HESCO

High Energy Services Corp.

Customer applications of a MINI- *LINATRON* 3000A supplied to Arnold Engineering and Design Center (AEDC), Tullahoma, TN. USA

The Center is responsible for test and analysis of various rocket and turbine propulsion technologies for government and civilian agencies. Through their facility management contractor Schnieder Services International, they acquired a MINI-*LINATRON* 3000A in the spring of 1994. This system has the capability of operating in either of three modes: 6, 9 or 11Mev. Additionally, the system was delivered with a remote option which allows the control to be located up to one mile from the point of x-ray generation. This option permits the operator to be stationed clear of the blast perimeter, which is generally much larger than the required radiation perimeter.

The MINI-*LINATRON* is used to support the radiographic analysis of motors at the Center as well as at remote field locations around the country.

A high altitude test facility on-base is used as a test bed for intermediate to large rocket motors. This facility (J6) is capable of maintaining an equivalent altitude of 100,000 ft. around an operating rocket motor such as the Minute Man ICBM. The MINI-*LINATRON* allows real-time imaging of all operating sections of these motors (see photo).

This system has also been used at the production and test facility of Thiokol Corporation in Brigham City, Utah for real-time live-fire tests of the Space Shuttle SRM as well as a series of smaller specialty motors.

The SRM program used the 9 Mev mode generating real-time images of propellant and inhibitor interaction at one of the three main motor field joints. These are the same joint locations that suffered the failure that led to the loss of the Challenger Shuttle (see photo).

The small motors were part of a test program designed to analyze the effectiveness of software intended to predict failure modes relating to a number of common production and design defects. Since some of these motors were expected to fail in operation, it was important to protect the accelerator from the blast effects. The high output of the system in the 6Mev mode allowed the accelerator to be placed far from the motor itself. The greater source-to-imager distance avoided the usual damage experienced during catastrophic motor failures and also reduced the geometric unsharpness and distortion of the images.

The portability of the system gives the user the capability to support radiographic needs in the Center turbine test beds as well. The Center operates one of the largest high altitude turbine test facilities in the world. This facility is responsible for many of the final stage operational and environmental testing needs of the major commercial and military turbine motor manufacturers, including the current 100,000 lb thrust engines for the Boeing 777-200.