

COMISION FEDERAL DE ELECTRICIDAD



SIMEFAS

MEXICO'S WIDE AREA MEASUREMENT SYSTEMS

NORTH AMERICAN SYNCHROPHASOR INITIATIVE WORKING GROUP MEETING

VANCOUVER, B. C. CANADA JUNE 7-8 2010

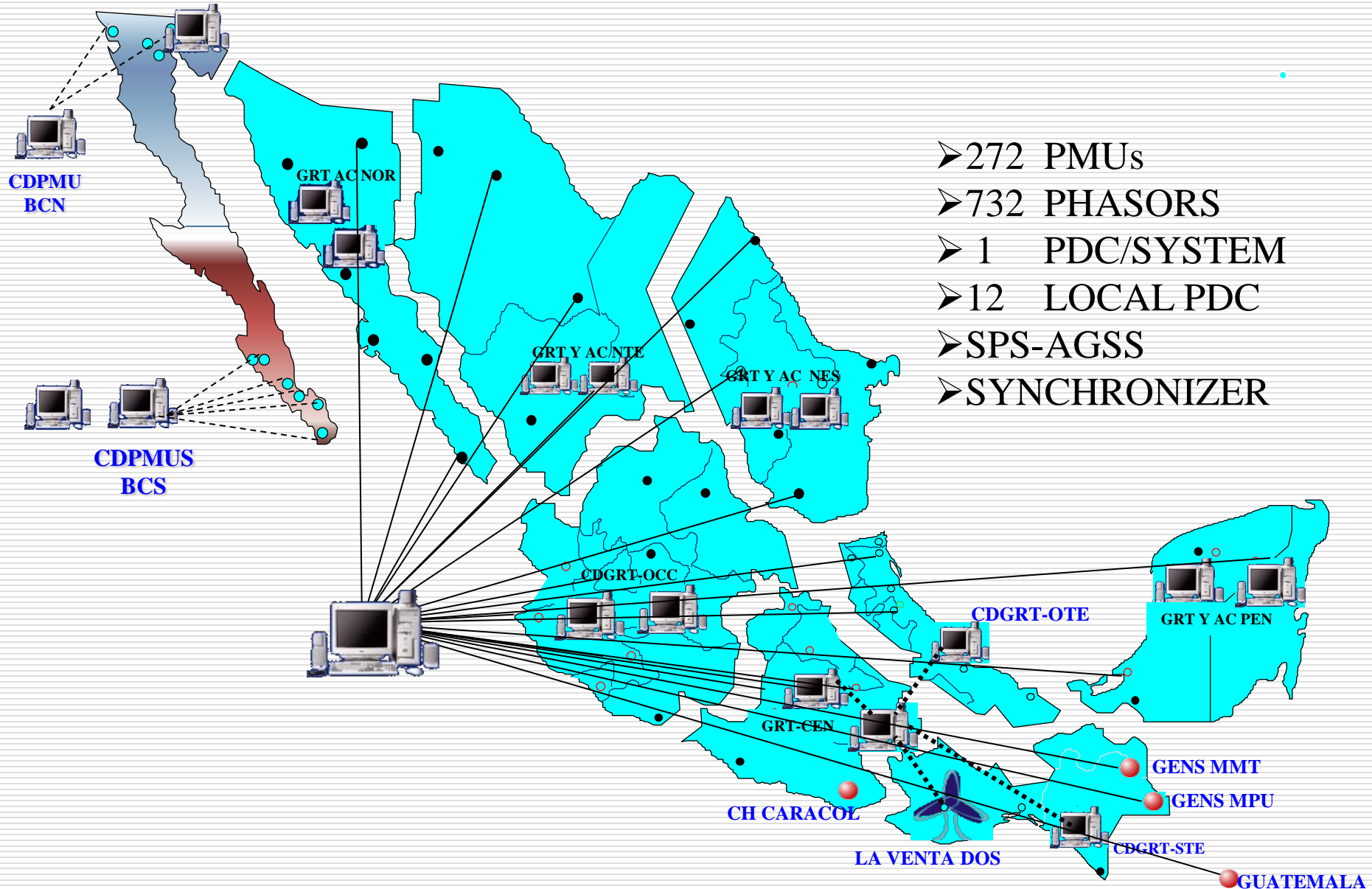


CONTENTS

- **MEXICAN ELECTRIC POWER SYSTEM**
- **WHY PMUS?**
- **APLICACIONES**
 - **REAL-TIME**
 - **OFF-LINE**
 - **SPS**
- **CONCLUSIONS**

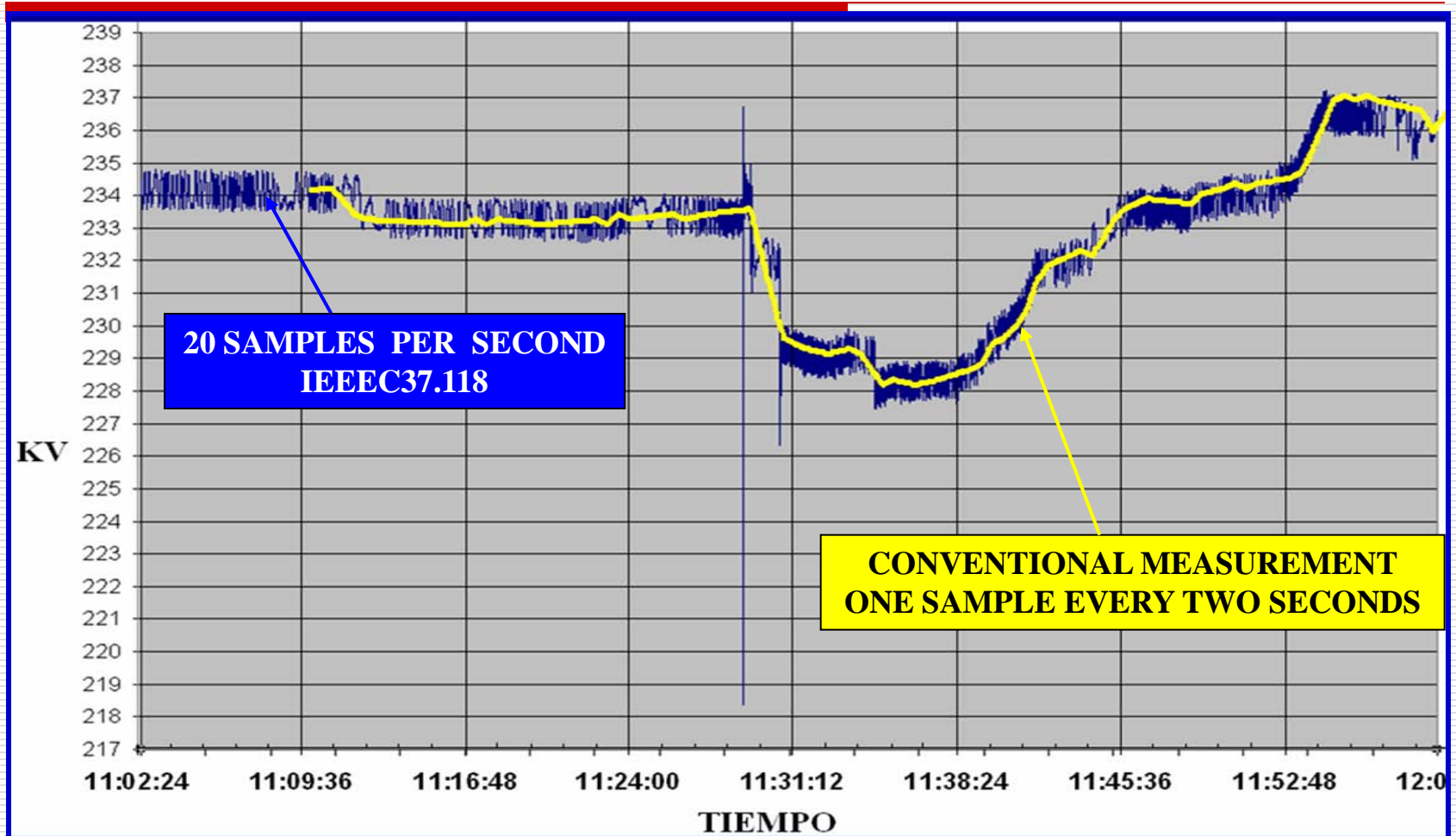


PHASORS, PMUS & PDCS

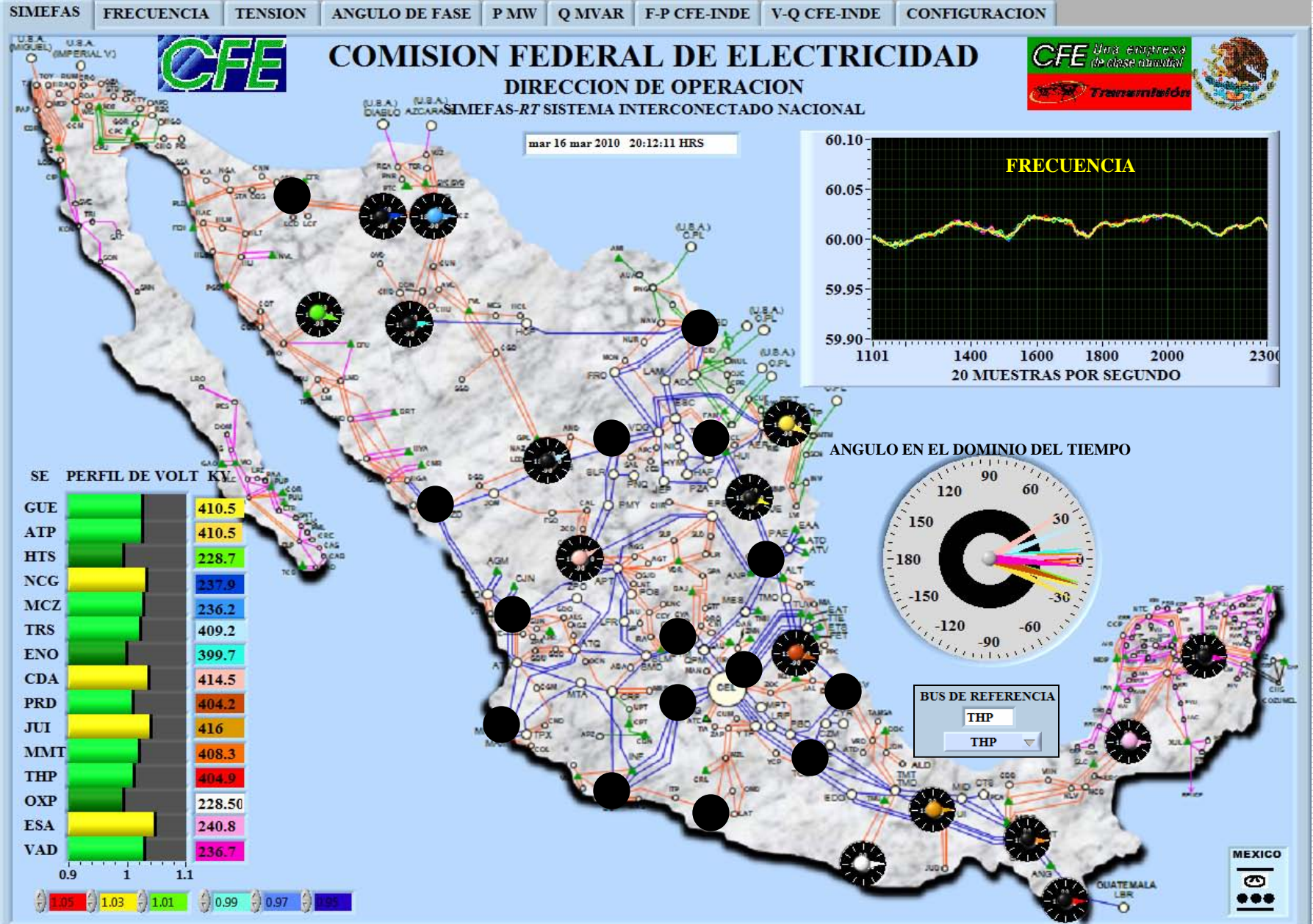




WHY PMU'S?



ON-LINE APPLICATIONS

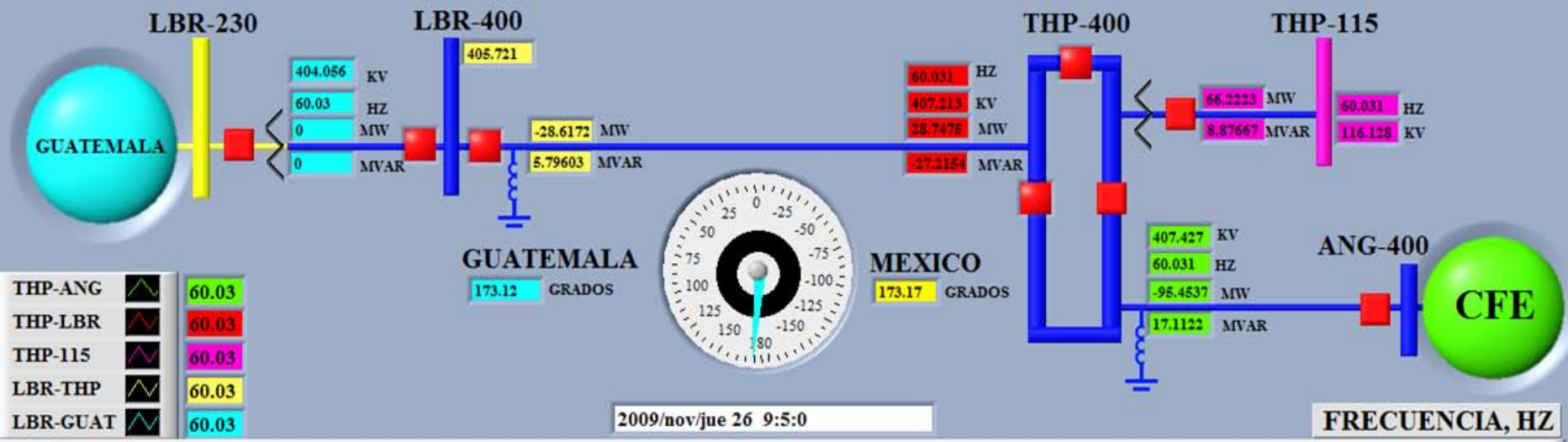




COMISION FEDERAL DE ELECTRICIDAD

DIRECCION DE OPERACION

ESQUEMATICO DE LA INTERCONEXION MEXICO-GUATEMALA

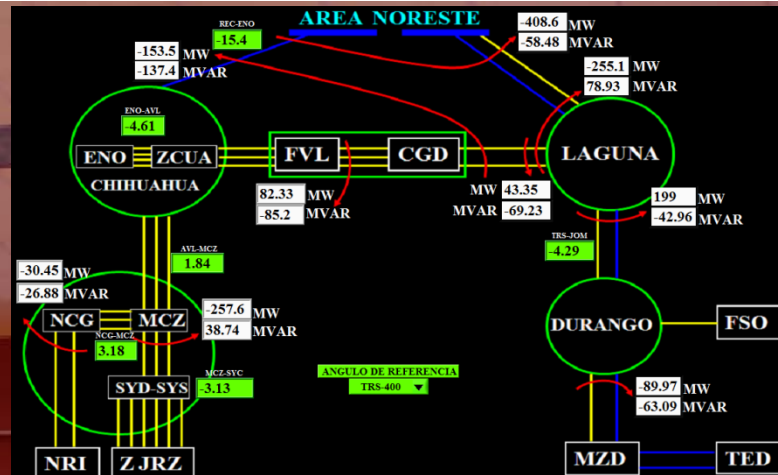


INTERCONNECTION MEXICO-CENTRAL AMERICA

MONITORING IN REAL TIME



REGIONAL DATA CONCENTRATOR

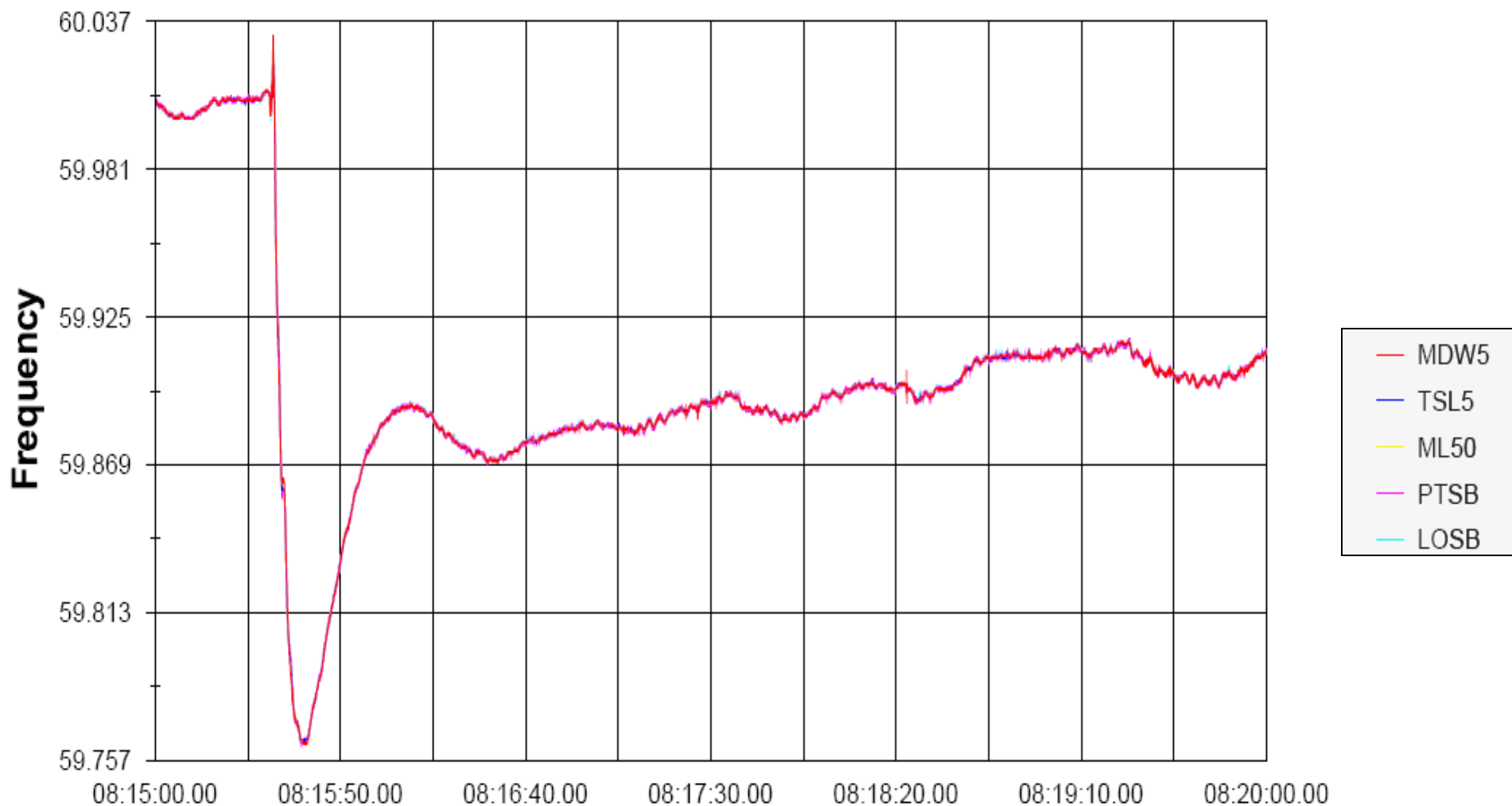




OFF-LINE APPLICATIONS

WECC SYSTEM

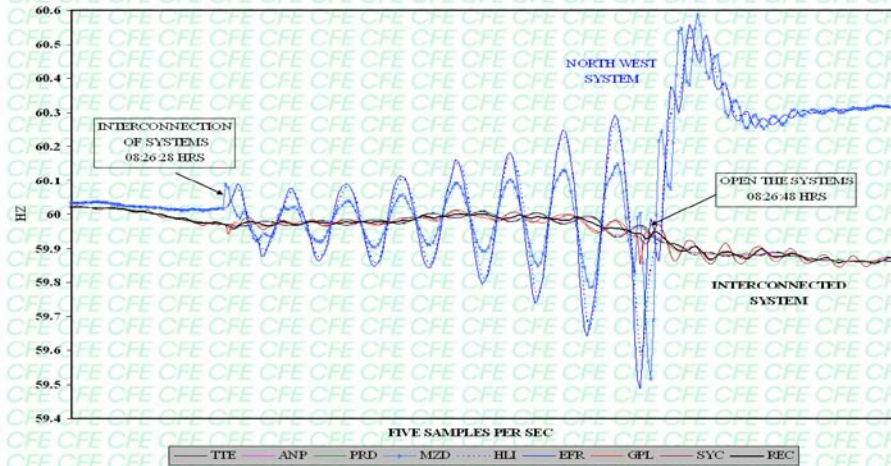
02/14/08 Event at 08:15 Pacific Time (02/14/08 at 16:15 GMT)



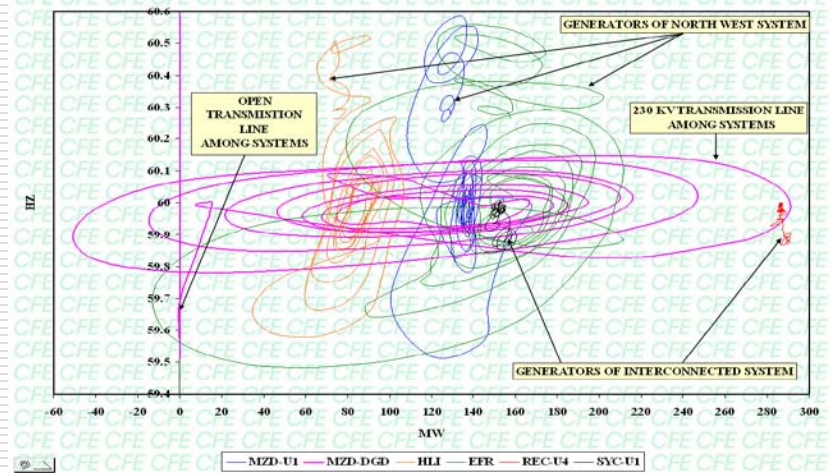


OFF-LINE APPLICATIONS

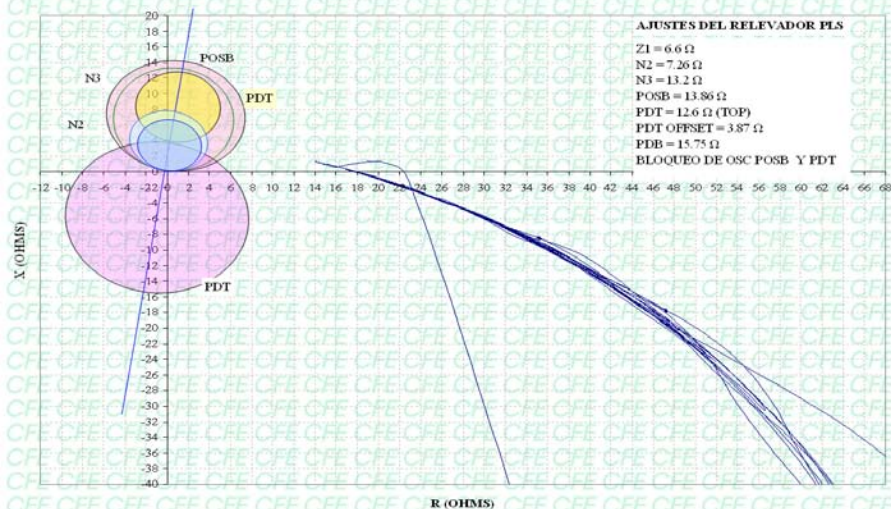
FREQUENCY IN THE SYSTEMS DURING AN INTENT OF SYNCHRONIZATION
09-03-2004



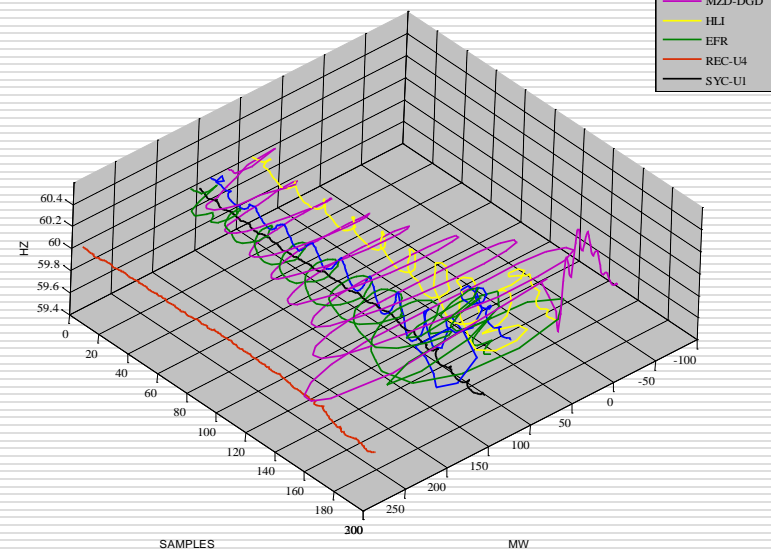
P-F CURVES DURING AN INTENT OF SYNCHRONIZATION OF SYSTEMS
09-03-2004



IMPEDANCE LOCI OF TRANSMISSION LINE MZD-DGD DURING INTENT OF SYNCHRONIZATION OF SYSTEMS 09-03-2004



THREE DIMENSIONAL ANALYSIS OF OSCILLATIONS

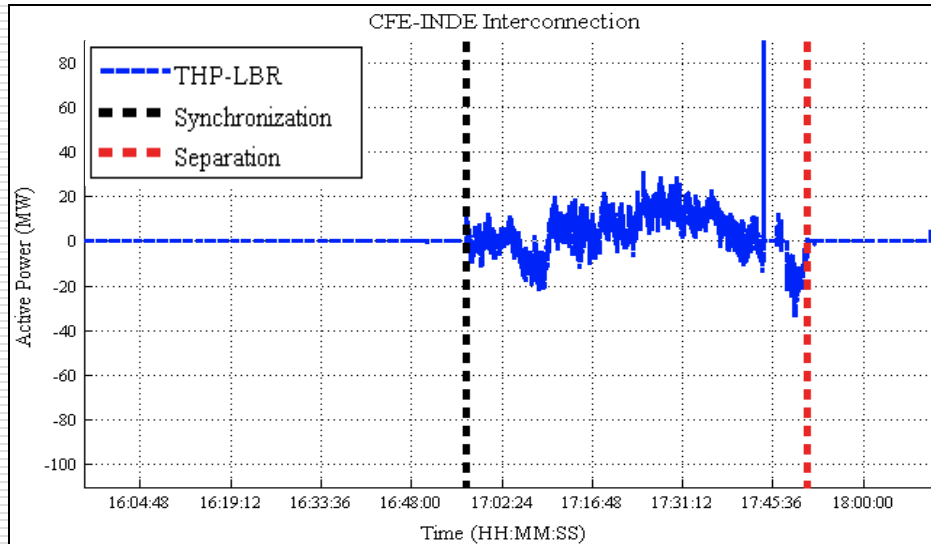




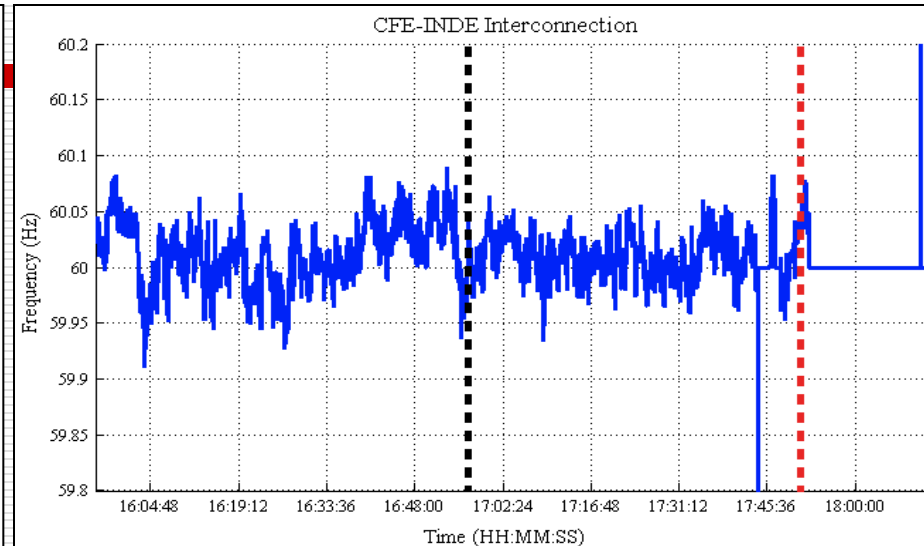
COLLABORATION CFE-KTH

Luigi Vanfretti, Mehrdad Ghandhari (KTH Royal Institute of Technology, Sweden),
Associated Collaborators: Dan Trudnowski (Montana Tech) & Joe H. Chow (RPI)

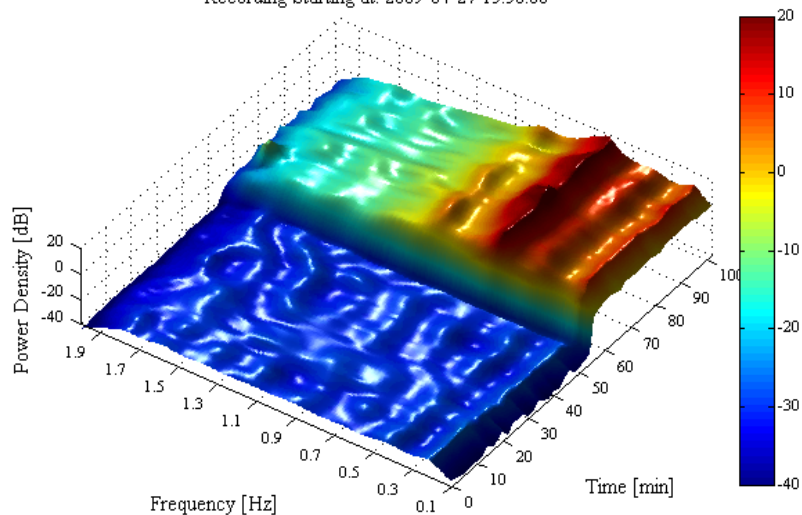
POWER FLOW



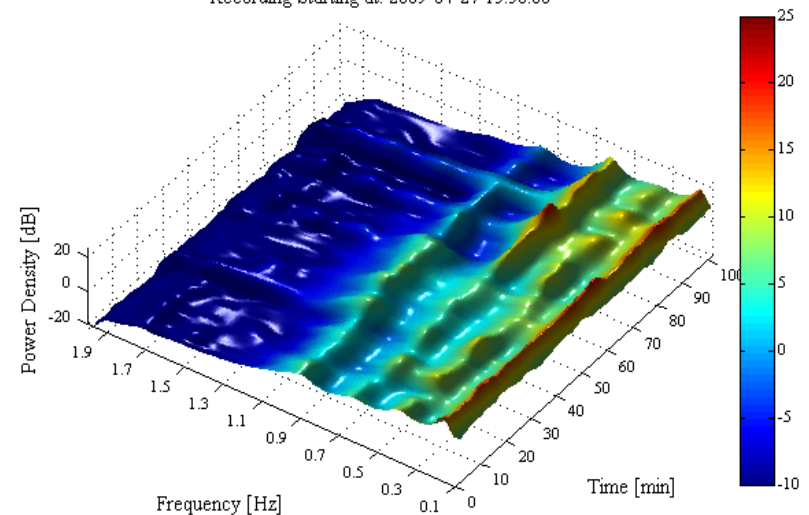
BUS FREQUENCY



Waterfall - Yule-Walker Spectrogram, THP-LBR - Active Power
Recording Starting at: 2009-04-27 15:56:00



Waterfall - Yule-Walker Spectrogram, THP-LBR - Bus Frequency
Recording Starting at: 2009-04-27 15:56:00



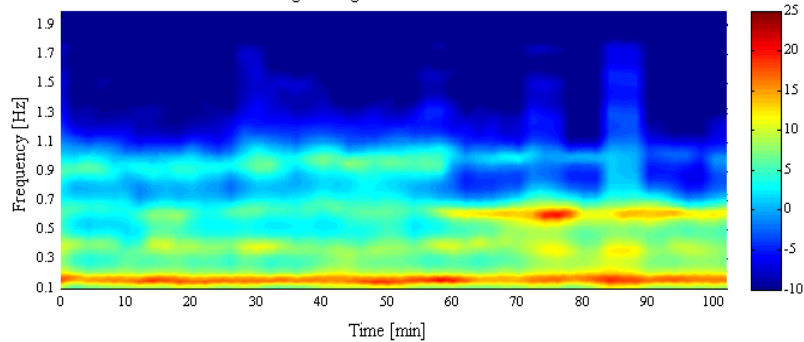


COLLABORATION CFE-KTH

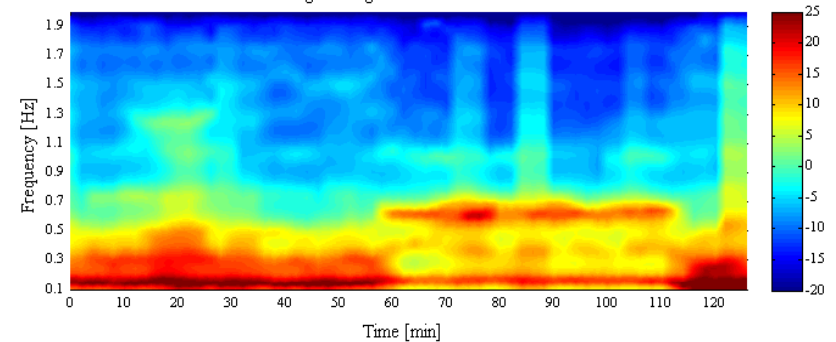
Luigi Vanfretti, Mehrdad Ghandhari (KTH Royal Institute of Technology, Sweden),
Associated Collaborators: Dan Trudnowski (Montana Tech) & Joe H. Chow (RPI)

MODE METER DAMPING AND FREQUENCY ESTIMATES FROM THE BUS FREQUENCY SIGNAL

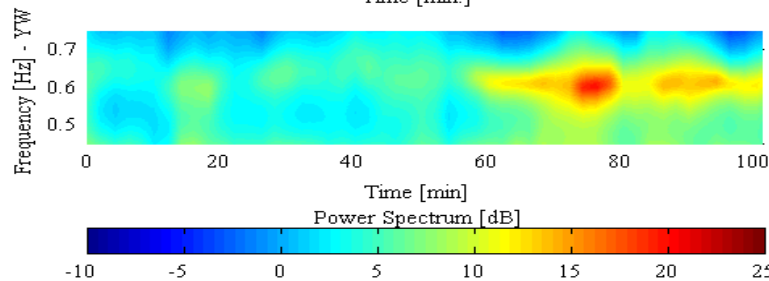
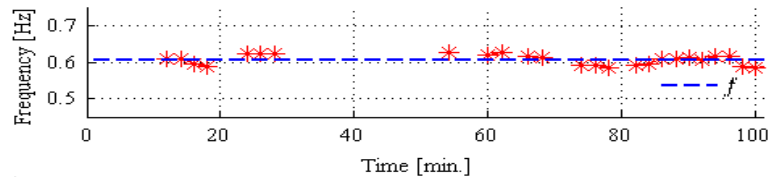
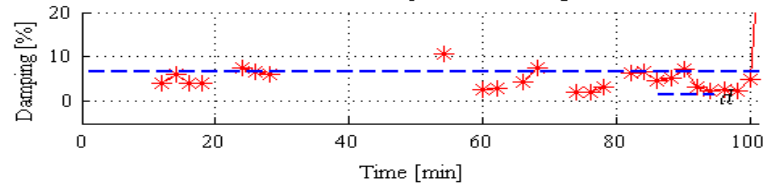
Yule-Walker Spectrogram, THP-LBR - Bus Frequency
Recording Starting at: 2009-04-27 15:56:00



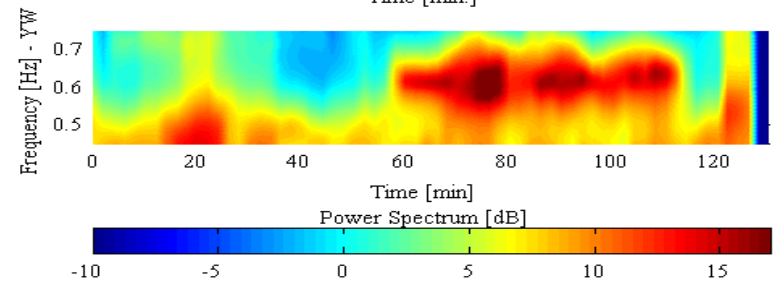
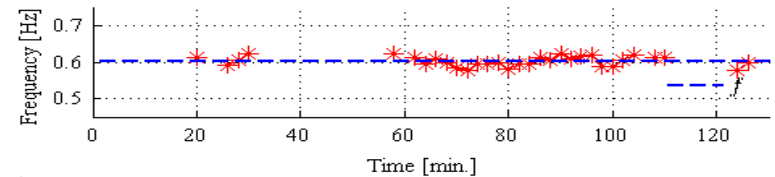
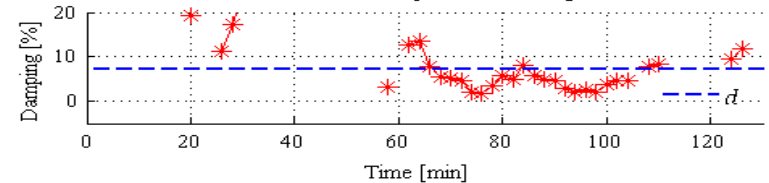
Yule-Walker Spectrogram, LBR-THP - Bus Frequency
Recording Starting at: 2009-04-27 15:56:00



Mode Meter Estimates for the Freq. THPLBR Signal (0.575-0.625Hz)



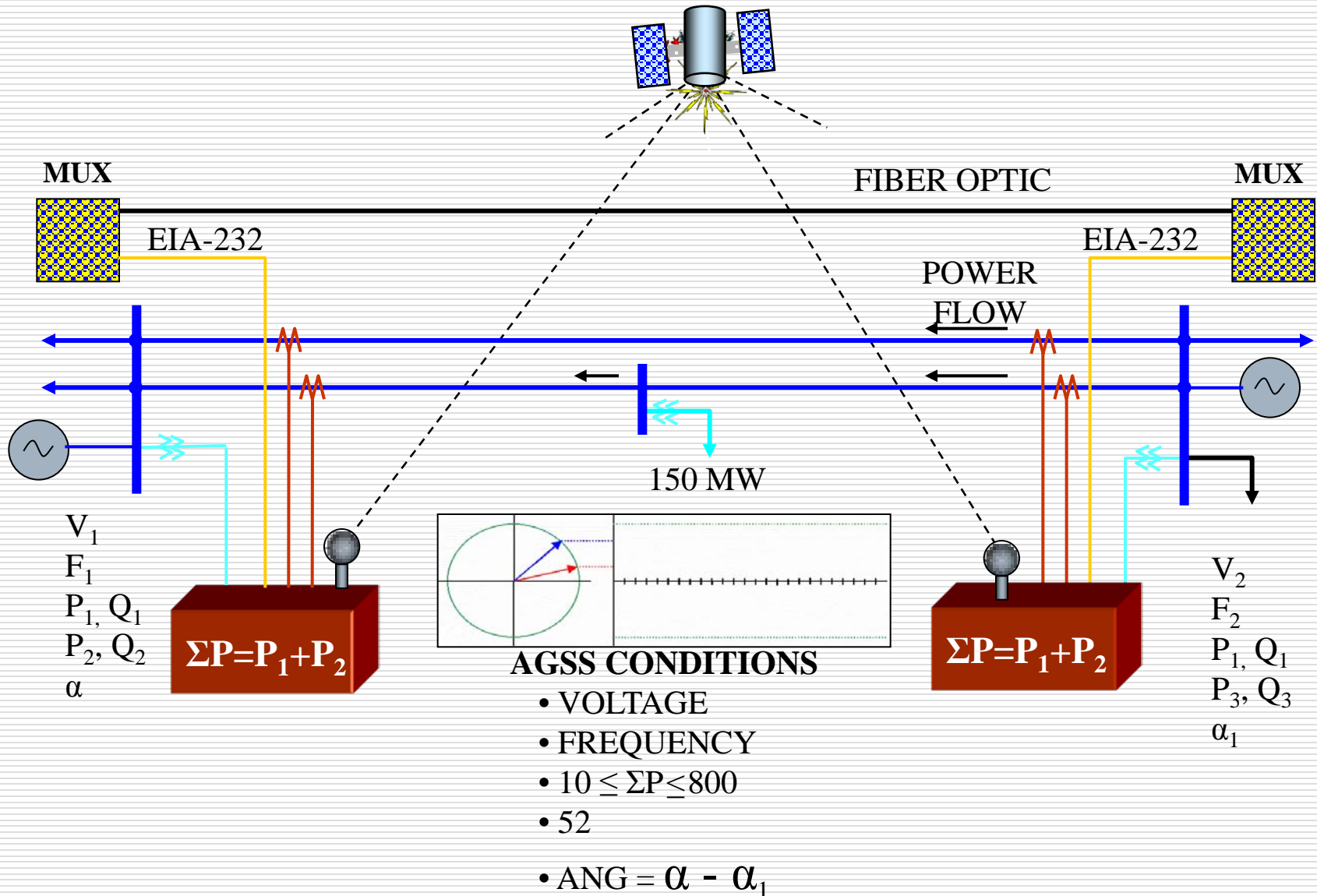
Mode Meter Estimates for the Freq. LBRTHP Signal (0.575-0.625Hz)





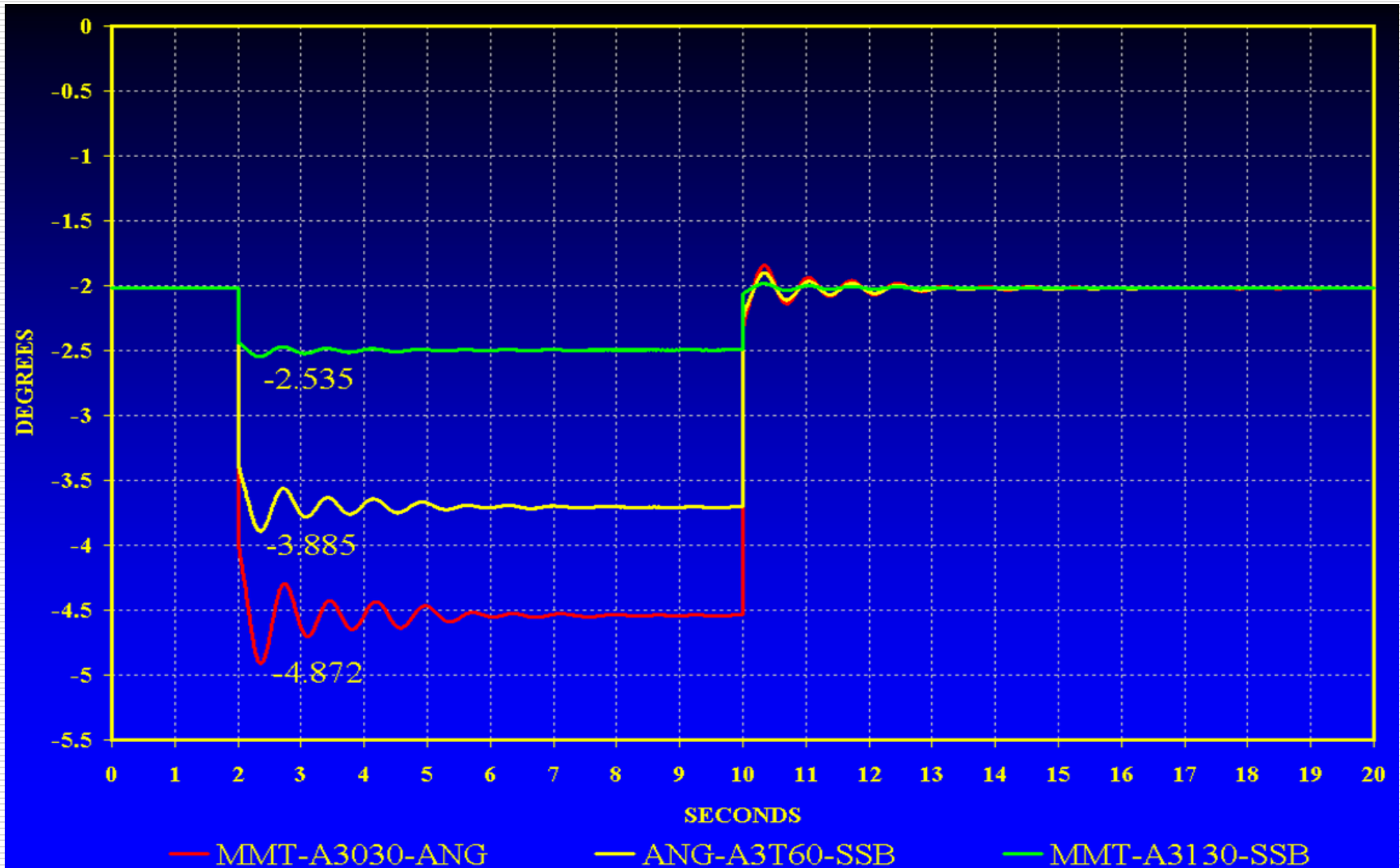
SPECIAL PROTECTION SCHEMS

CHICOASEN-ANGOSTURA AGSS





ANGLE DIFFERENCE CALCULATIONS AND MEASUREMENTS FOR THREE DIFFERENT LINE TRIPS





CONCLUTIONS

MAIN TECHNICAL FACTORS

- **MEASUREMENT LOCATION**
 - **PMU, PMCU or RD/PMU**
 - **SAMPLES**
 - **ONE PHASOR or MULTI-PHASOR**
 - **WAMS ARCHITECTURE**
 - **SUPERPDC or PDCs**
 - **COMMUNICATION SYSTEM**
-



YOUR QUESTIONS?

THANK YOU
