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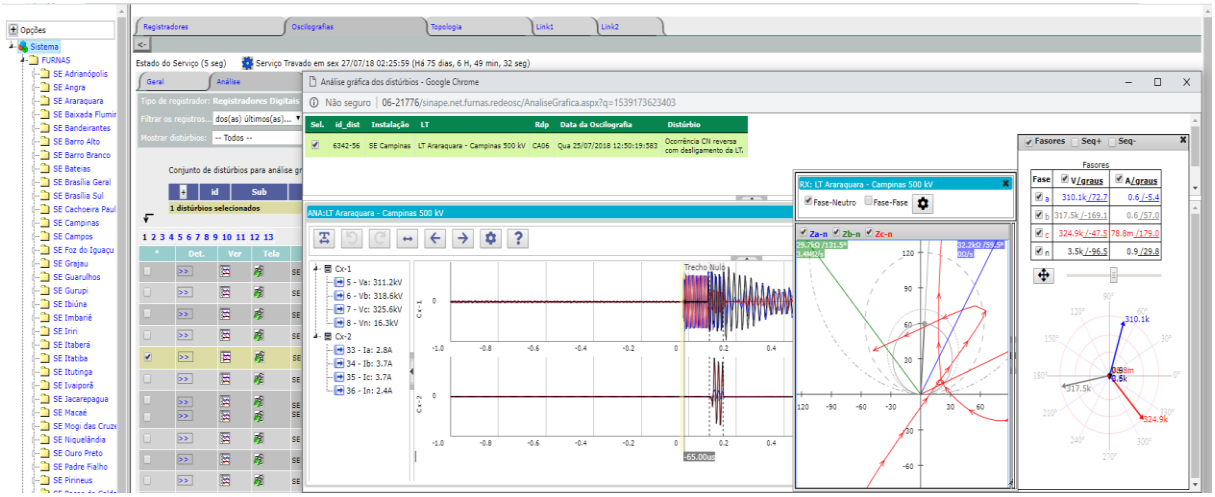
COUNTRY : Brazil	PREF. SUBJECT : 2
REGISTRATION NUMBER : 5200	QUESTION N° : 3

Q. 2.03: What are the experiences to fault identification and location and how to design the scheme to meet the practical application requirement?

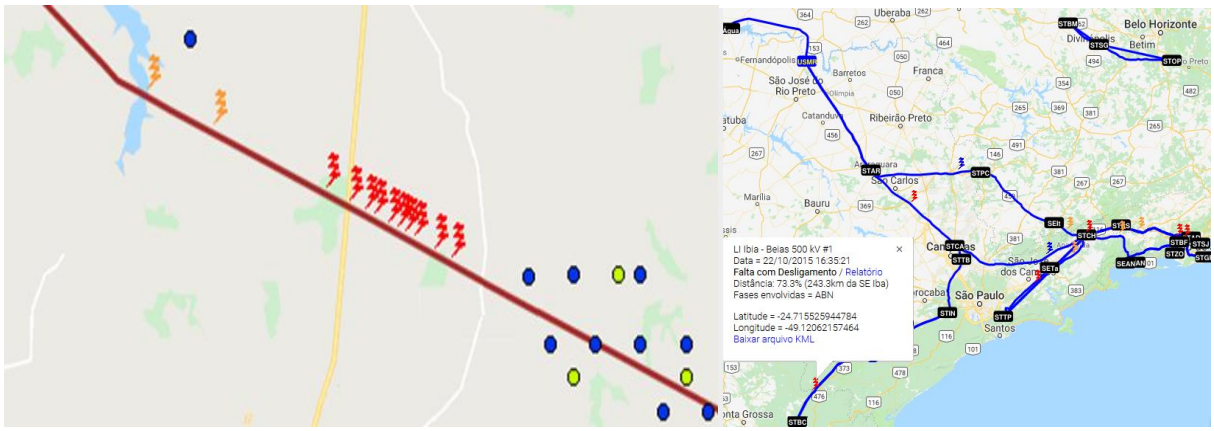
The contribution highlights a commercial application called SINAPE.Net (Automatic Oscillography Management and Analysis System) developed by CEPEL (Electrical Energy Research Center, at Rio de Janeiro, Brasil). The software uses a client-server architecture and performs automated fault recording analysis, indicating fault characteristics like fault type, line disconnection and fault location. It has a modern HTML graphical user interface implementing a complete set of features for DFR analysis, including signal plotting, symmetric components calculation, impedance chart (RX graph) etc. It works with recordings from dedicated devices and multifunction IEDs.



SINAPE.Net calculates fault location using impedance (data from one or two terminals) and travelling wave (TW) methods (data from two terminals). TW recordings consist of high sampling frequency high-pass filtered recordings from TW fault locators.

TW fault locators produce a large number of recordings, even if the line was not affected by a fault. Correlation to regular (lower sampling frequency) fault recording analysis is used to discard false recordings. The system has a dashboard where the most precise result available is displayed.

Calculated fault location can also be correlated to geographic localized phenomena (fire burnings and lightning), which can be used both to determine the fault cause and to improve fault location figures. In the figure below, it can be seen the calculated position of a number of recurrent faults in a transmission line in Brazil (in red) and the position of fire burnings (blue and green circles) from satelites.



Although within the expected error range for impedance based faut location, a systematic error can be noted, when positions of fire burnings are included in the map.