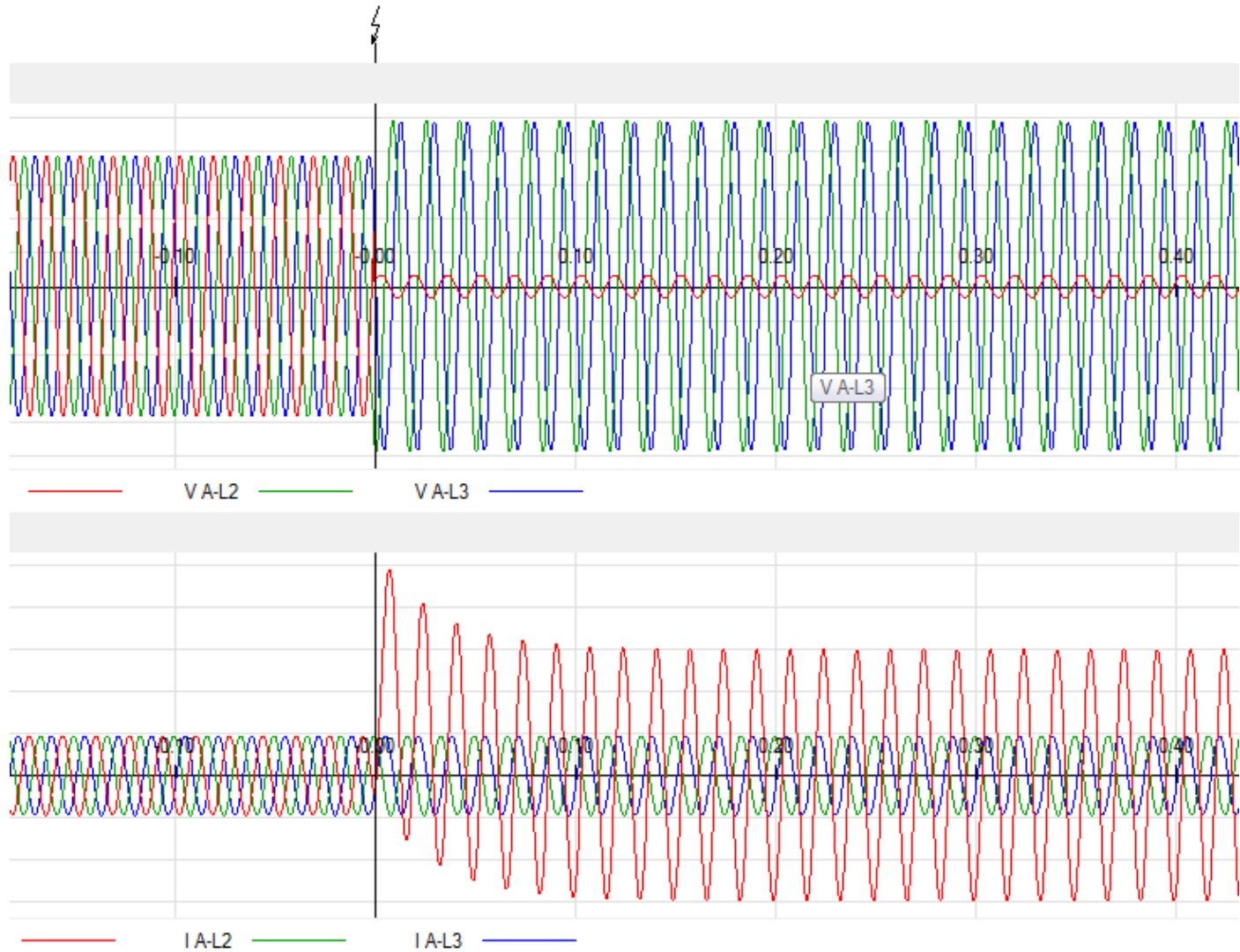


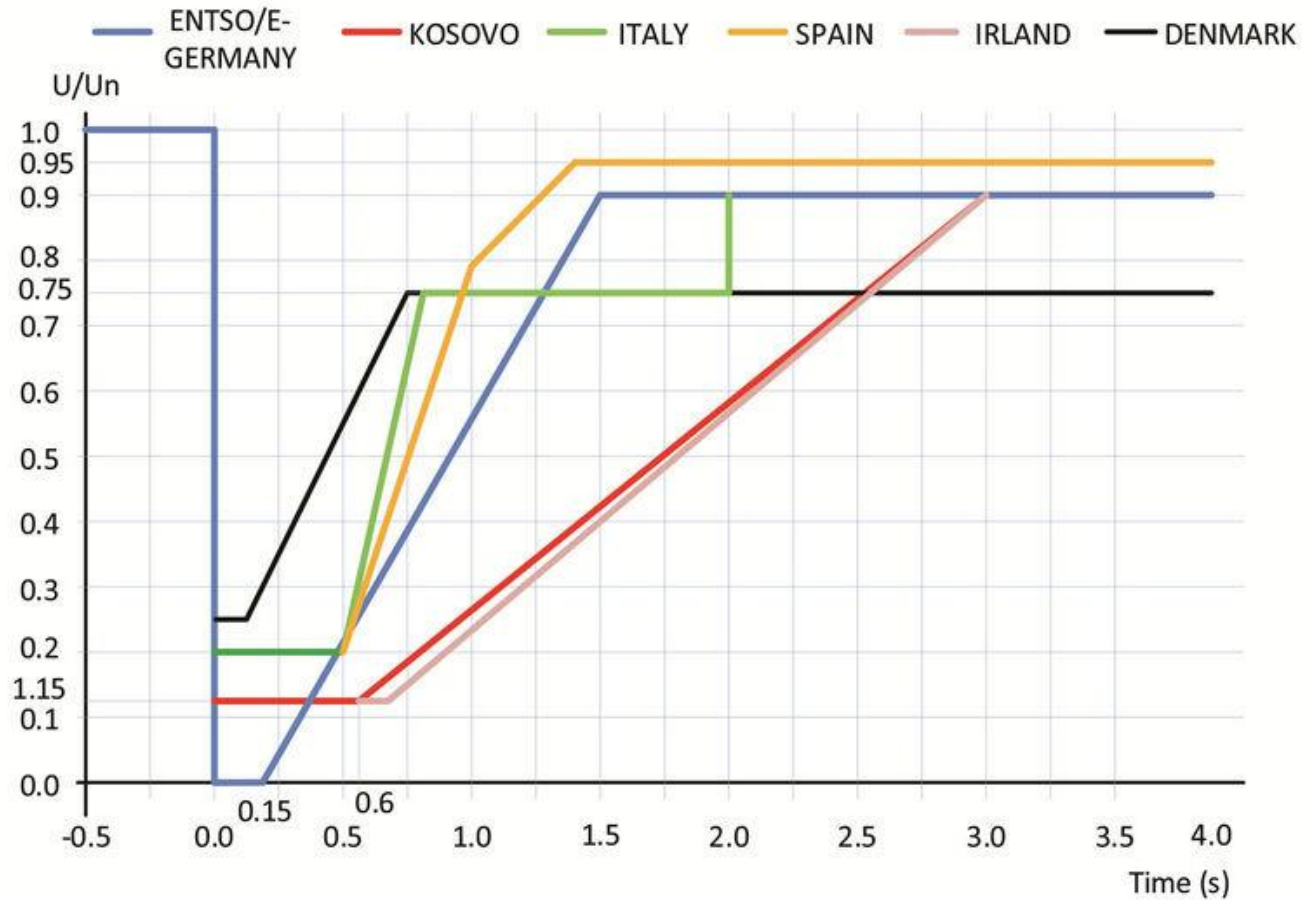
# Improving Reliability

Dr. Alexander Apostolov  
March 2016  
San Francisco, CA

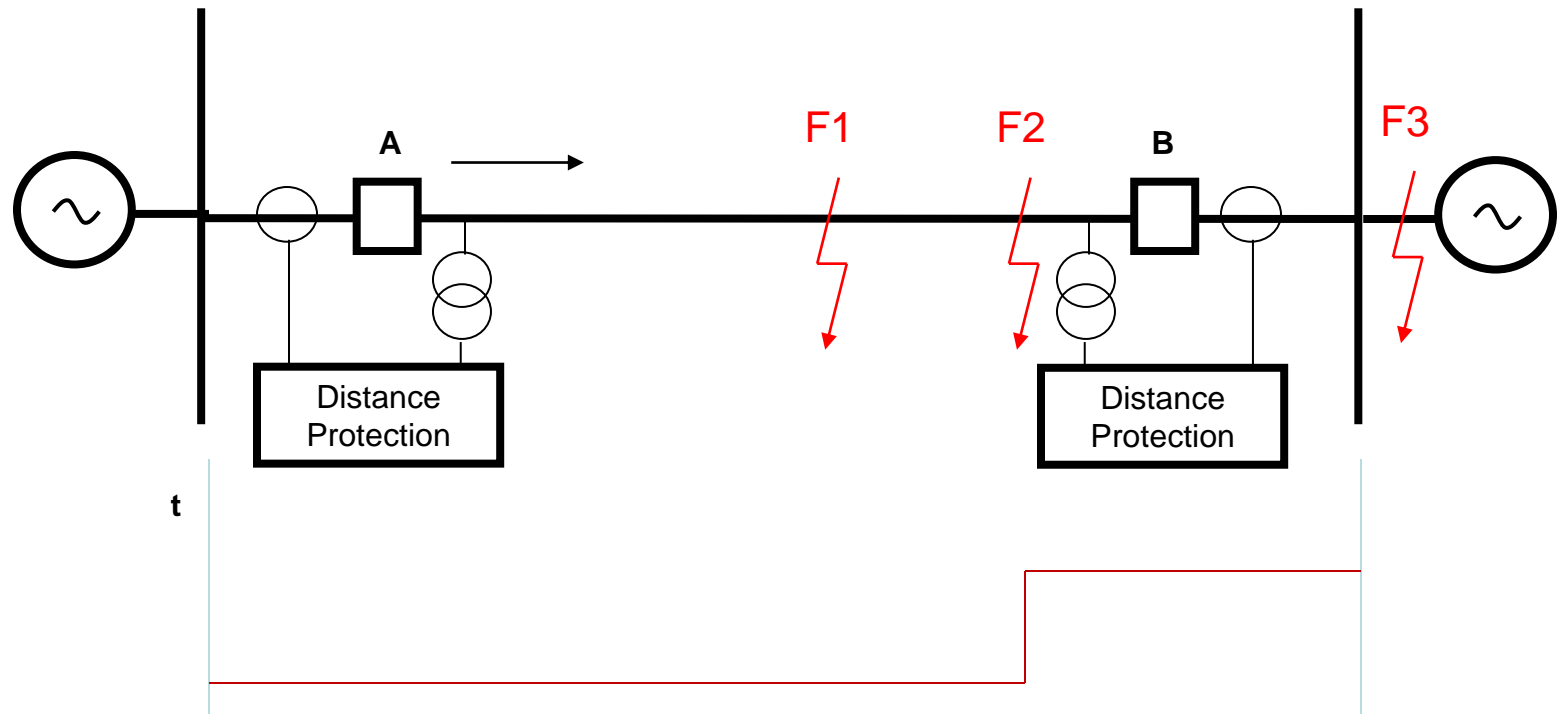
# Effect of Short Circuit Fault



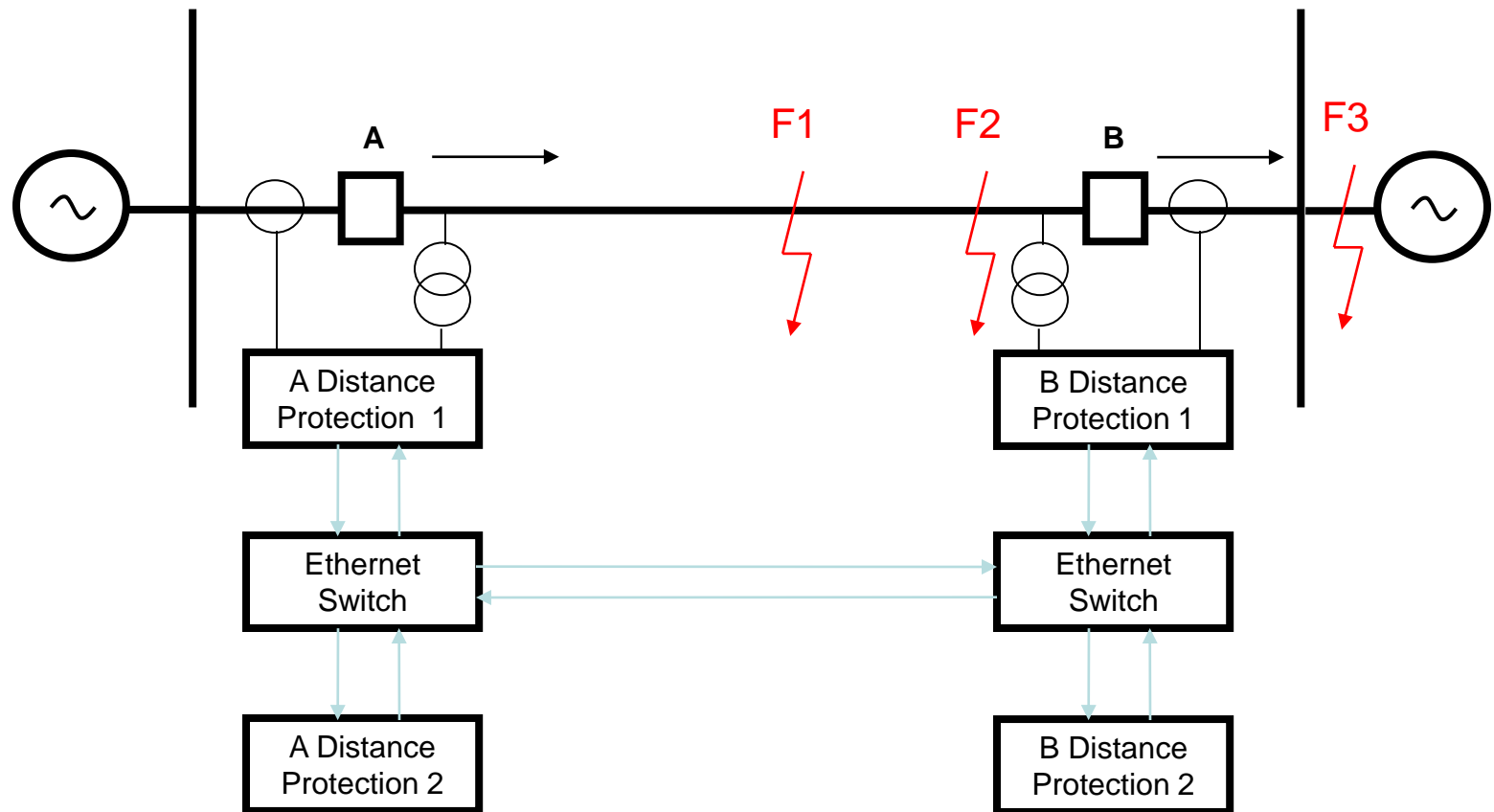
# Ride-Through Capability



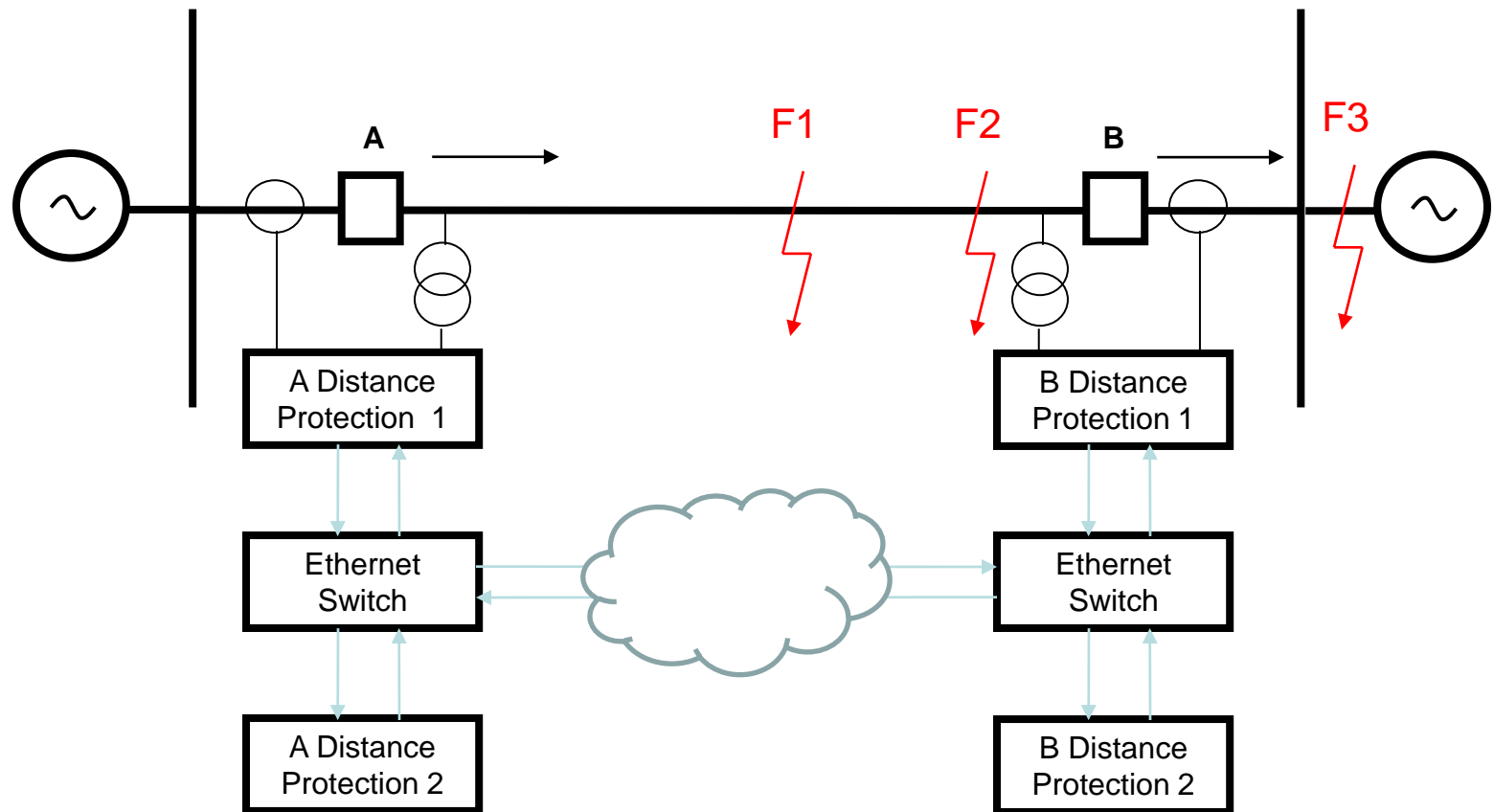
# Transmission Line Protection



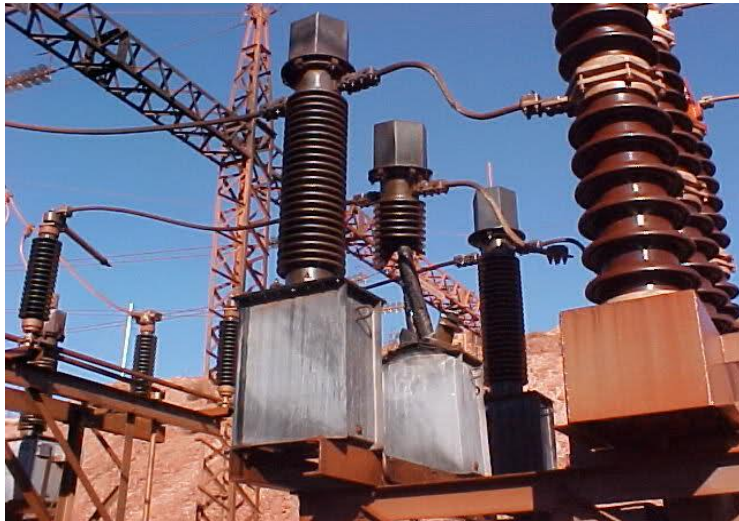
# IEC 61850 Based Accelerated Line Protection



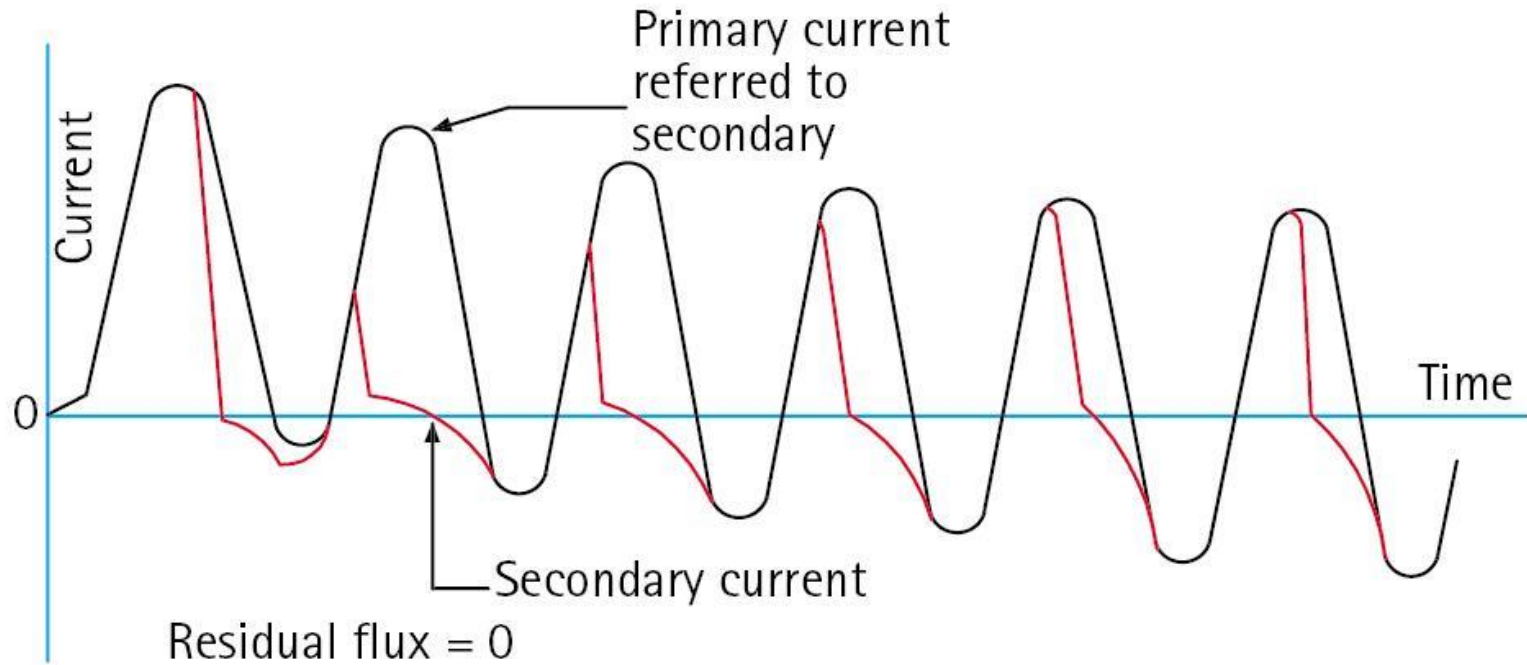
# IEC 61850 Based Accelerated Line Protection



# Open CT Circuit



# CT Saturation

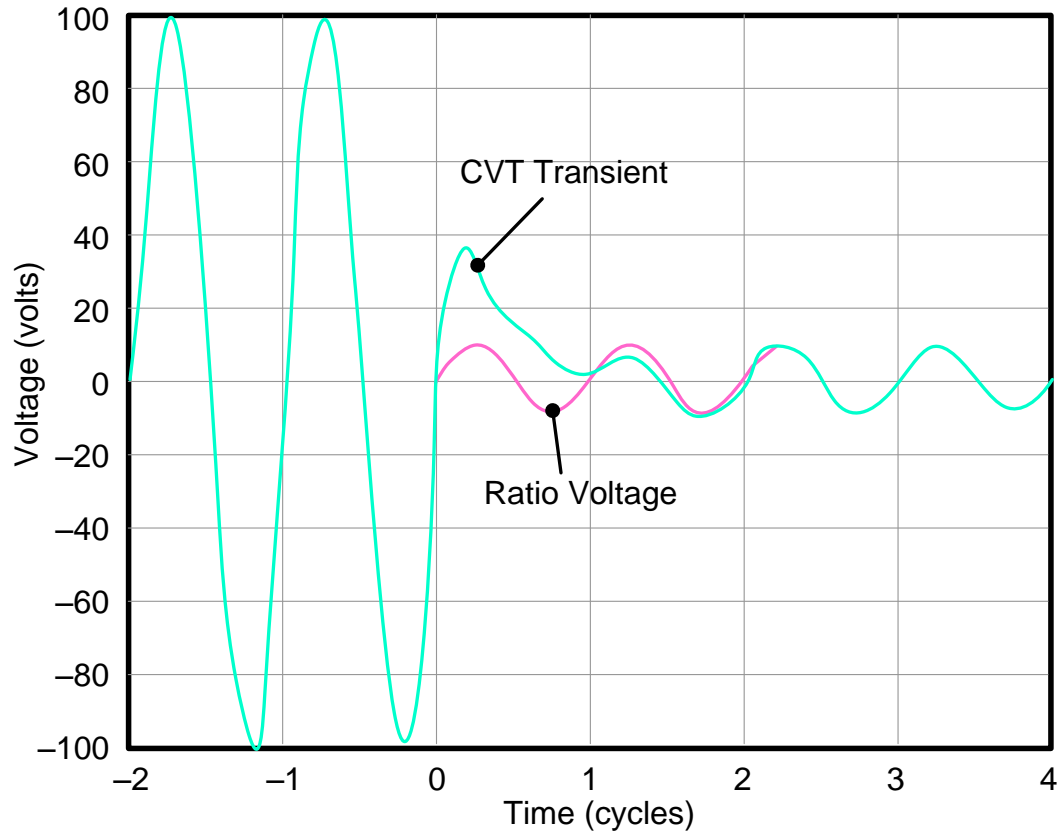


Residual flux = 0  
Resistive burden  
Power system T.C. = 0.05s

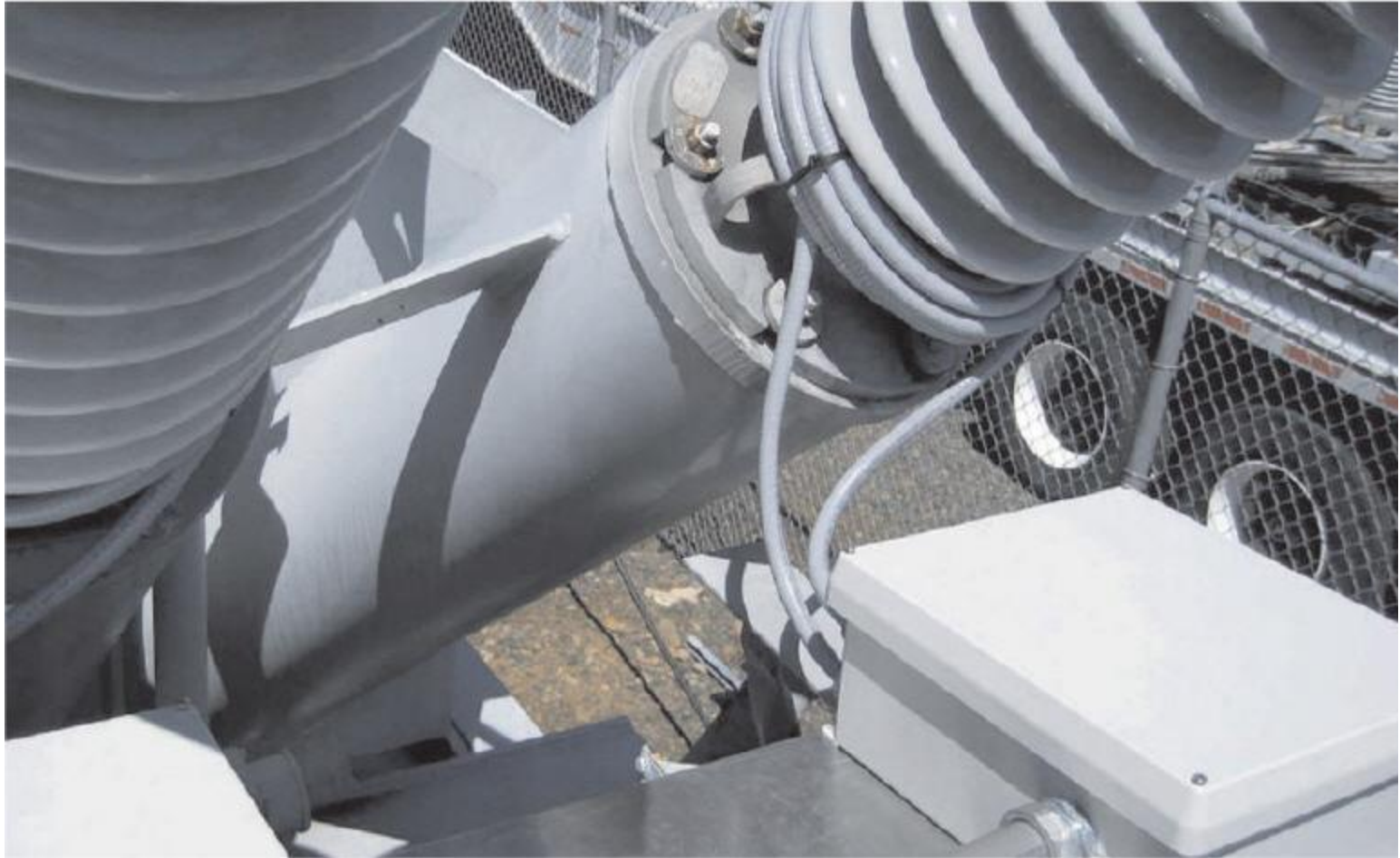




# CVT Transients



# Flexible Optical CT



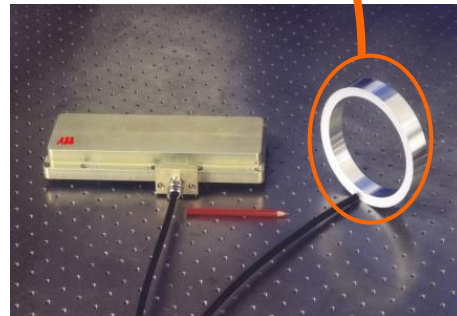
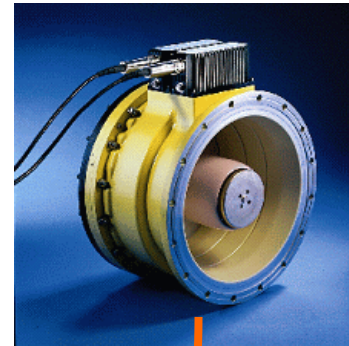
# CEVT



CEVT sensor electrode



# NCITs



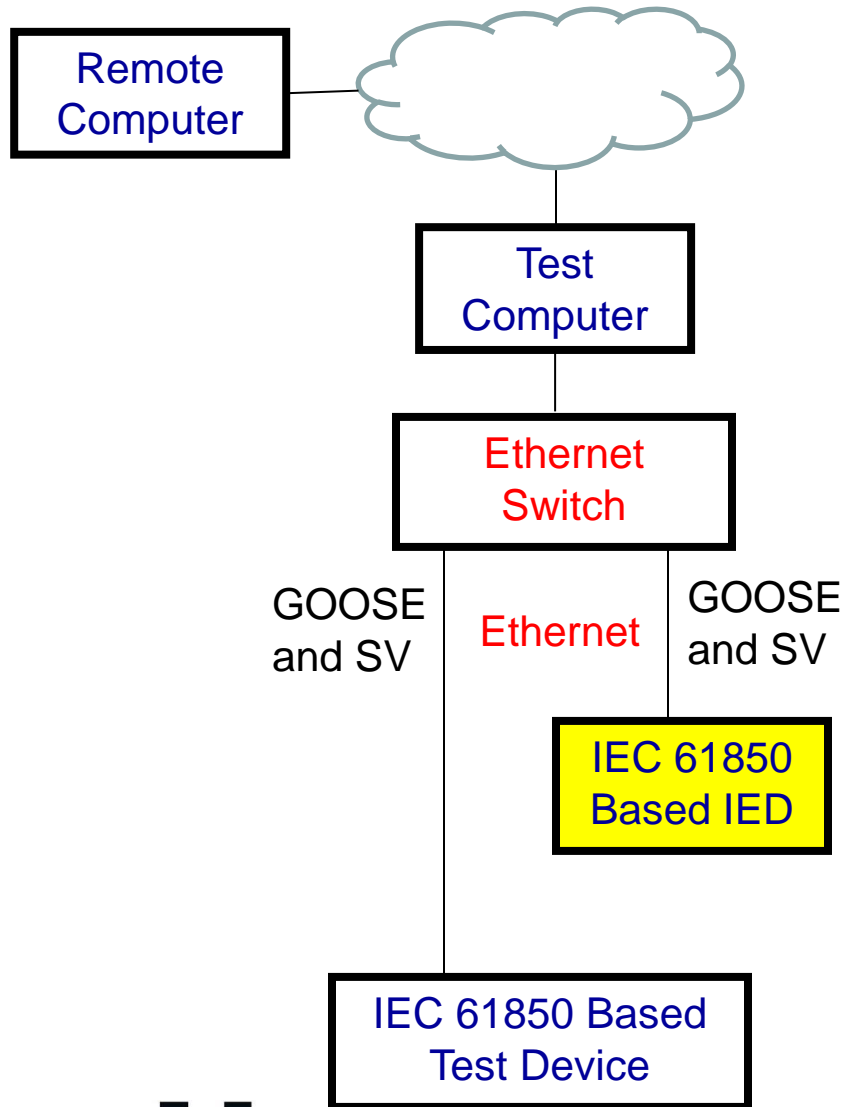
# Why do we need remote testing?



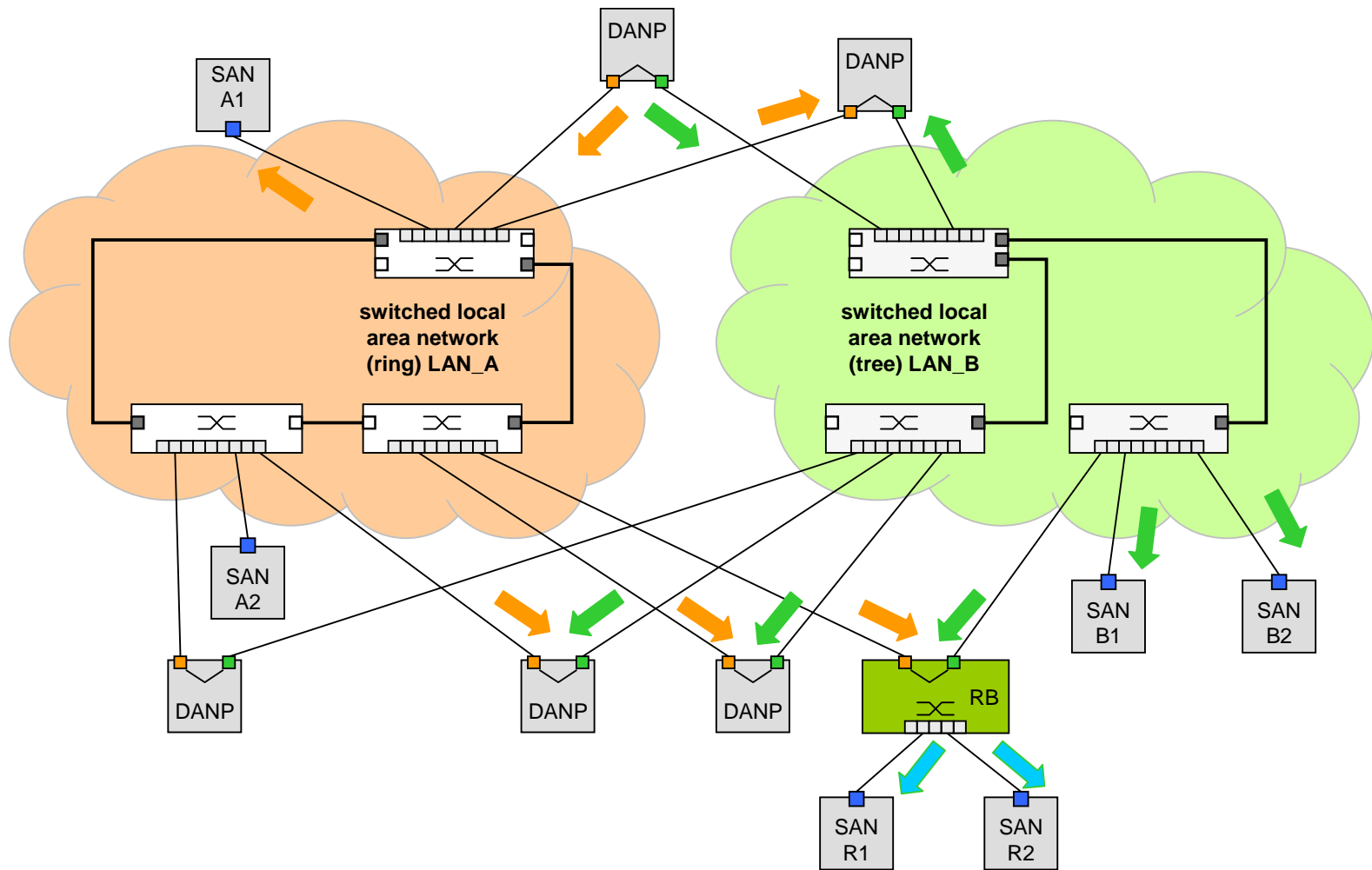
# The benefits

- No travel time
- Minimum setup time
- Independent of weather conditions
- Improved PACS availability
- Reduced outage time

# Remote Testing



# Redundant communications



SAN - Singly Attached Nodes  
DAN - Doubly Attached Nodes