Paris Session 2022

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

B5-PS2

Q2.03

Paulo Junior - Brazil

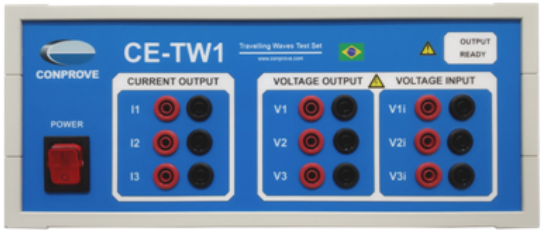
Q2.03

- ***Why fault locators and protection based on traveling waves?***
  - **High** accuracy location;
  - **Fast** Trip: allows improvement of system **stability** and reduces stress on components;
  - Protection of **hybrid and compensated lines**.

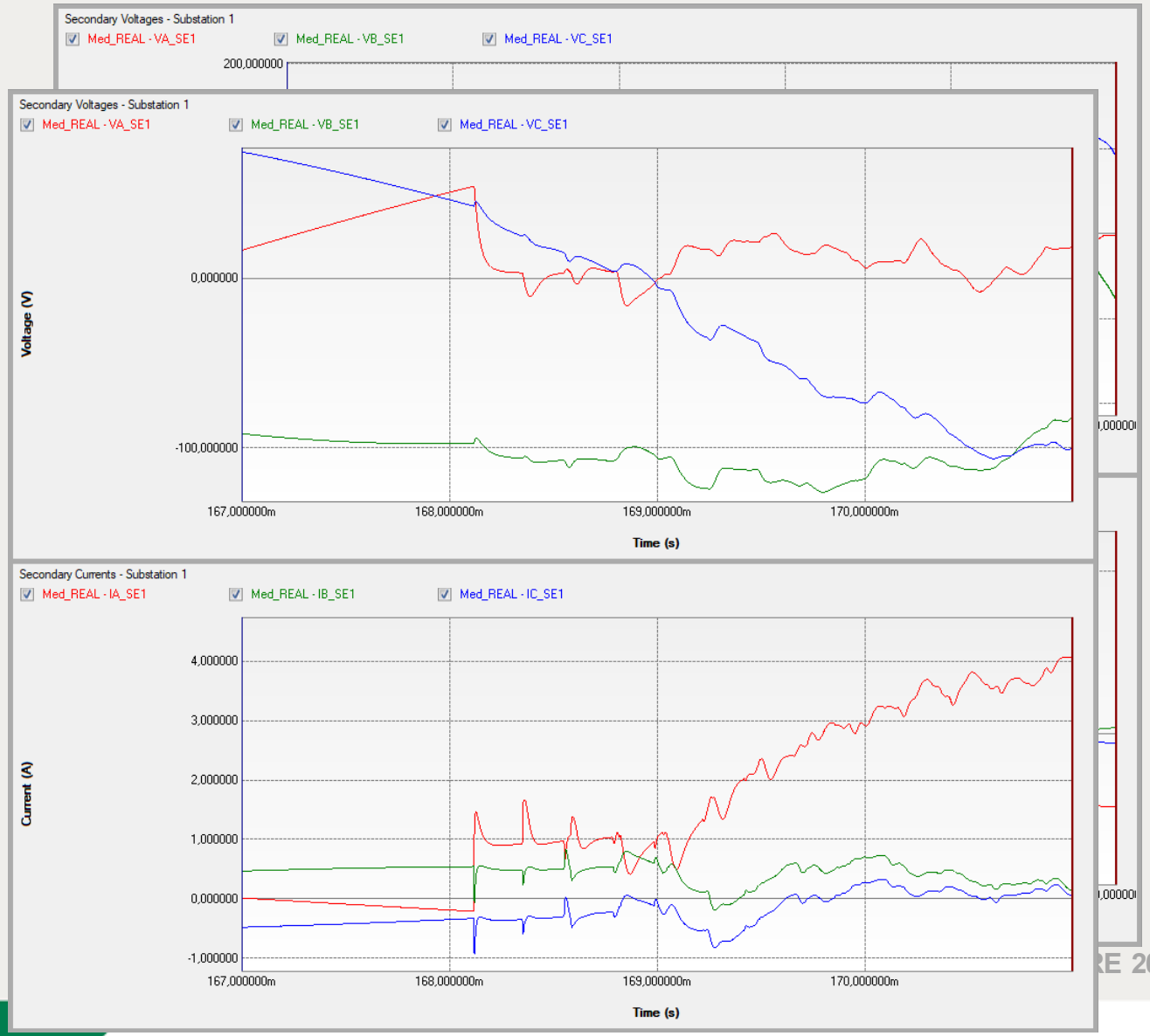
- ***Experiences in testing fault locators based on traveling waves***:
  - CIGRE GROUP Participation Mirror: ***B5.55***;
  - Supply of ***TW Laboratory*** for ***energy utilities***.
  - ***Thousands*** of tests on ***commercial IEDs*** of different manufactures changing fault type, fault location, incident angle;
  - ***Electromagnetic transients*** simulation ***software (PS Simul)***;
  - Testing using ***frequency dependent*** line model (Phase-Domain).

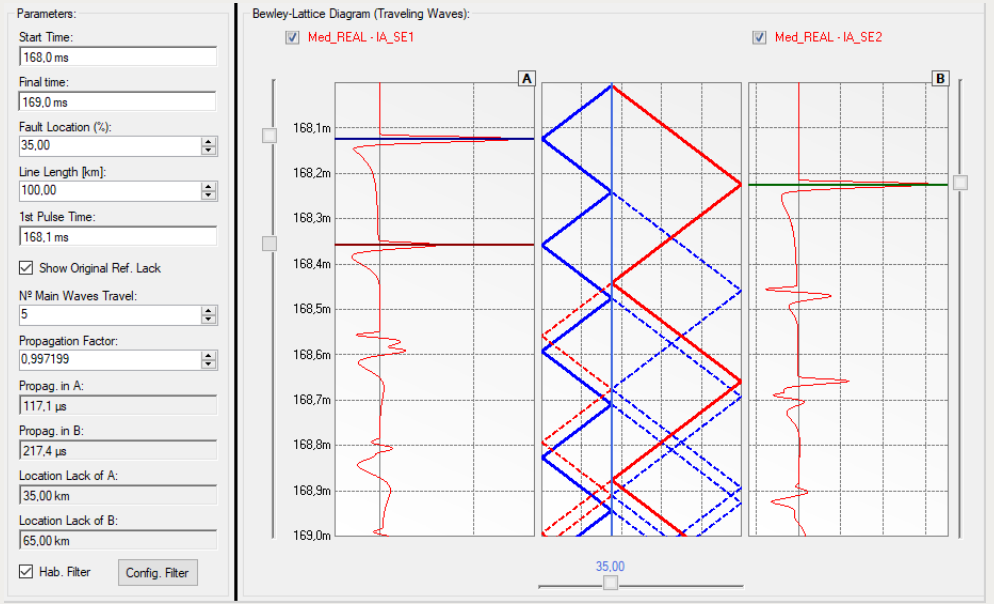
Q2.03

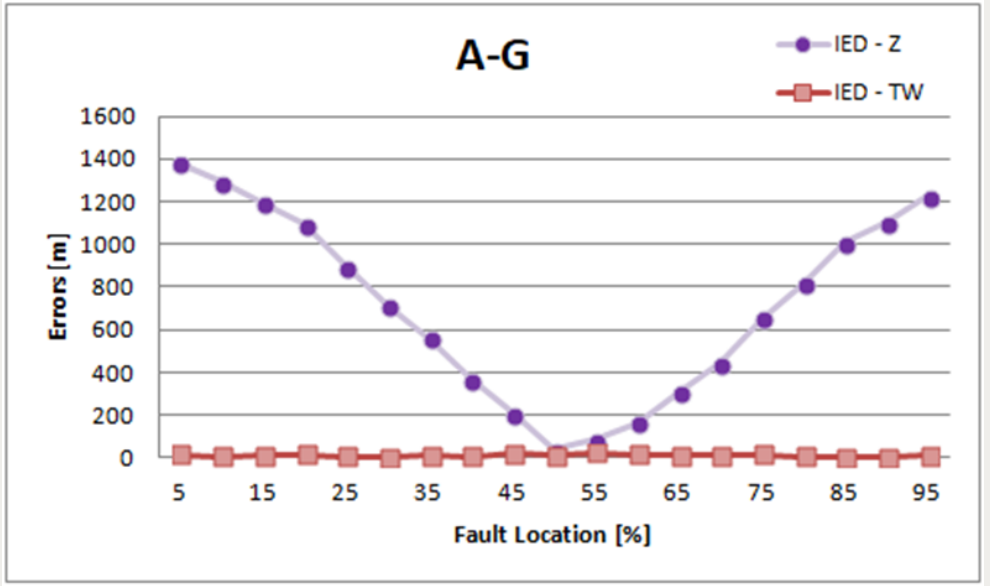
FEATURE	CE-TW1
Simulation fidelity	Real waveform
Injection level	Secondary level
IED input test	Yes
Portability	Light weight
Test on site	Yes
COMTRADE with TW	Yes
Sensitivity test	Yes
Number of reflections	Several
Transmission line models for TW tests	Frequency-dependent line models (Mode / Phase)

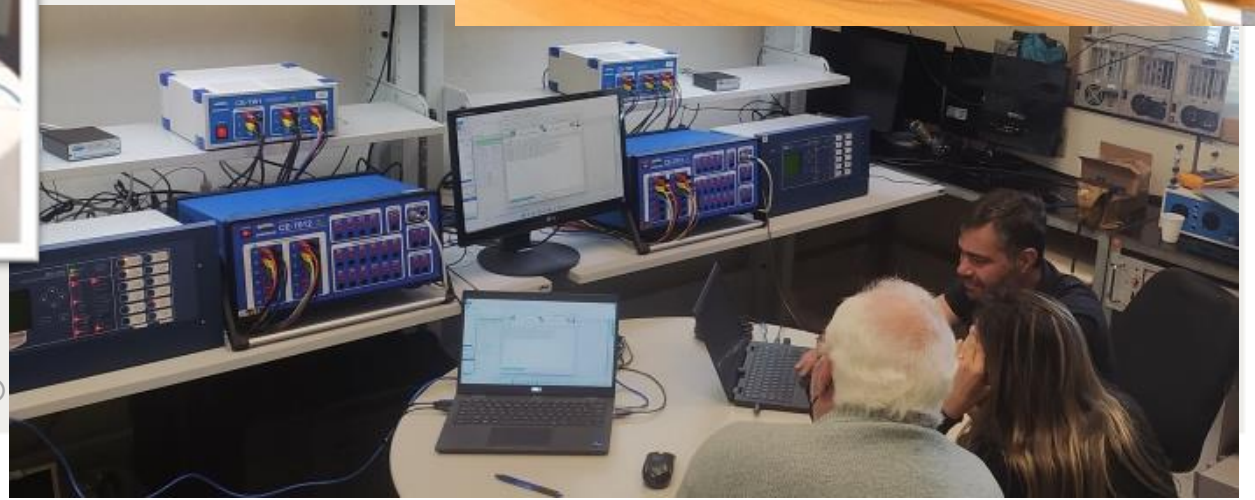


Q2.03


Secondary Voltages - Substation 1
Med_REAL - VA_SE1
Med_REAL - VB_SE1
Med_REAL - VC_SE1
200,000000
0,000000
-100,000000
Voltage (V)
167,000000m
168,000000m
169,000000m
170,000000m
Time (s)
Secondary Currents - Substation 1
Med_REAL - IA_SE1
Med_REAL - IB_SE1
Med_REAL - IC_SE1
4,000000
3,000000
2,000000
1,000000
0,000000
-1,000000
Current (A)
167,000000m
168,000000m
169,000000m
170,000000m
Time (s)


Parameters:
Start Time:
168,0 ms
Final time:
169,0 ms
Fault Location (%):
35,00
Line Length [km]:
100,00
1st Pulse Time:
168,1 ms
Show Original Ref. Lack
Nº Main Waves Travel:
5
Propagation Factor:
0,997199
Propag. in A:
117,1 µs
Propag. in B:
217,4 µs
Location Lack of A:
35,00 km
Location Lack of B:
65,00 km
Hab. Filter
Config. Filter
Bewley-Lattice Diagram (Traveling Waves):
Med_REAL - IA_SE1
Med_REAL - IA_SE2
A
B
168,1m
168,2m
168,3m
168,4m
168,5m
168,6m
168,7m
168,8m
168,9m
169,0m
35,00


A-G
IED - Z
IED - TW
1600
1400
1200
1000
800
600
400
200
0
Errors [m]
5
15
25
35
45
55
65
75
85
95
Fault Location [%]



Group Discussion Meeting