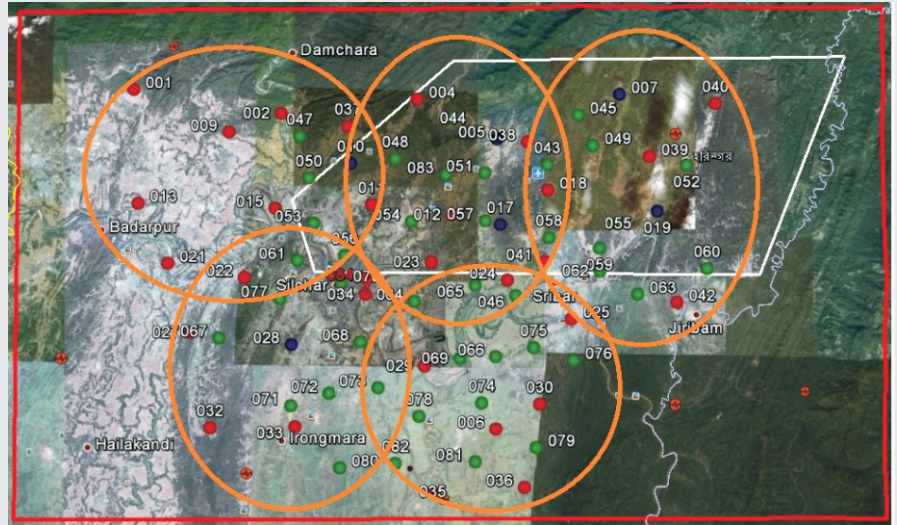




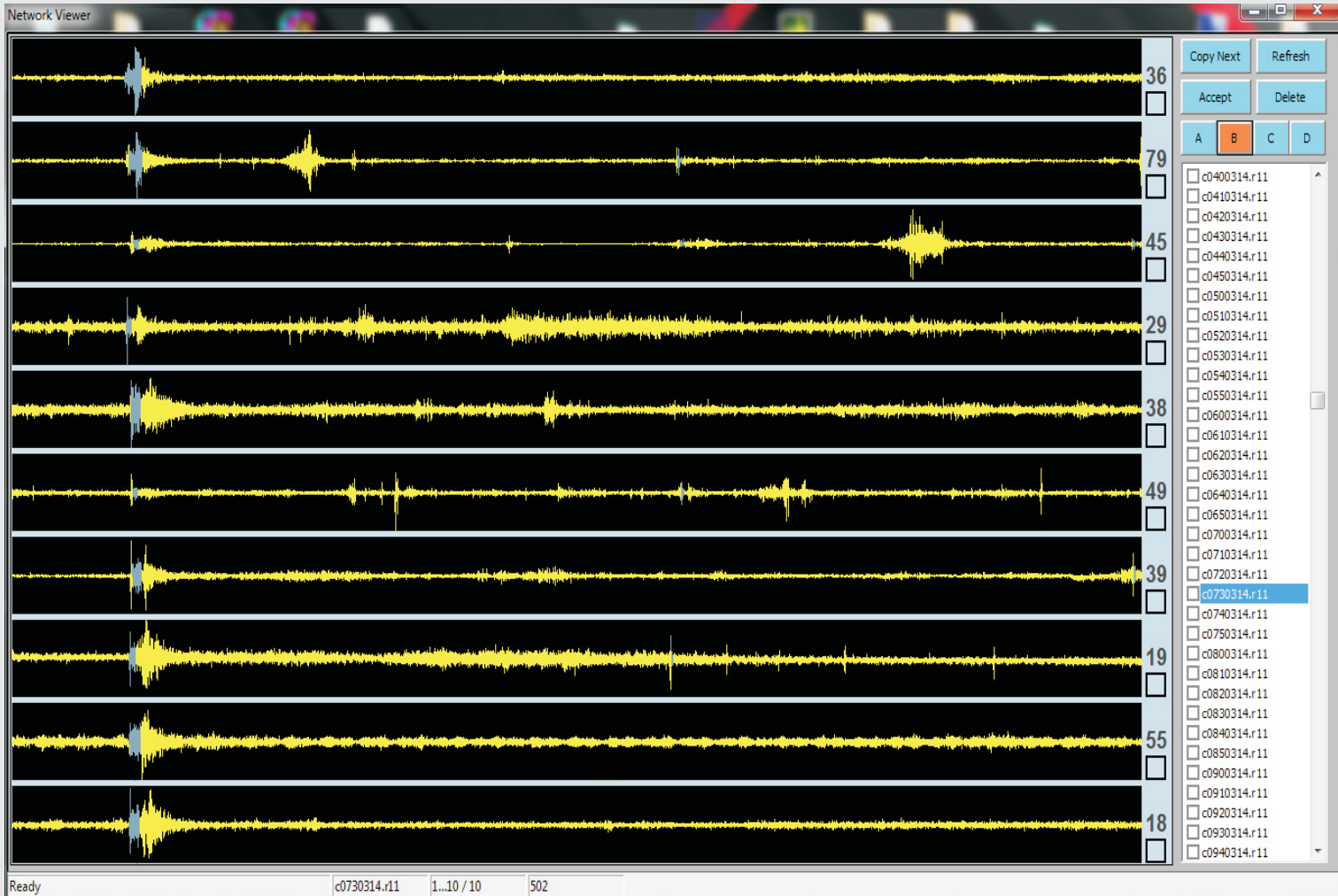
Monitoring the earth 

- Automatic Event Detection
- Modular Architecture
- Network Topology
- Multi Algorithm Functionality
- Visual Post Processor
- Smart elastic clamping



Supported Algorithms:

- Recursive STA/LTA
- Standard STA/LTA
- Delayed STA/LTA
- Frozen STA/LTA
- Bleeding STA/LTA
- Filter Picker
- Algorithms for P & S-onset times estimation
- Modified Recursive STA/LTA (GEObit Patent)



Software Operation

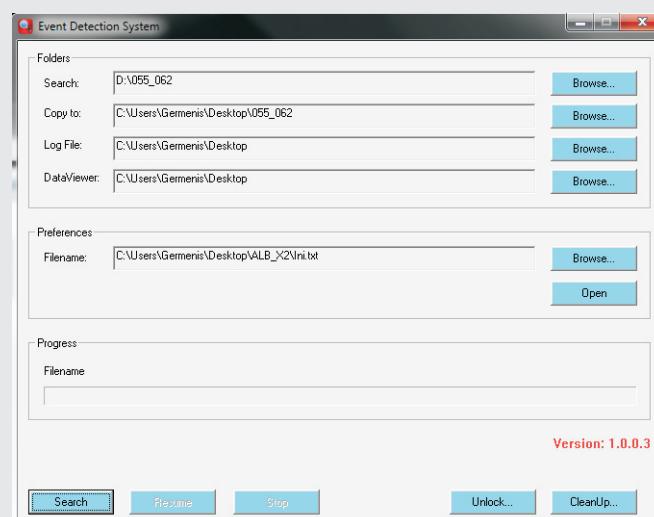
The Event Detection software has been developed on the following independent modules:

- 1. Trigger.** The trigger module applies the recursive STA/LTA algorithm on a file and detects triggers regardless if the trigger is generated by noise or seismic event.
- 2. Classifier.** The Classifier module uses high order statistics to categorize the trigger as noise or seismic wave.
- 3. Associator.** The Associator module compares the time stamp of the primary arrival of the seismic waves of all stations of the same group. If the time difference is less than a value in a predefined number of stations, the seismic wave is identified as event.
- 4. Post Processor.** Gives the ability to the user for plotting the files with the selected events, to confirm that the triggered data are seismic events. False triggers can be rejected by the user.

During the developing of the software, many seismic algorithms were tested, for the detection of the arrival times of the events. When data are noisy, best results were obtained by applying the "recursive STA/LTA" which combines speed and reliability as it is a real-time sequential algorithm and its implementation is easy. However, the algorithm has one basic disadvantage when it has to be applied in random noise signals. The trigger threshold value is fixed so the algorithm will not be applicable in noisy data.

This disadvantage has been eliminated with the use of variable threshold level, which automatically is set from each file being processed. Thereby the sequential behavior of the algorithm recursive STA / LTA algorithm is maintained and it still remains real time.

The raw data have to be organized in files named with the station number. Station numbers must start from 01 to 99. This dataset can be under any directory like "visits_9_10_11_12" or whatever. The output directory has to be initially created from the user, and it's path has to be added to the appropriate field on the software form. The parameters of the ini.txt file have to be set by the user, and it's path has to be added on the software form as well. Then just pressing the "Search" button, the software will do the seismic event detection, and select and copy all the files. Further data post processing will be applied by the user, using the "CleanUp" procedure. Plotting of the data will be done, in group of stations, like they have been processed. All the trigger points of the waveform will be grayed from the data plotter helping the user to confirm if the detected signal is a seismic event or a false event.



The screenshot shows the 'Event Detection System' window. It contains several input fields and buttons:

- Folders:** Search (D:\055_062), Copy to (C:\Users\Germeris\Desktop\055_062), Log File (C:\Users\Germeris\Desktop), Data Viewer (C:\Users\Germeris\Desktop). Each field has a 'Browse...' button.
- Preferences:** Filename (C:\Users\Germeris\Desktop\ALB_X2\ini.txt). It has 'Browse...' and 'Open' buttons.
- Progress:** A section with a 'Filename' label and an empty text box.
- Buttons:** Search, Pause, Stop, Unlock..., and CleanUp... are located at the bottom.
- Version:** 1.0.0.3 is displayed in red text at the bottom right.