

FAULT ANTICIPATION IN DISTRIBUTION NETWORKS BY RTDS

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RTDS USER GROUP MEETING

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Biography

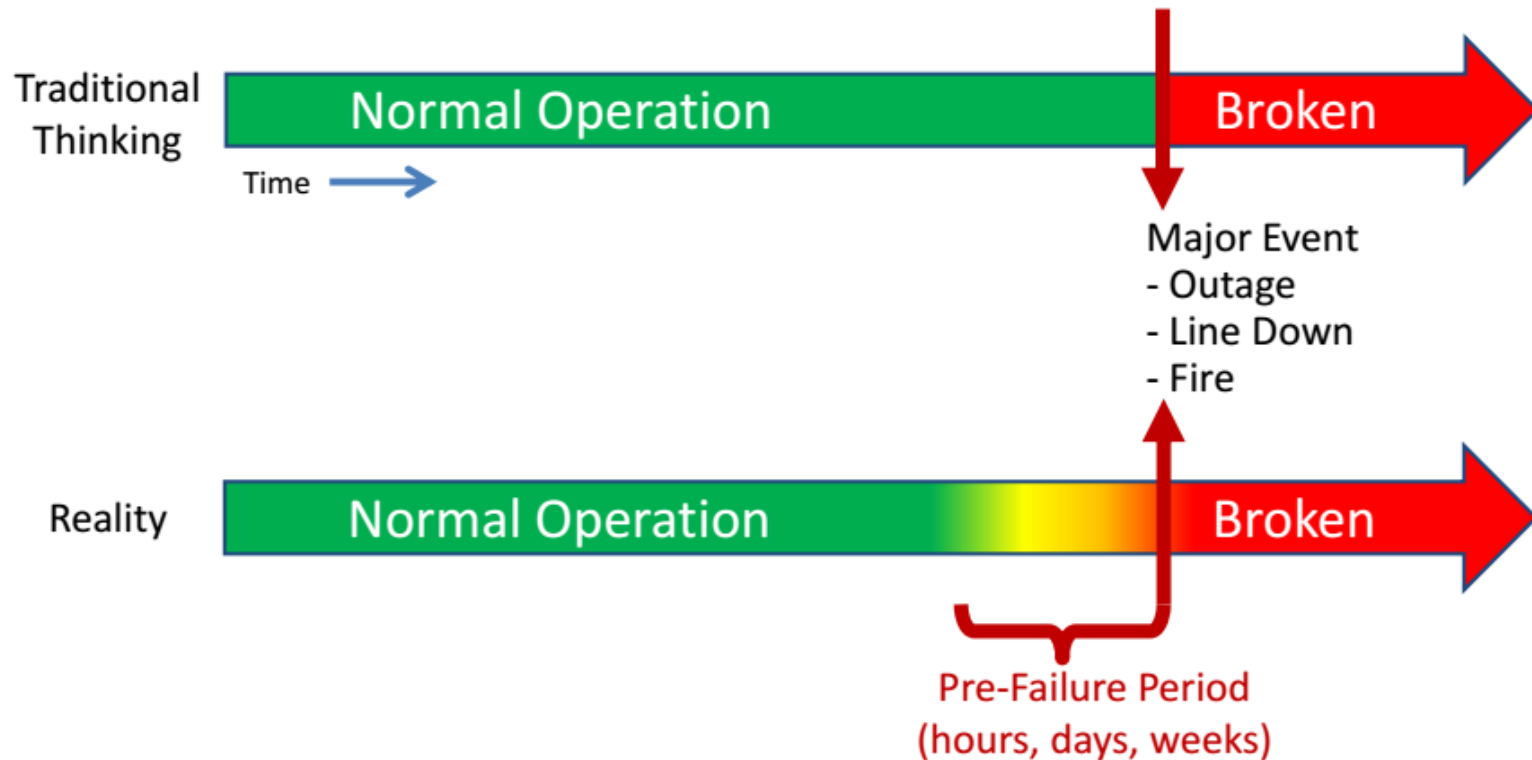
- Name: ***Rishabh Bhandia***
- ***PhD student in Delft University of Technology from January 2016.***
- Thesis Title: ***Improved power grid reliability by fault anticipation methods.***
- Supervisor: ***Prof.dr. Peter Palensky***
- ***Involved In ERIGRID (European Research Infrastructure supporting Smart Grid Systems Technology Development, Validation and Roll Out) project***

RTDS in TU Delft

- The RTDS installation at TU Delft consists of 8 racks with 10 PB5 and 36 3PC cards, capable of simulating grids in 2 μ s and 50 μ s step size.
- The rest of the 3PC cards to be soon replaced with PB5 cards.



Fault Anticipation (1/3)



Source: John S. Bowers, Jeffery A. Wischkaemper, "Distribution Fault Anticipation," TechAdvantage 2014, Tennessee

Fault Anticipation (2/3)

- *The main aim is to study and analyse the electrical parameters of the power system which can give us an indication of the fault.*
- *Identifying and defining the limits beyond which the behavioural pattern of the parameters can leave a signature of the fault.*
- *Creating a master algorithm to automate all these functions.*
- *Testing and validation in a co-simulation setup.*

Fault Anticipation (3/3)

SMART ELECTRICAL GRID



- Analysis of parameter patterns to identify faults.
- Corrective actions taken by algorithm and relayed back to the grid.
- All actions taken to be stored in library for quick reference and response in future for similar faults.

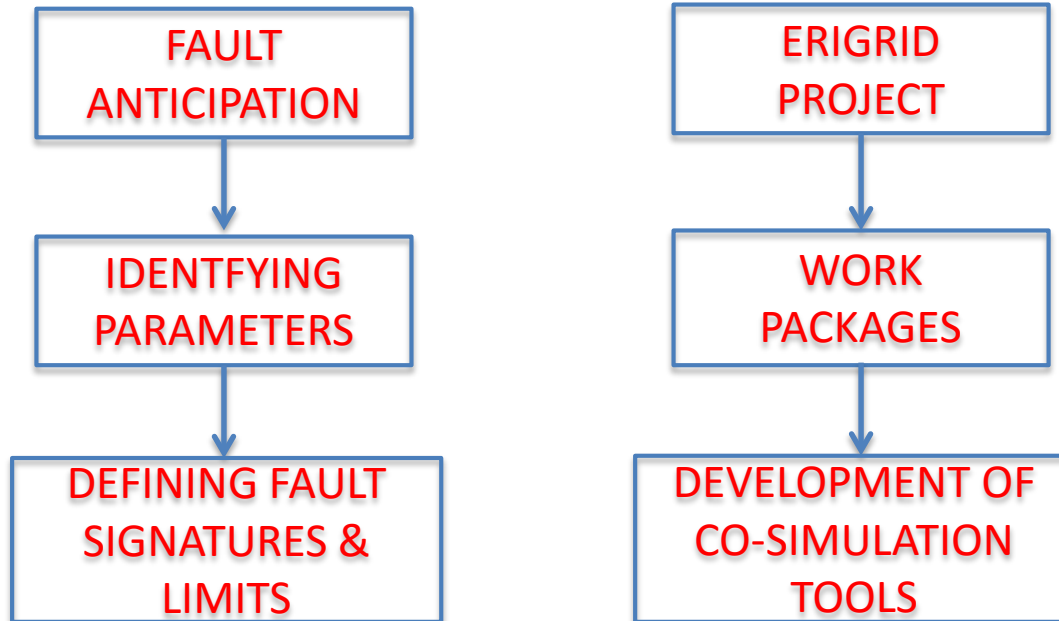
Approaches

- Waveform analytics , modified Kalman filter are some approaches currently used.
- Electrical Power Research Institute (EPRI), USA funding research with other universities.

Challenges

- Availability of high-fidelity recording instruments.
- Huge amount of data to analyze critically, maybe need of specialized codes or software's.

Methodology



CO-SIMULATION PLATFORM



USE-CASES & TEST-CASES



WHY RTDS ?

- It can simulate in real time, different scenarios and different power grid configurations with fast, reliable and accurate results.
- HIL (Hardware in Loop) testing capability of RTDS helps in testing of physical devices across wide range of applications.
- The new PB5 card means more computing power and especially that two subsystems can be now simulated in one rack.
- In ERIGRID, TU Delft's RTDS facility has been listed as research infrastructure for transnational access by partners for experimental purposes.

Questions & Feedback