readings. This study, based upon the analysis of recordings of more than 7,000 earthquakes, has resulted in the delineation of systematic location correction terms. Application of these correction terms will help facilitate reliable and speedy (from 20 minutes to one hour) epicentral determination of any well-recorded seismic event occurring within a 10,000 kilometre radius of the YKA.

The data-intensive approach described above is complemented by the development of a new method of signal identification and processing. Rooted in recent advances in mathematical engineering, the "oriented energy approach" has been introduced by the University of Toronto team into seismic wavefield analysis, taking advantage of the recent availability of the three-component, broadband recordings of the refurbished YKA. Preliminary investigations have shown that the new approach facilitates effective recognition of signals which are buried in noise.

The above teleseismic verification research is carried out in parallel with regional (close-in) verification research aimed at monitoring low-yield nuclear explosions using seismic network stations outside and inside the territory being monitored. Our regional research focuses upon the propagation, attenuation, geological distortion (site effects) of two regional seismic waves — L_g and P_n — of paramount importance in nuclear test ban verification.

A novel technique for measuring the decrease in energy over distance (i.e. attenuation) for L_g waves has been developed and successfully tested in the low-attenuating Canadian Shield. We have shown that the new technique is capable of detecting a minute amount of attenuation suffered by the L_g waves over Canadian Shield paths as short as 100 km — in the presence of conspicuous site-related differences. Spatial resolution on this scale is a valuable asset in monitoring low-threshold nuclear test ban treaties.

Development of an effective method for measuring P_n attenuation proves to be more challenging. Unlike other seismic phases, the P_n propagation mode, and hence the manner in which its energy spreads out geometrically (a phenomenon unrelated to attenuation), is poorly known. The uncertainty concerning the P_n geometrical spreading rate is well known to be a major source of error in the determination of the P_n attenuation. We have recently completed the development and testing in the Canadian Shield of a method for simultaneous determination of the P_n attenuation and the P_n geometrical spreading rate.

In order to preserve "earthquake-like" and "explosion-like" signature characteristics of arriving L_g and P_n waves and to "standardize" the station site amplification factor for reliable yield estimation, we have striven to overcome the