Proposal Abstract K27(A77)

1. **Arms Control Problem:**
   Nuclear weapons - comprehensive test ban
   - peaceful nuclear explosions

2. **Verification Type:**
   (a) Seismic sensors - intra-border stations
   - extra-border stations
   - international network
   (b) Remote sensors - satellites
   - ELINT
   (c) Short-range sensors - monitoring devices
   - sampling
   (d) On-site inspection - selective
   (e) International exchange of information
   (f) Literature survey

3. **Source:**
   Dahlman, Ola and Hans Israelson. Monitoring Underground Nuclear Explosions. Amsterdam: Elsevier Scientific, 1977.

4. **Summary:**
   This book provides detailed coverage of the political and scientific issues surrounding the verification of a comprehensive test ban. It includes chapters on:
   (1) The test ban negotiations to 1976 with summaries of the positions of several countries on the issue.
   (2) Background information on nuclear explosions.
   (3) Background information on seismology and seismic sources.
   (4) Description of existing seismic instruments (seismographs, recording equipment, array stations, future developments) and existing networks (national, World Wide Standard Stations Network, array stations. Very-long-period Experiment Stations, Seismic Research Observatories, ARPANET, "black boxes").
   (5) Problems and capabilities for signal detection. (The authors conclude that seismic events with magnitudes down to about 4 can be detected over teleseismic distances, but to obtain such a capability a network of stations must be established. To achieve a lower detection threshold, stations at short distances from the even must be employed).
   (6) Problems and capabilities for event definition and location. (The authors state that in most cases seismic events can be located to an accuracy of 10-20 km. If data from ten well distributed stations are available. If calibration data from earlier events in the region are provided (as in the Threshold Test Ban Treaty) then the event can be located to within 5 km).