right PM fibers are compared to determine the appropriate rotational alignment prior to spicing the fibers. The large area to the right is the live image displaying the right fiber, “EFI Fiber 2” and the calculated rotational offset is displayed at -37.28 degrees.