



# UI-ASSIST: FOURTH PROGRESS MEETING

## Theme-2: US Updates

7:30-8:00 P.M (Pacific Time) July 21, 2020

8:00-8:30 A.M (India time) July 22, 2020

Speaker: Noel Schulz (WSU)

Venue: Virtual Meeting

Host: Washington State University



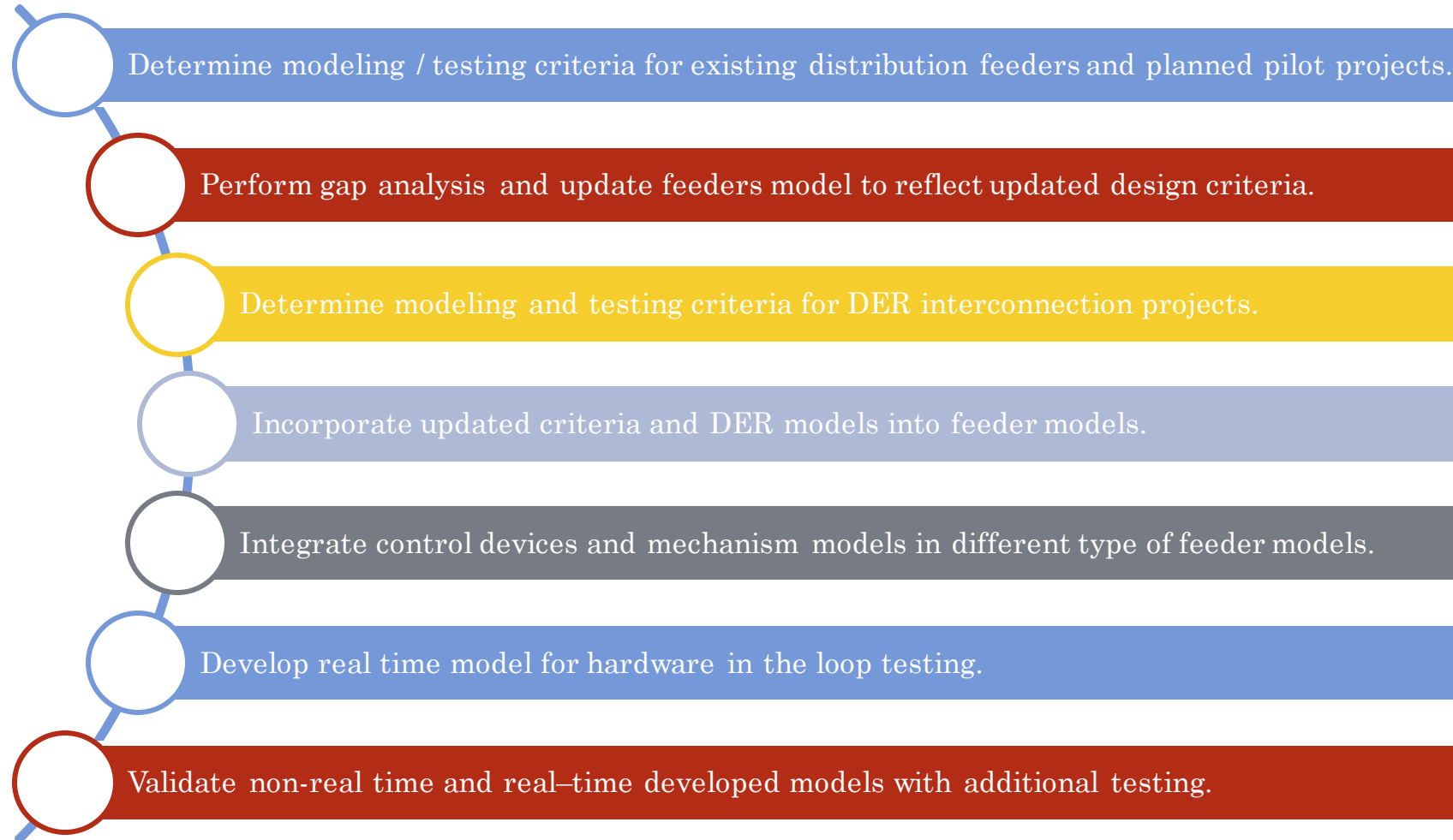
**U.S. INDIA COLLABORATIVE FOR SMART  
DISTRIBUTION SYSTEM WITH STORAGE**

*Evolving future energy distribution grids*  
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## Theme 2: Distribution System Modeling and Benchmark System Development



### Tasks List



## Theme 2: Distribution System Modeling and Benchmark System Development



### Summary of Progress

- WSU conducted study on gap analysis, feeder classification and developing Pullman distribution system as semi-urban case study and Spokane distribution system modelling (i.e. Urban pilot) as well as cyber modeling.
- WSU completed framework for developing synthetic feeder models and identified the requirements for smart grid communication networks, including traffic-forwarding and end-user devices
- HNEI developed offline and real time feeder models (Maui Meadows and Molokai feeder models in EDD DEW and OpenDSS)



### Next Steps:

- Development of customized CP-SyNet feeder models for offline analysis
- Updating existing benchmark feeder models for offline and real-time analysis.
- Developing rural, semi-urban and urban feeder models on real time platform
- Development of field feeder models on real-time platform
- Validating the developed feeder models using both offline and real time platforms (Grid-LabD, OpenDSS, OPAL-RT, RTDS)

## Theme 2: Distribution System Modeling and Benchmark System Development



Gaps, overlaps, collaborations, technical challenges, inter-theme interactions

- Getting systems modeled into multiple software platforms for comparisons will be challenging and requires understanding solvers and different platforms
- Pulling together all the available test systems from partners will be important
- Establishing high-level criteria for model needs. Example includes—
  - Three phase unbalanced
  - Real-data vs simulated data vs synthetic data
  - Requirements for control, application, cyber
  - Performance result comparisons
  - AC versus DC -- > Most systems AC right now
  - Microgrids versus Advanced Distribution Systems
- Real time testing and validation important for Themes 8 and 9





# Publications List

## ○ Related Work

- R. Dutta, S. Som, S. Chakrabarti, A. Sharma and A. Srivastava, “Event Detection and Localization in Active Distribution Networks using PMUs”, IEEE PES General Meeting, Montreal, Canada, August 2020
- P. Sarker, V. Venkataramanan, D. Sebastian Cardenas, A. Srivastava, A. Hahn, and B. Miller, “Cyber-Physical Security and Resiliency Analysis Testbed for Critical Microgrids with IEEE 2030.5”, IEEE/ ACM CPSWeek, MSCPES workshop, Sydney, Australia, April 2020
- M. H. Namaki, X. Zhang, S. Singh, A. Ahmed, A. Foroutan, Y. Wu, A. K. Srivastava, A. Kocheturov, “Kronos: Lightweight Knowledge-based Event Analysis in Cyber-Physical Data Streams”, International Conference on Data Engineering (ICDE), Dallas, TX, May 2020
- R. Panigrahi, S. K. Mishra, S. C. Srivastava, A. K. Srivastava, and N. N. Schulz, “Grid Integration of Small-Scale Photovoltaic Systems in Secondary Distribution Network- A Review”, IEEE Transactions on Industry Applications, 2019
- R. Saeedi, K. S. Sajan, K. Davies, A. Srivastava, and A. H. Gebremedhin “A Customizable Machine Learning Framework for Behind-the-Meter Load/PV Disaggregation”, IEEE Transactions on Sustainable Energy [Submitted]
- Y. Zhang, A.K. Srivastava,, “Voltage Control Strategy for Energy Storage System in Distribution System with DERs” IET Renewable Energy, 2020 [submitted]



## Acknowledgement



“This material is based upon work supported by the U.S. Department of Energy under Award Number DE-IA0000025 and the Indo-US Science and Technology Forum in partnership with Department of Science and Technology, Government of India, under grant no. IUSSTF/JCERDC-Smart Grids and Energy Storage/2017. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.”

*Thank you*