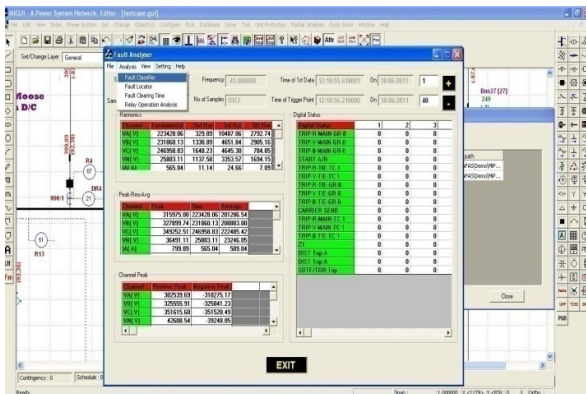# MiFAS

MiPower-Fault Analysis System

Introduction

MiPower Fault Analysis System (MiFAS) is a unique package which helps in analyzing the system conditions during disturbances. MiFAS is aimed at performing various major type of analysis such as fault identification, fault classification, fault location, fault signature analysis and relay operation analysis.

MiFAS
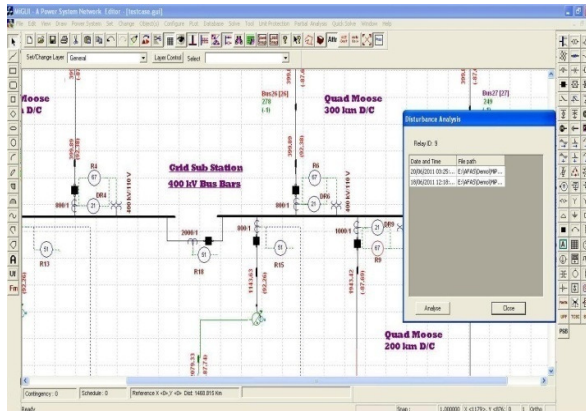
- o Inputs are considered as per IEEE standard C37.111-1991/99 COMTRADE format.
- o Selection among various input files.
- o Creation and Editing of network.
- o Facilities for both Manual and Automated mode
- o Deriving various quantities as an output such as rms, peak, average, harmonic content etc....
- o Options to provide various level of analysis.

Types of Analysis

The package provides various types of analysis such as:

- o Fault Classifier
- o Fault Locator
- o Fault clearing time
- o Relay operation Analysis

Fault Classification and Location

- o MiFAS effectively differentiate between normal and abnormal conditions in the system.
- o Analysis provides classification for various type of fault.
- o Provides location of the fault on the transmission line by using both single ended and double ended algorithms.
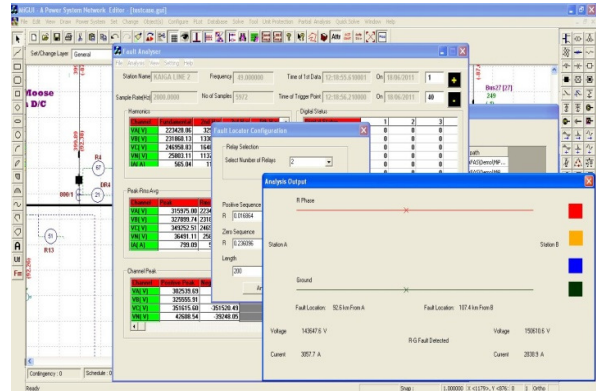
Relay Operation Analysis

- o This analysis can be utilized to verify various protective schemes.
- o It can assess the performance of protective schemes under critical situations
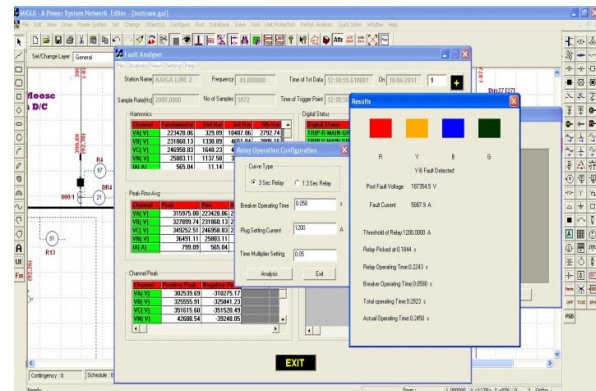
Graphical Analysis

Four Levels of Analysis

Level of analysis is restricted to the one particular equipment.

UNIT LEVEL

System Level Analysis

Station 2

Station 3

Station 4

Station Level Analysis

Bay Level Analysis

440KV 220KV
Unit Level Analysis

Station 1

STATION LEVEL

Various contingencies including line outages, protection system failure, faults etc. can be evoked.

In this case analysis is depended on communication channel, relay and circuit breaker employed at both terminals

BAY LEVEL

SYSTEM LEVEL

This level will provide broad overview of system with certain critical information such as phase angle between two stations, system frequency, voltage levels etc.

Description of Analysis

Protection relay operation analysis

This type of analysis can be majorly utilized to verify various types of protective schemes employed in the system. It should able to perform verification operations for performance of CT, CVT, relays and other protective equipments. It should also be able to assess the pe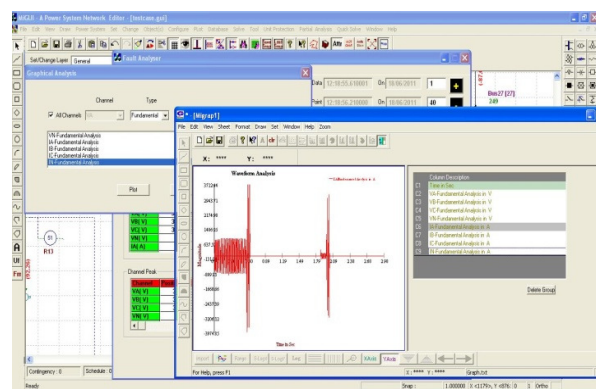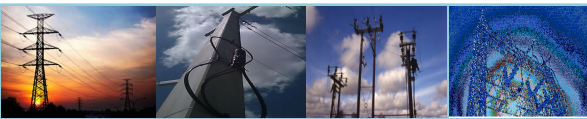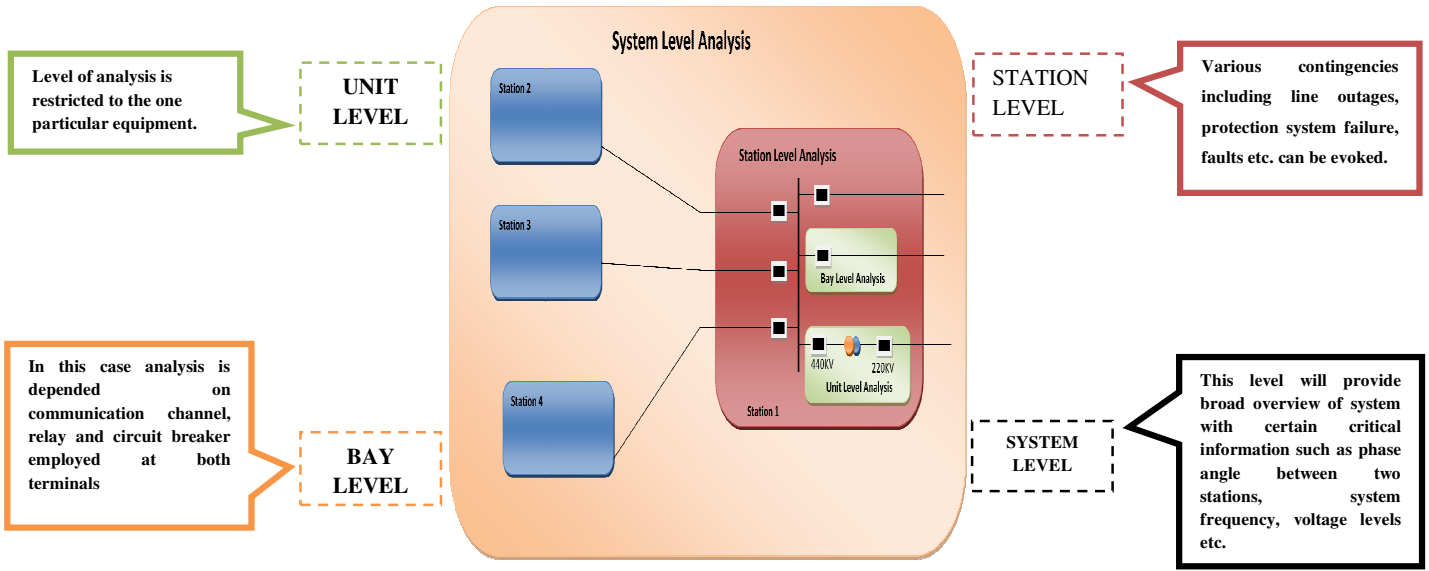rformance of protective scheme under various critical situations such as faults, load throw off, higher loading on system, relay mal operation etc. MiFAS should also provide user with number of additional tools which can be best utilized for their analysis to given understanding of system and develop their skills.

Fault identification:

MiFAS identifies the faulty condition in the system from data provided. It should be able to discriminate very effectively between a faulty and normal operation of system. Proper checks and messages evoking need to be made available at various steps of analysis in case of any discrepancy in the data.

Fault signature analysis

This in addition to fault identification and classification to give more insight to user what is the cause of fault. System should be able to classify the fault among the number of possibilities for their occurrence. For example if single line to ground fault occurs on transmission line, analysis should be able to distinguish whether fault is due to lightning, tree fault, bird collision or pulled insulator it can also take to predict some peculiar events or behaviour based on the past experience.

MiFAS

Fault classification

Once MiFAS has identified that fault persist in the system, next step will be to classify type of fault. The analysis should be able to discriminate between various types of faults (for example: three phase to ground, single line to ground etc) in précised manner based on available voltage and current data.

Fault location

This application can be specific to overhead line and cables. The analysis should be able to correctly predict the distance of fault. The algorithm considered and its accuracy need to be well defined highlighting limitations if any. The data required for the analysis should be confirmed as it can be based on single ended or two ended data availability depending on the communication interface.

Fault summary:

It is the part of output obtained after analysis has been performed. Fault summary can be obtained in report format or graphical representation of event including inputs considered, values or desired quantities obtained and result availed after the analysis. Summary should be formattable to accomplish given user needs.