

MODEL DEFORMATION SYSTEM

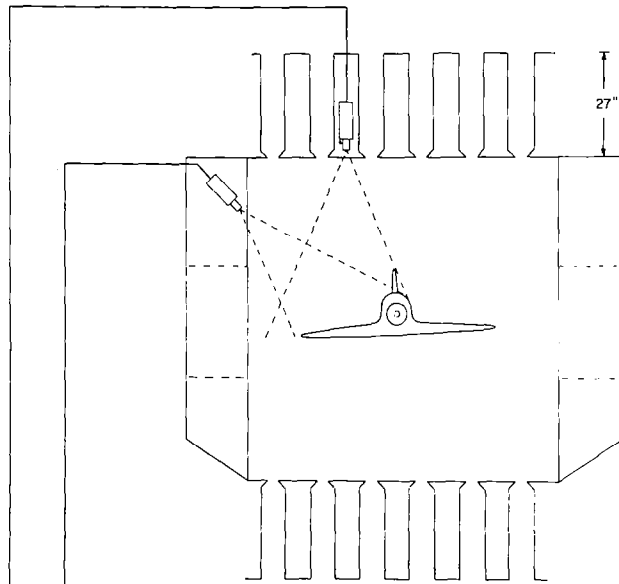
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The high model loads to be encountered in the National Transonic Facility (NTF) will cause large model deflections, thus creating a new measurement requirement, that of measuring model deformation. Our goal is to be able to measure peak deflections of up to 3 in. with accuracies to within 0.0025 in. over an area 1 m square as the model pitches through an included angle of 30°. Stereophotogrammetric techniques are being implemented, with the initial system being an extension of standard techniques. A second system, which will be all electronic, is under development. Both techniques will require targets to be strategically placed on the model. Active targets are being developed for location in the model in order to maximize the signal-to-noise ratio and to approximate a point source. Image-processing techniques and stereophotogrammetric data reduction programs are being implemented to perform the data reduction tasks.

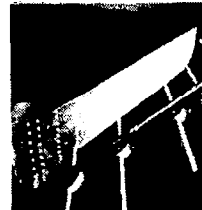
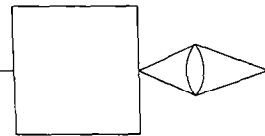
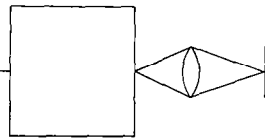
SPECIFIC TECHNICAL REQUIREMENTS

- VIEWING AREA - 36 IN. SQUARE
- MODEL PITCH - 11 TO +19 DEGREES
- MEASUREMENT TIME - < 2 SECONDS
- NUMBER OF POINTS - UP TO 50
- MAXIMUM DEFLECTION - 3 INCHES
- ACCURACY DESIRED - ± 0.0025 INCHES
- ENVIRONMENT
 - TEMPERATURE - 140 TO 610°R
 - PRESSURE - 130 PSIA MAX
 - SOUND PRESSURE - 150dB SPL

MODEL DEFORMATION MEASUREMENT FOR NTF

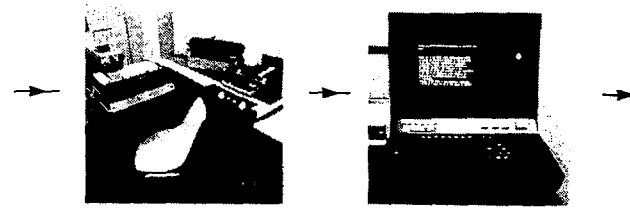


- EXTENSION OF STANDARD TECHNIQUE
- REAL-TIME MONITORING OF DATA
- DOES NOT REQUIRE TUNNEL ENTRY
- UPGRADABLE (DIGITAL IMAGE PROCESSING)



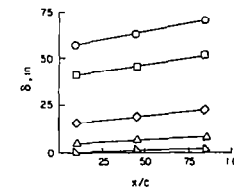
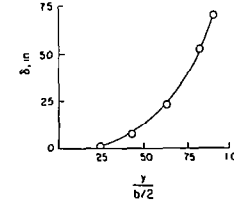
CRTS

CAMERAS

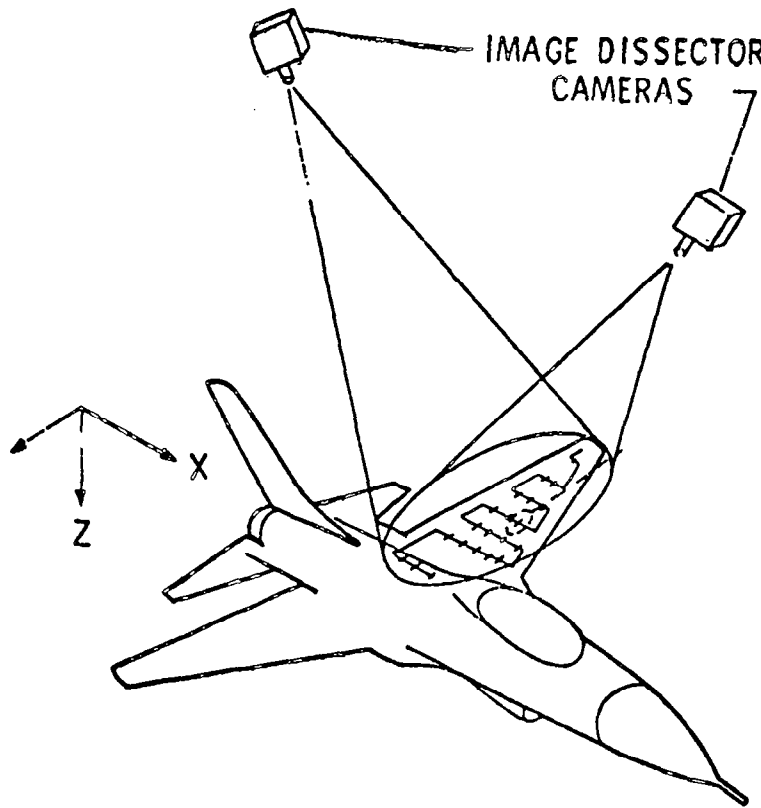


COMPARATOR

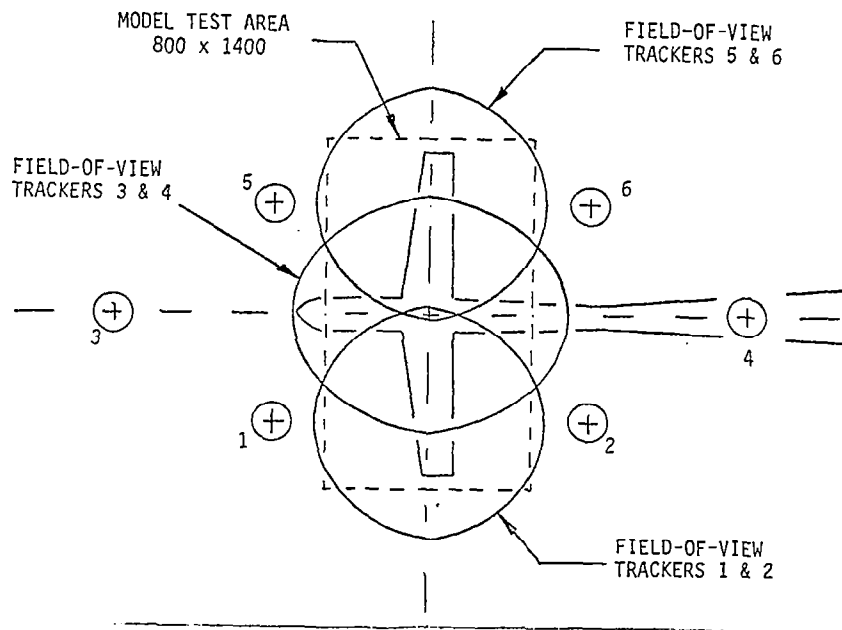
DATA REDUCTION



SCANNING STEREO PHOTOGRAMMETRY

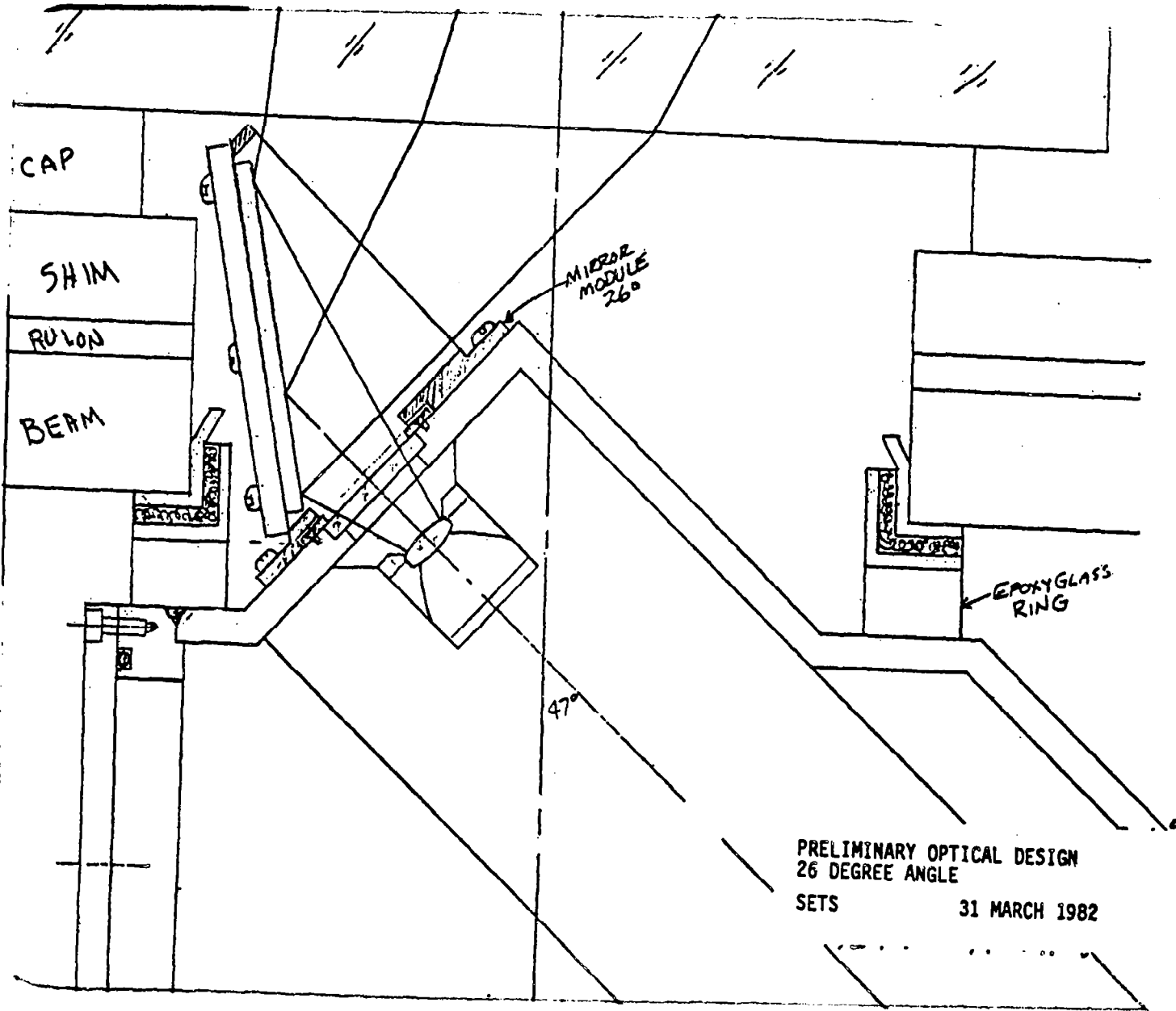


STEREO ELECTROOPTIC TRACKING SYSTEM (SETS) FIELD OF VIEW



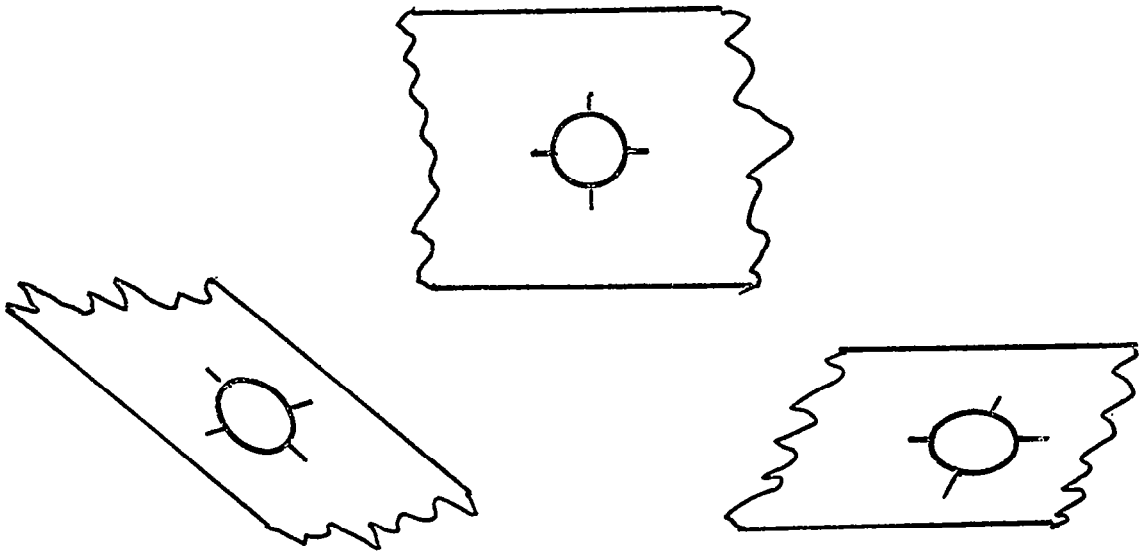
NOTE: FIELDS OF VIEW ARE IN A PLANE THROUGH THE TUNNEL CENTER LINE ($Z=0$)

SETS PRELIMINARY OPTICAL DESIGN (26° angle)

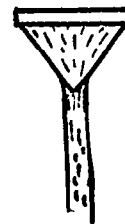
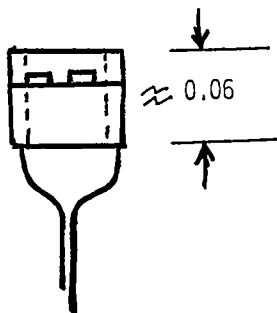
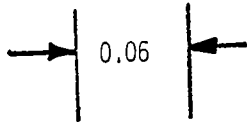


PRELIMINARY OPTICAL DESIGN
26 DEGREE ANGLE
SETS 31 MARCH 1982

TARGET ORIENTATION



ACTIVE TARGET CONCEPTS



MULTIPLE LED

MULTIPLE FIBER