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## Deliverable 57 Results summary report on fault location solutions

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<b>PU</b>	Public	X
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<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

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## 1. INTRODUCTION

This summary report very briefly describes the activities in work package 2.3 “New fault location solutions in distribution network”.

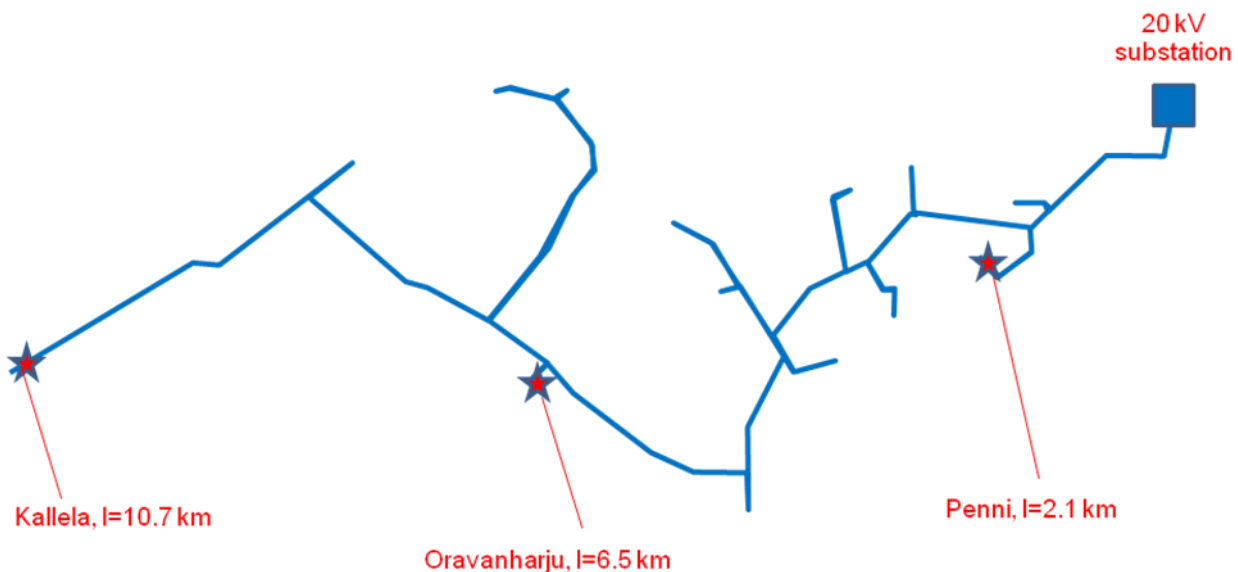
## 2. EXISTING FAULT LOCATION APPLICATION

Based on the practical studies and simulation results, it can be concluded that fault location is no longer accurate once distributed generation with substantial short circuit current is placed in the system. Therefore new fault location methods are needed. In distribution management system (DMS) existence of DG disables fault location functionality for the feeders with DG. This may be serious problem at least in the future.

## 3. NEW FAULT LOCATION APPLICATIONS

In real network demonstrations totally 141 individual test cases were conducted with varied network parameters. The network is a Petersen coil neutral compensated 20 kV, 50 Hz rural distribution network. The studied feeder and network had the following electrical parameters:

Feeder length (main branch)	= 10.7 km	
Earth fault current of the feeder		≈ 3A
Earth fault current of the network		≈ 69A



Based on demonstration test results the following can be concluded:

- \* The proposed new fault location application is capable in locating low ohmic single phase earth faults in Petersen coil earthed distribution networks. Fault resistance may not exceed approximately 50 ohm, otherwise the fault distance calculation is affected negatively and the estimate is not valid.
- \* The fault location error is max 0.06 p.u. i.e. approximately 0.6 km
- \* The value of parallel resistor seems to have no considerable effect on fault distance estimation

- \* The compensation degree seems to have no considerable effect on fault distance estimation

Generally, an accurate computational fault location procedure requires that:

- \* Current and voltage measurements are accurate
- \* Settings, especially positive- and zero sequence impedances are correct

In the system software side Distribution management system has been improved. If DG is not producing too much short circuit current thus not disturbing fault location calculation faults can now be located normally.