OpenDSS

Interfaces and applications

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Instructor

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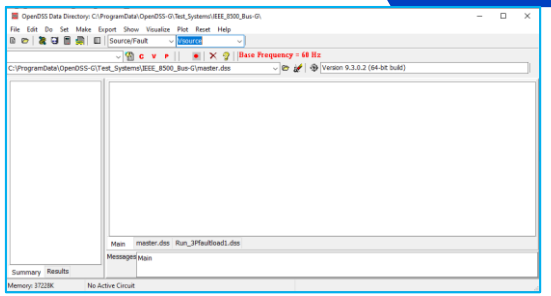
Davis Montenegro-Martinez serves as technical leader at the Electric Power Research Institute (EPRI) in the areas of power system modeling, analysis and high-performance computing. He received his degree in electronics engineering from Universidad Santo Tomás, Bogotá, Colombia (2004); he is M.Sc. in electrical engineering from Universidad de los Andes, Bogotá , Colombia (2012). He received his Ph.D. in electrical engineering from Universidad de los Andes (2015), and a Ph.D. in electrical engineering from the University Grenoble-Alpes, France (2015).

Before joining EPRI, Davis served for 10 years as a lecturer for Universidad Santo Tomas in Colombia, during this time he was also technology consultant in the areas of industrial automation, software and electronic hardware design focused in the electric power industry, specifically in monitoring and control for meter calibration laboratories. His expertise in parallel computing techniques is being used at EPRI for incorporating multi-core processing to power system analysis methods such as QSTS, reducing the computational time required to perform these analysis using standard computing architectures

OpenDSS flavors

User Interfaces

- A **stand-alone executable** program that provides a text-based interface (multiple windows)



- An **in-process COM server** (for Windows) that supports driving the simulator from user-written programs.

- A **direct DLL** interface that mimics the COM interface
  - For non-Windows platforms, such as HPCs
  - For programming languages that do not support COM or are not efficient at supporting COM

User Interfaces

OpenDSS-G

Graphical aids for situation awareness to describe the system functional status intuitively

Electrical equipment described using frontal panels to emulate the console of the equipment on the terrain to mimic the real device

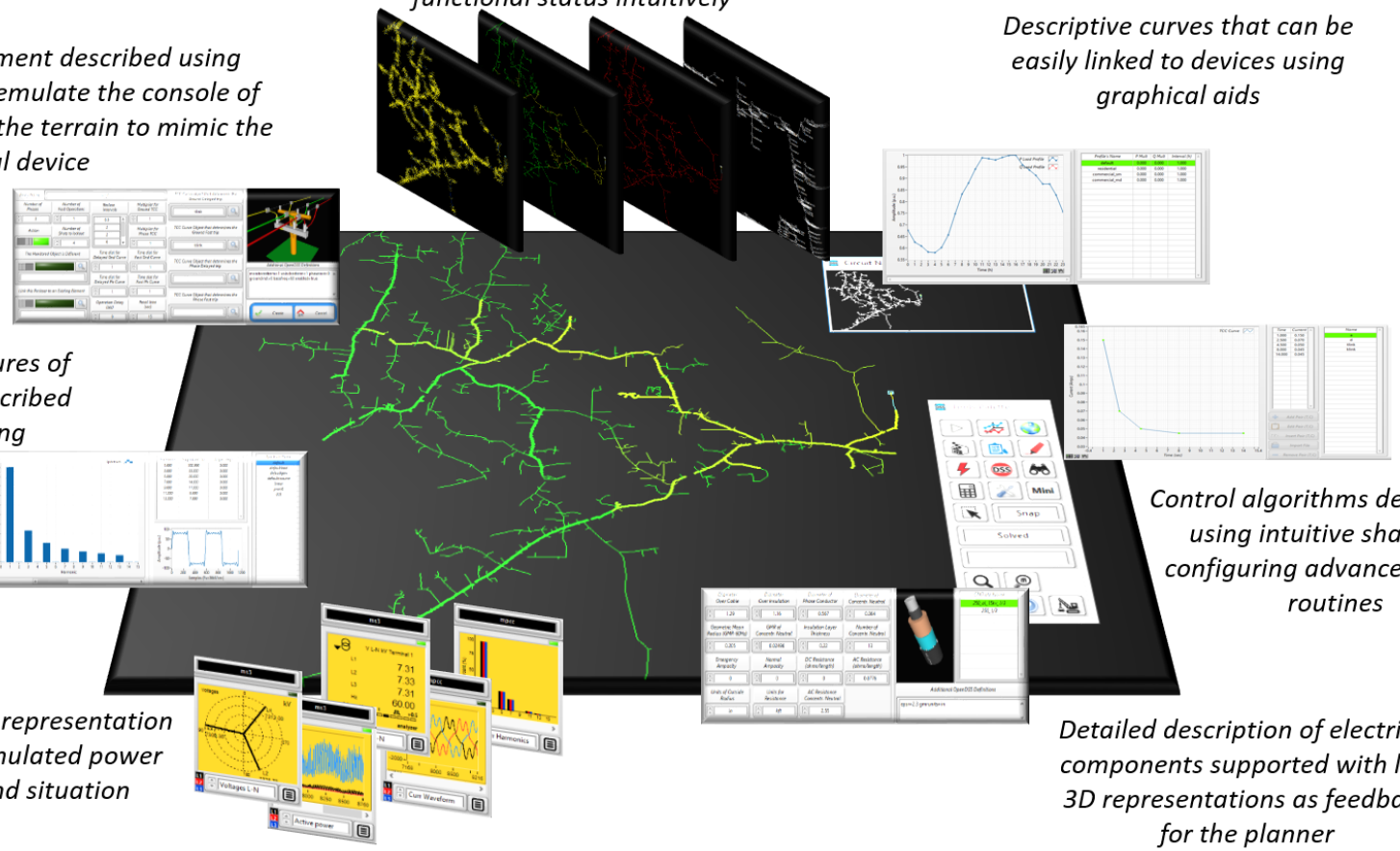
Descriptive curves that can be easily linked to devices using graphical aids

Electrical behavior and features of the electrical equipment described and linked to models using graphical aids

Control algorithms described by using intuitive shapes for configuring advanced control routines

Advanced metering representation for showing the simulated power system status and situation

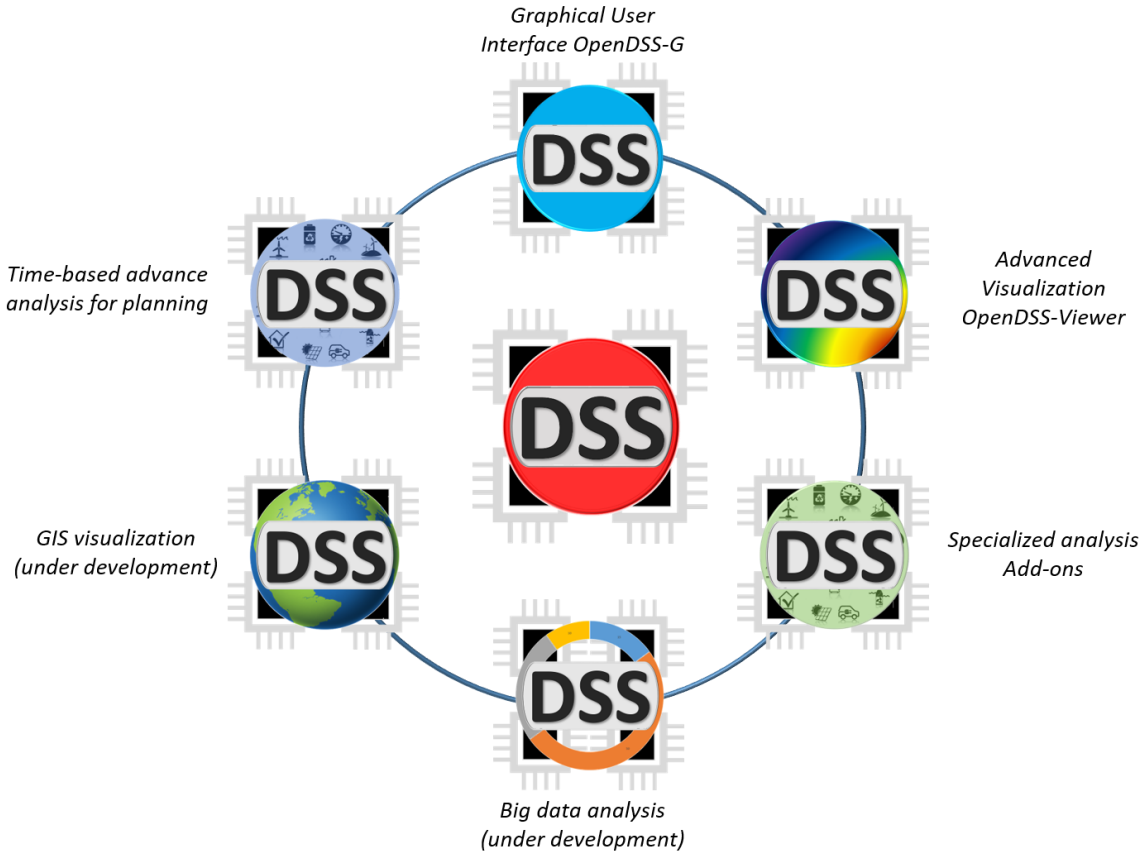
Detailed description of electrical components supported with live 3D representations as feedback for the planner



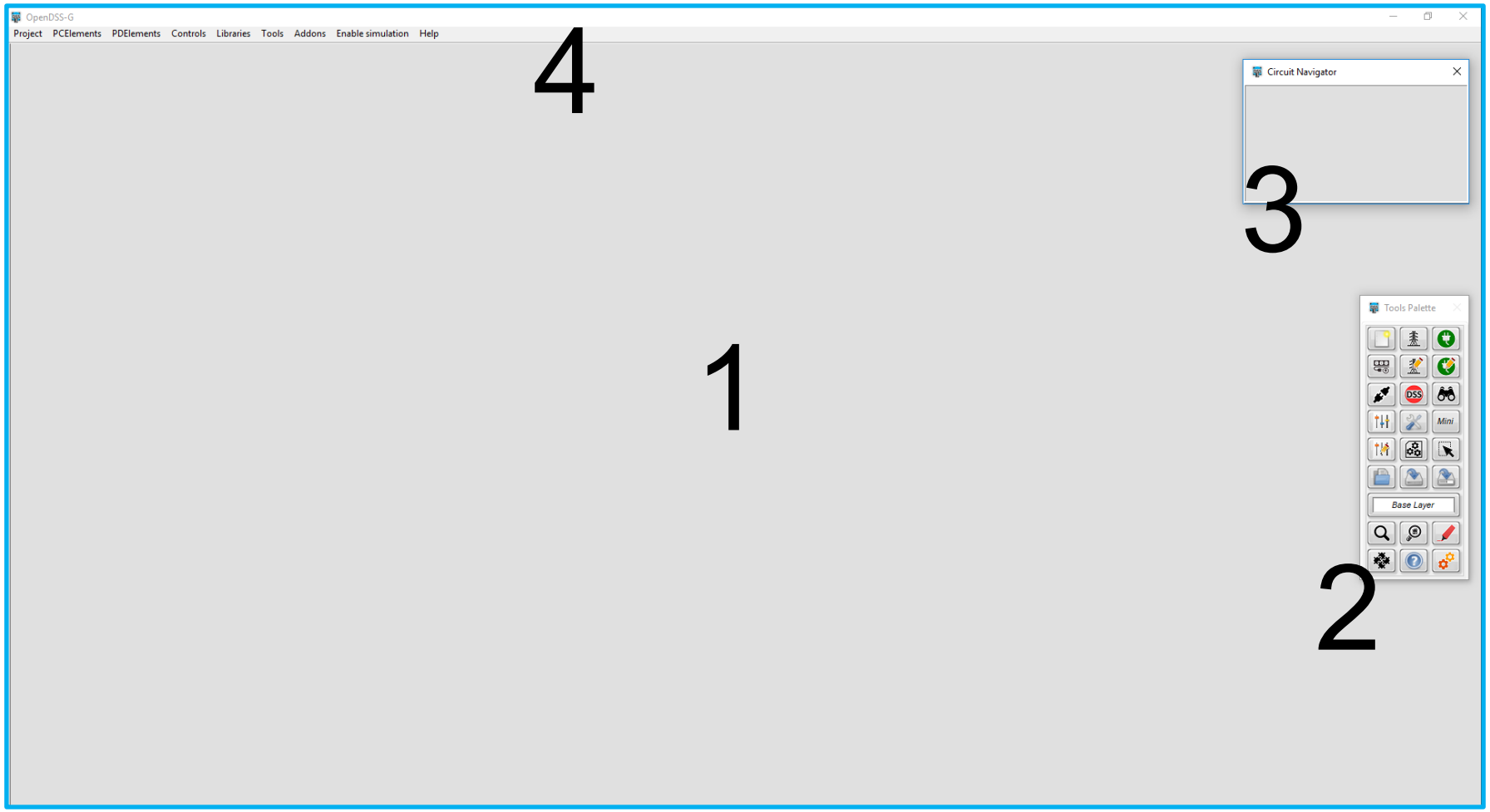
https://www.youtube.com/channel/UCGe58SDH3lq-EGvnxEOuWaQ

OpenDSS-G

- It is a graphical interface for OpenDSS
- Provides the same functionalities using graphical objects
- Provides additional functionalities using the integrated TCP server
- Cooperates with other applications within the OpenDSS tool suite
- Integrates automation objects and routines to ramp up the OpenDSS learning curve

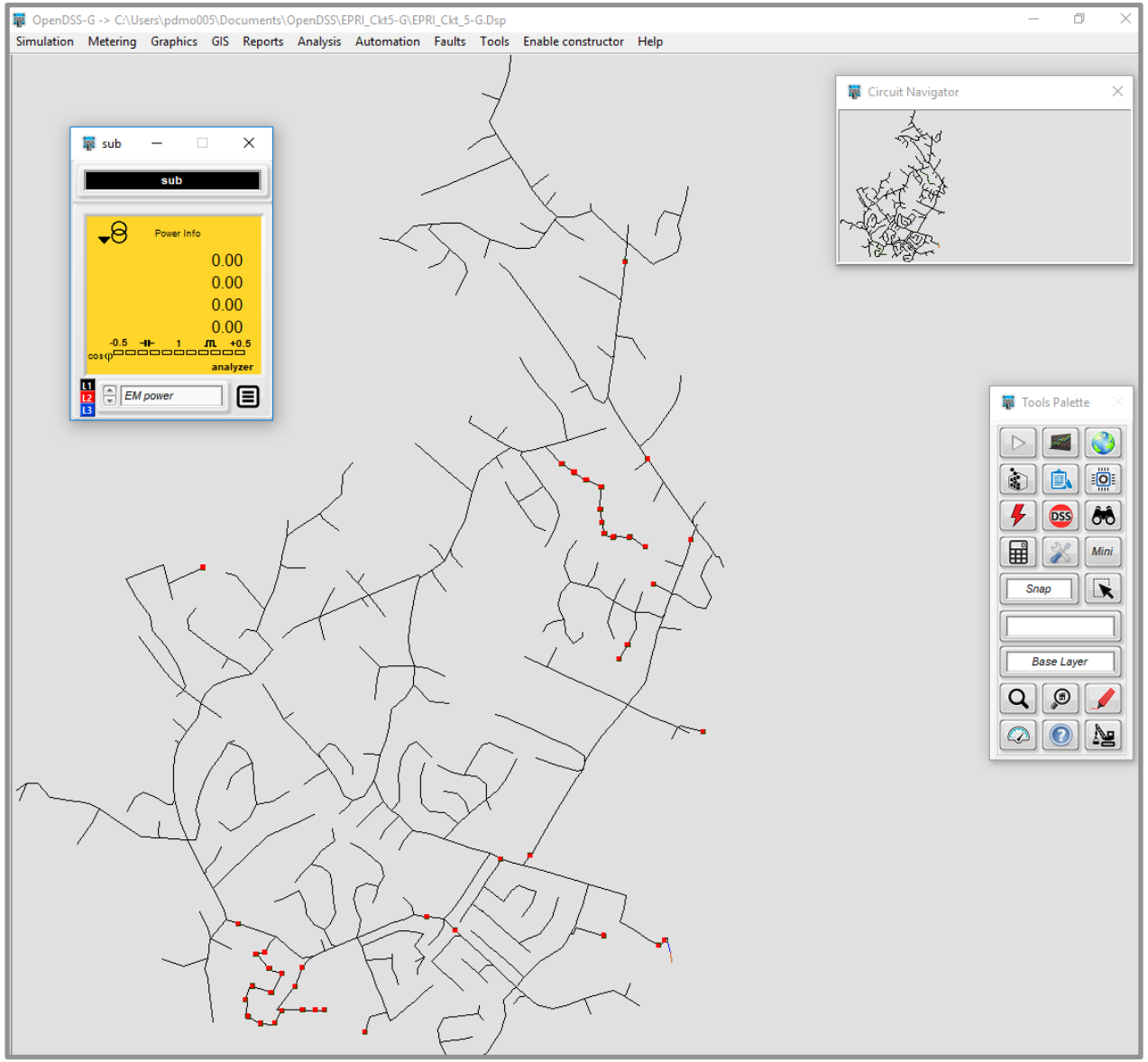


OpenDSS-G



https://www.epri.com/pages/sa/opendss

OpenDSS-G



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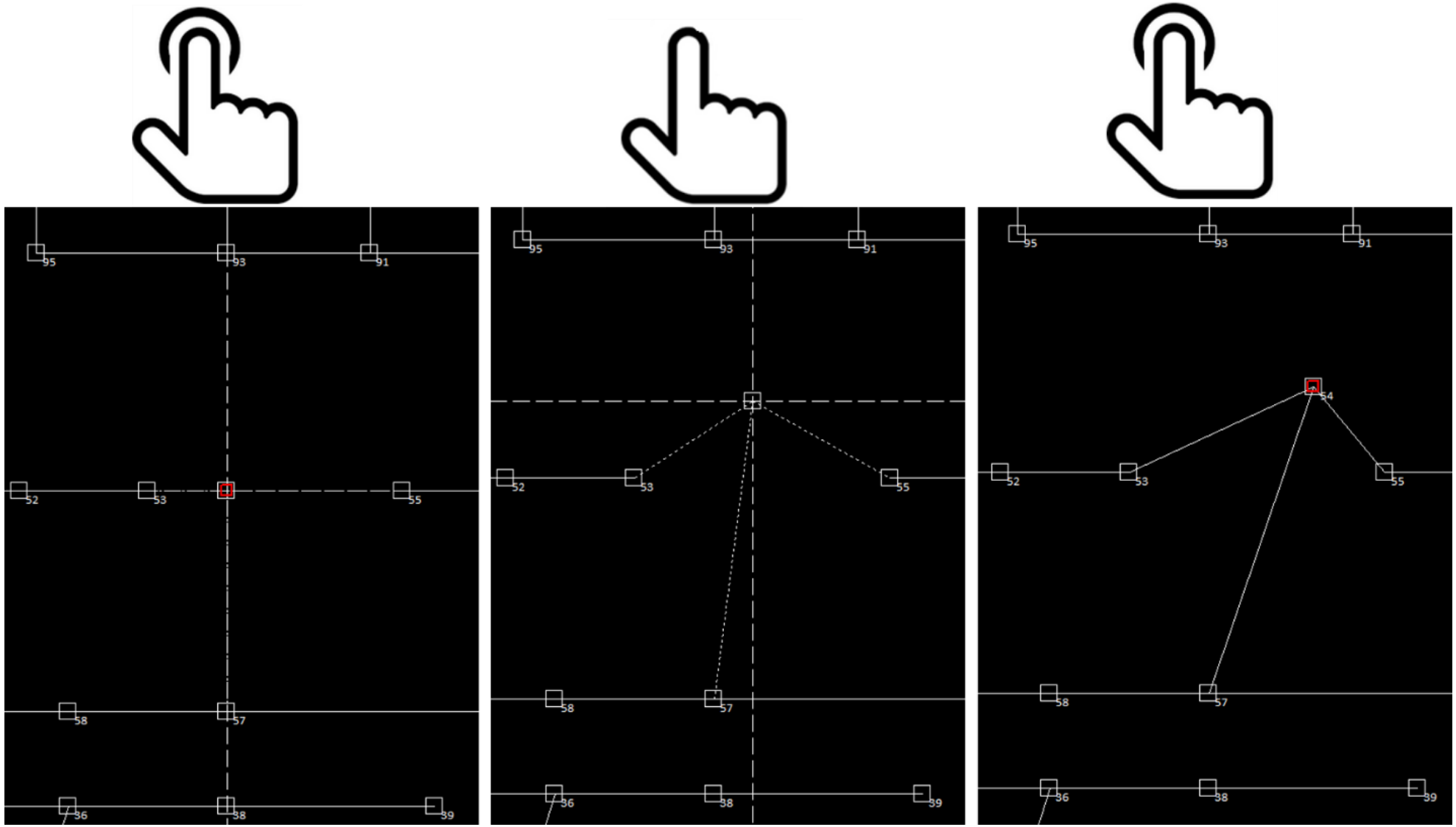

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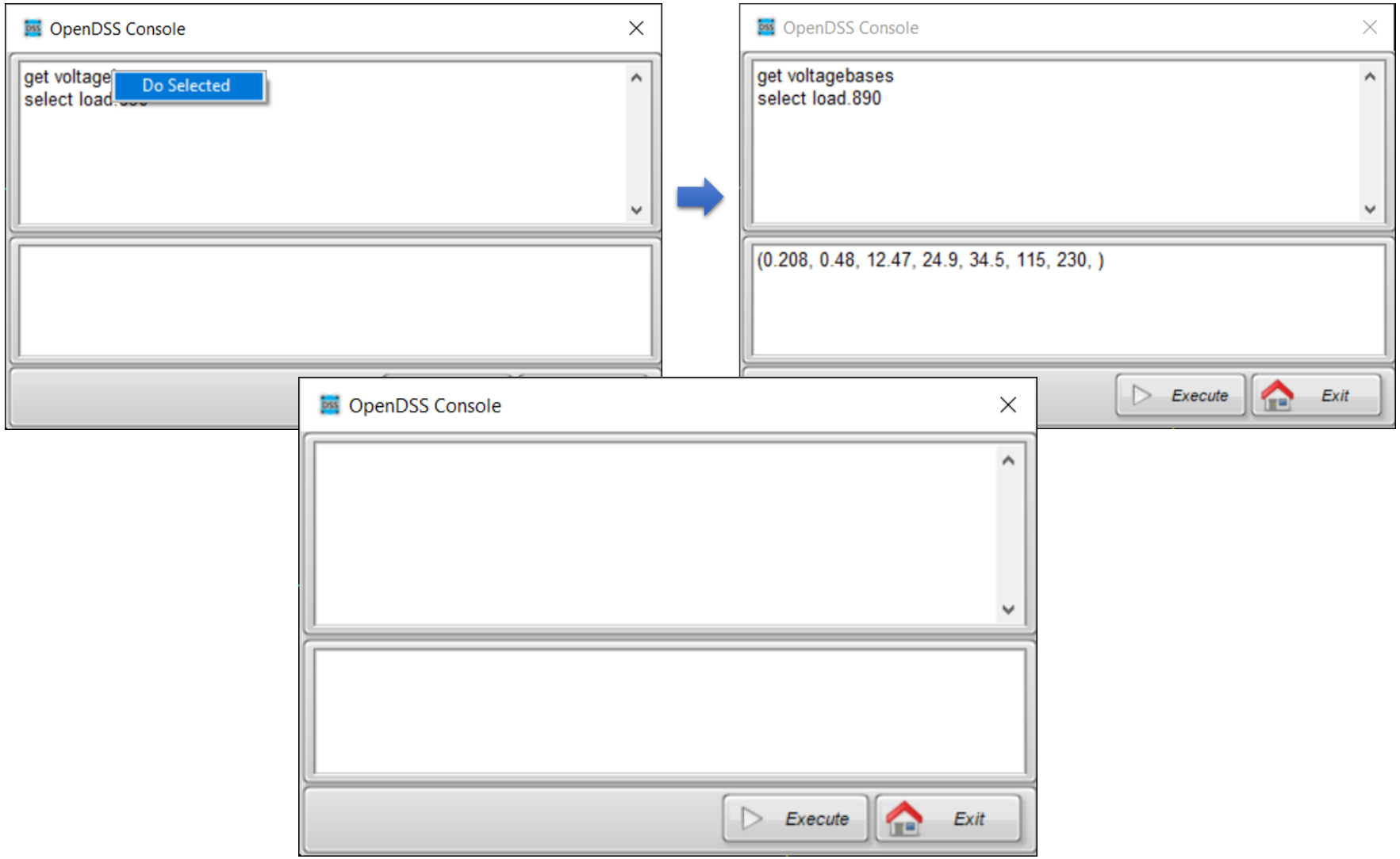
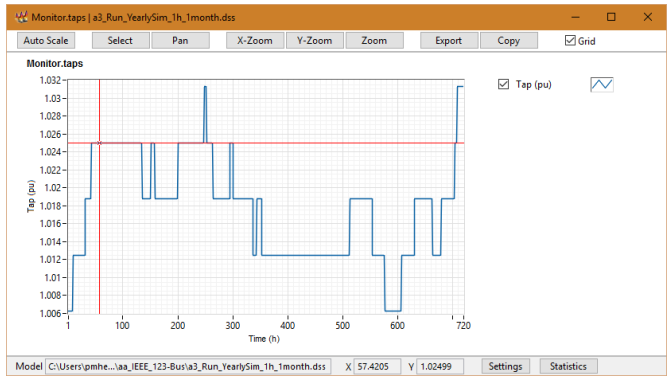
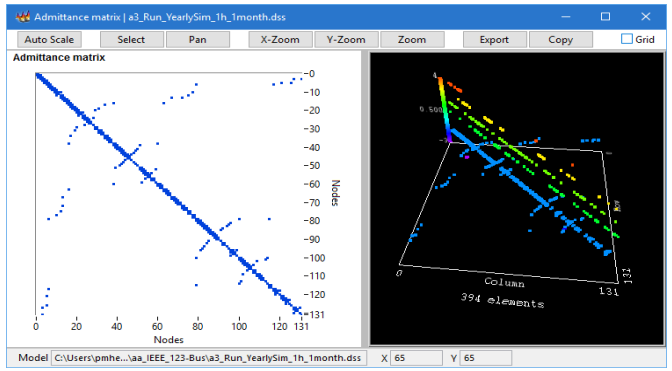
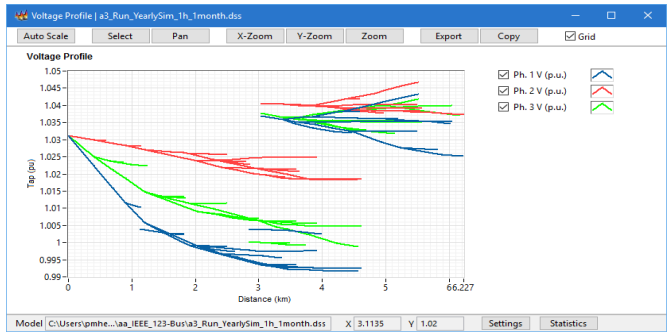
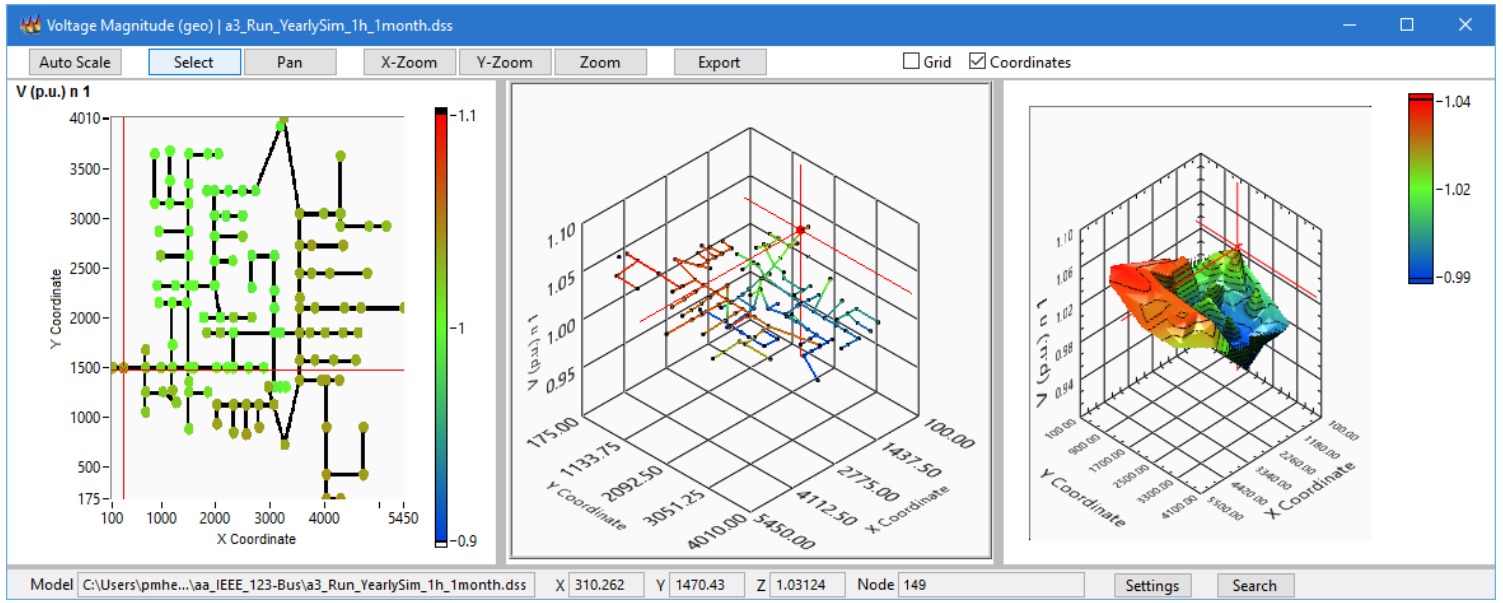


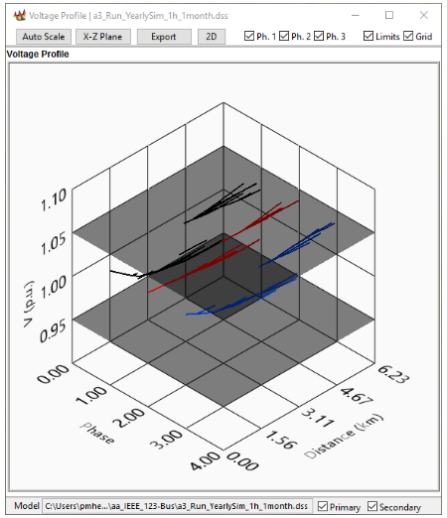
Complementary Tools

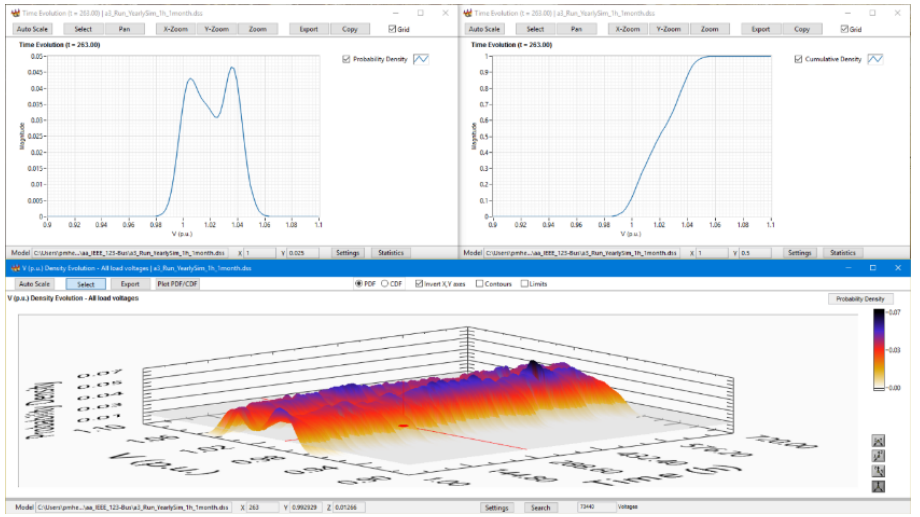












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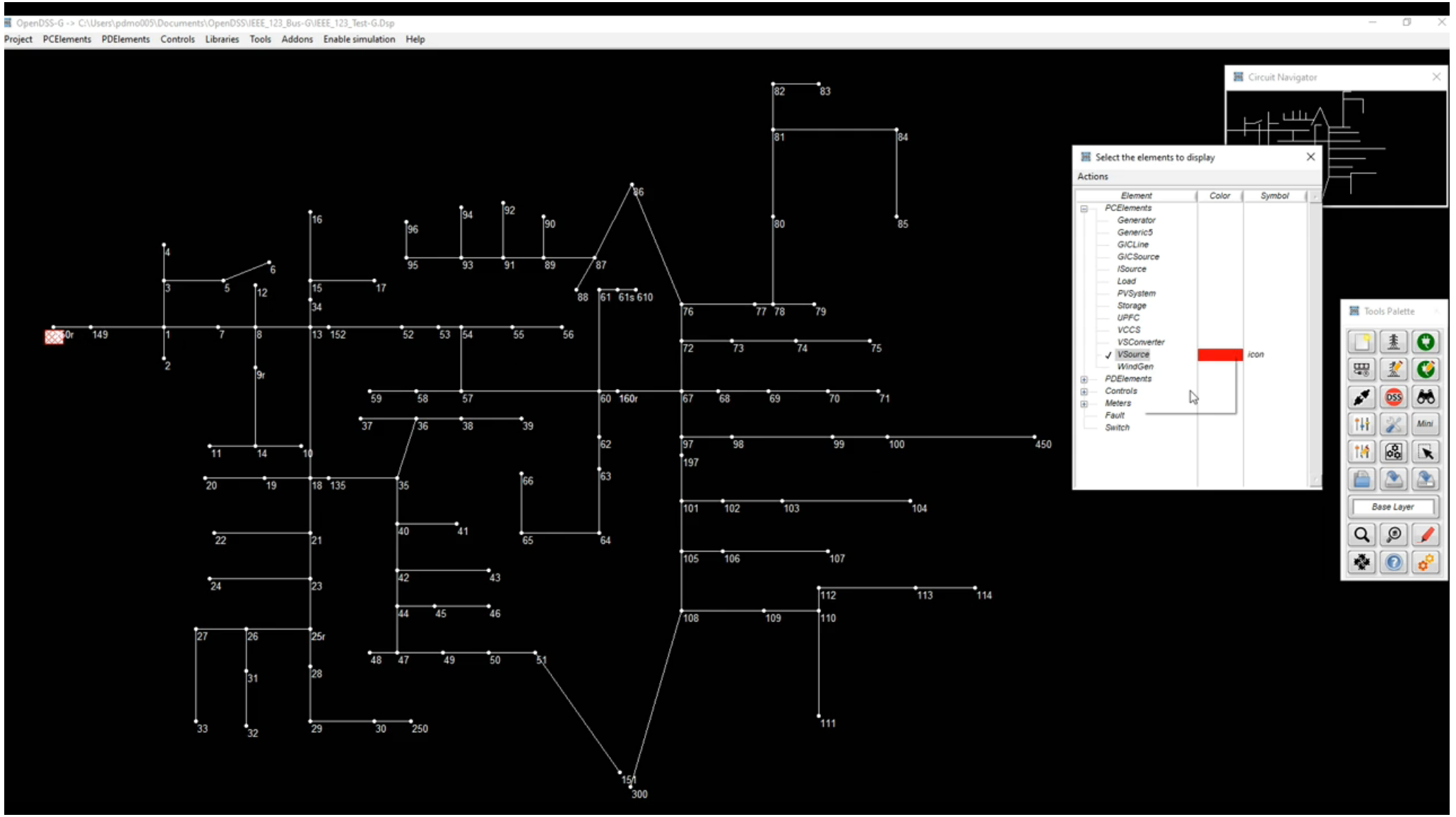

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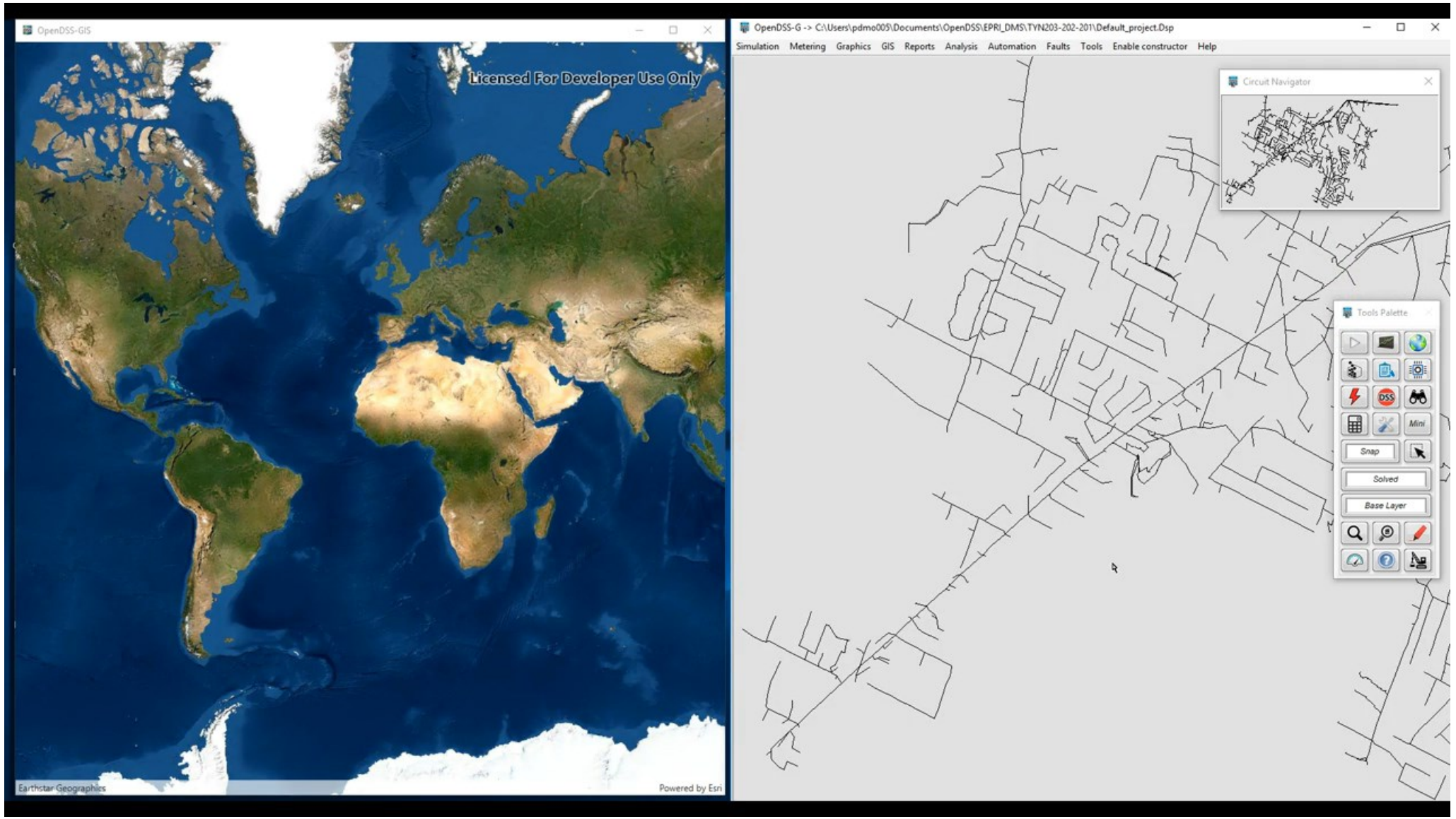

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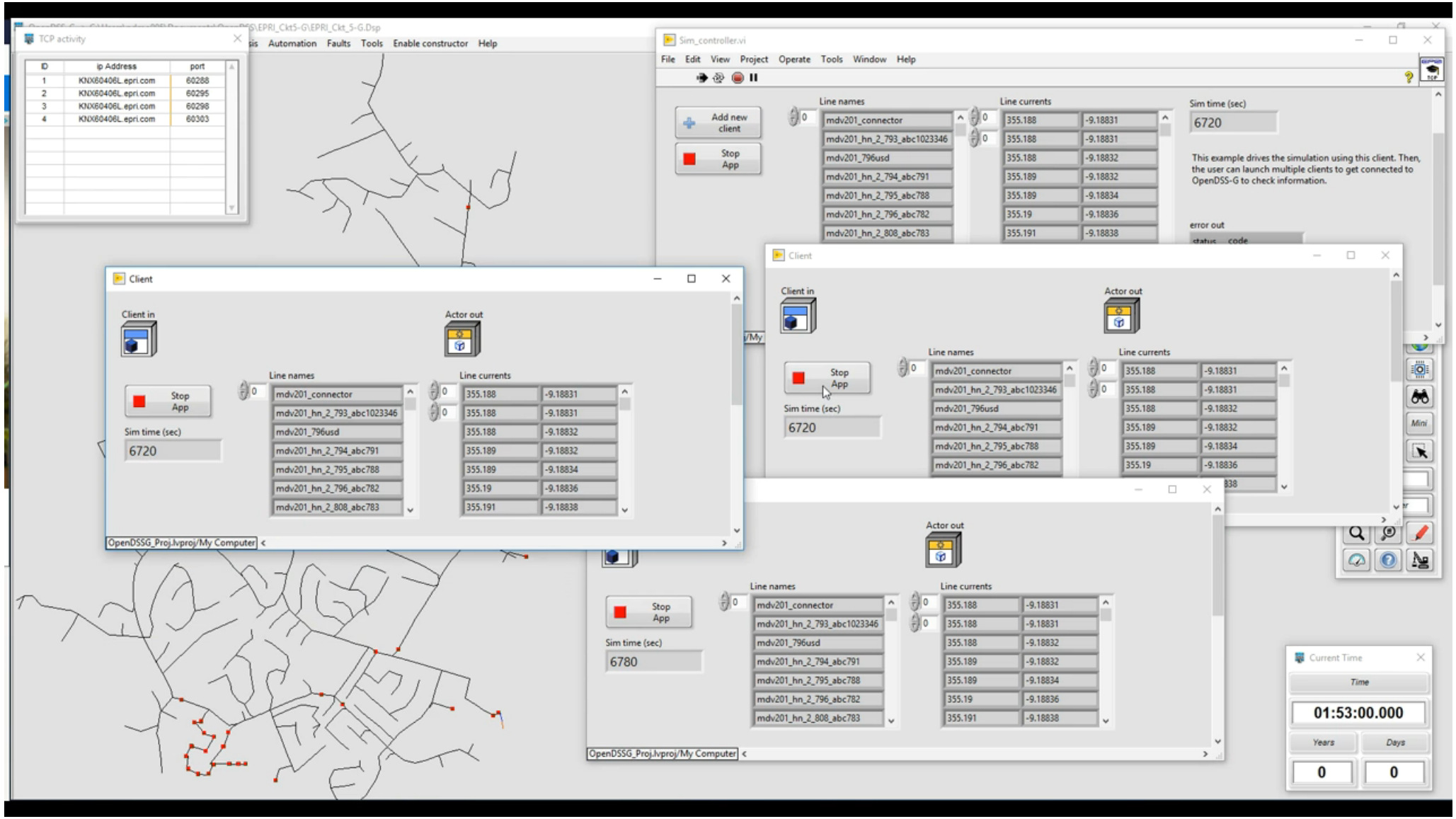
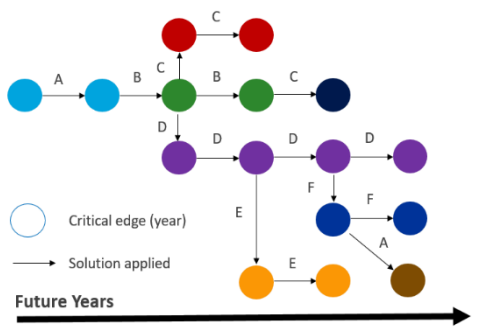
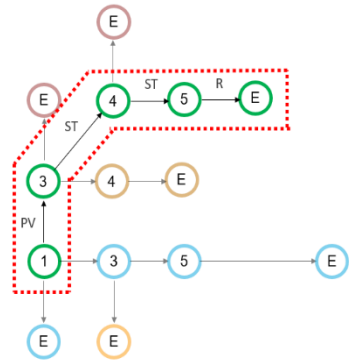


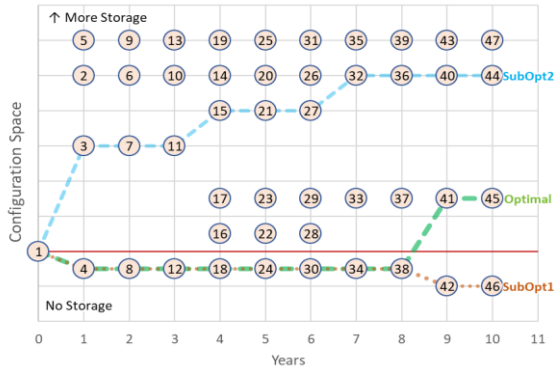
Applications

Automated distribution assessment & planning tools



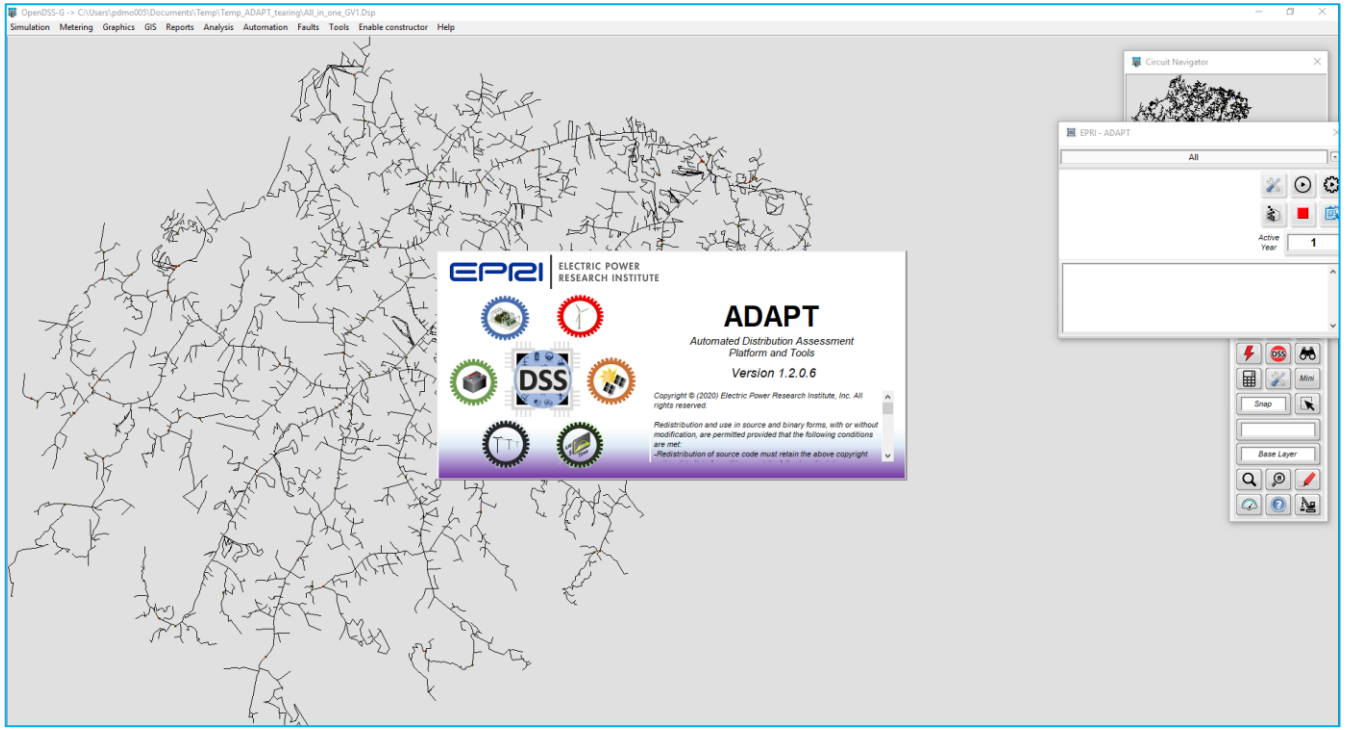


R = re conductor
LT = Load Transfer
PV = Photovoltaic
ST = Storage
E = end of timeline



ADAPT

Enable distribution planners to effectively account for the dynamics introduced by NWA, more effectively evaluate NWA versus traditional solutions, as well as identify optimal deployment strategies.



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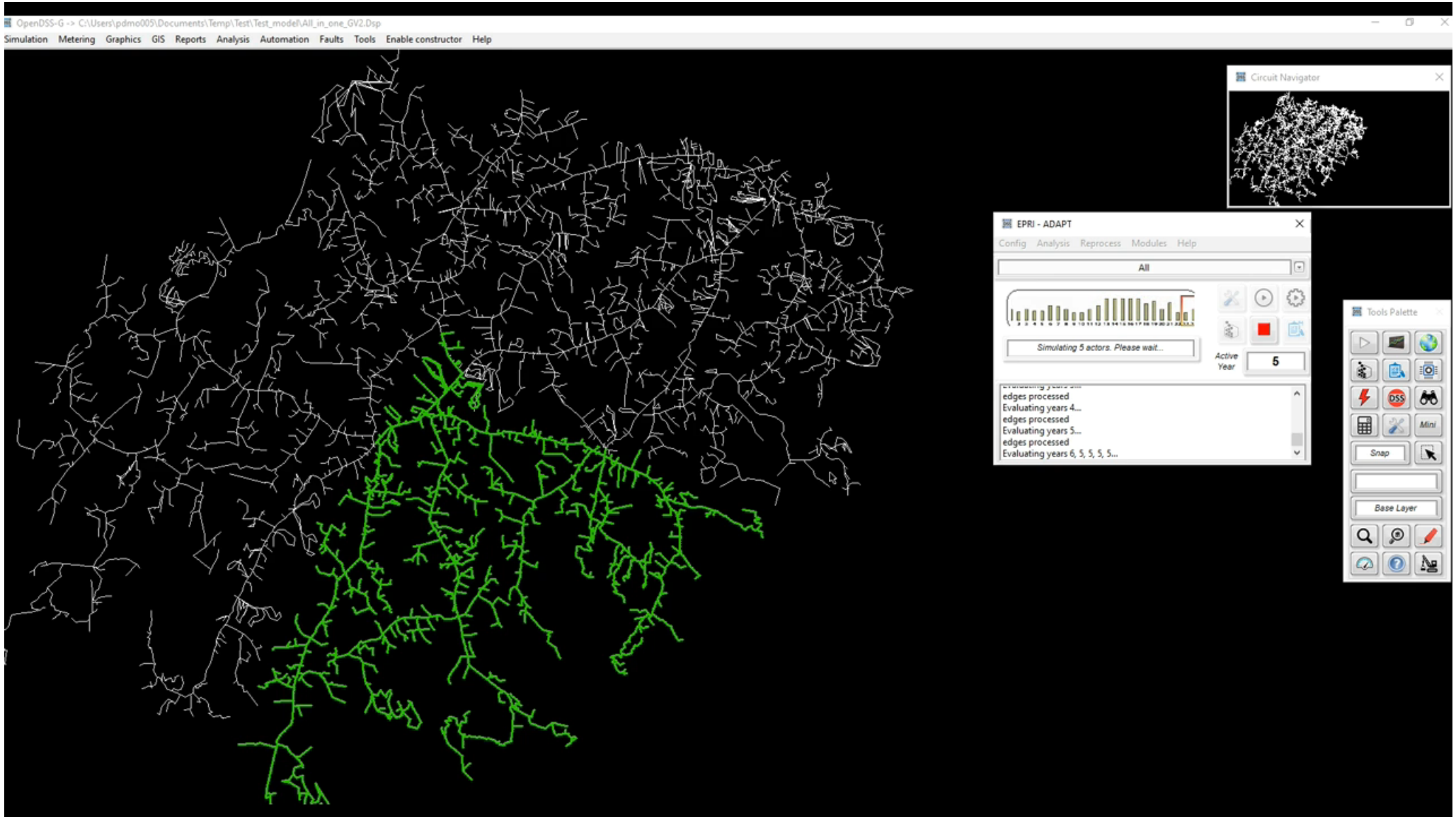
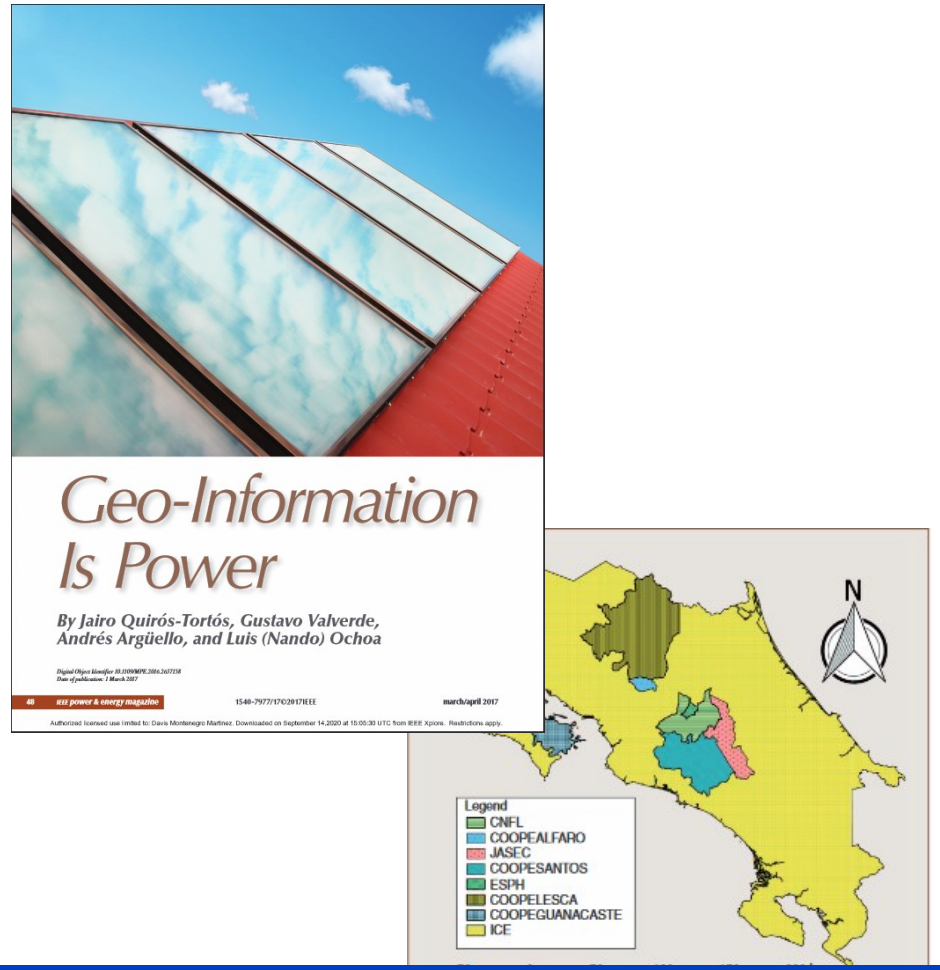
ADAPT



Identifying Physical Threats to Power Systems Using GIS and Satellite Imagery

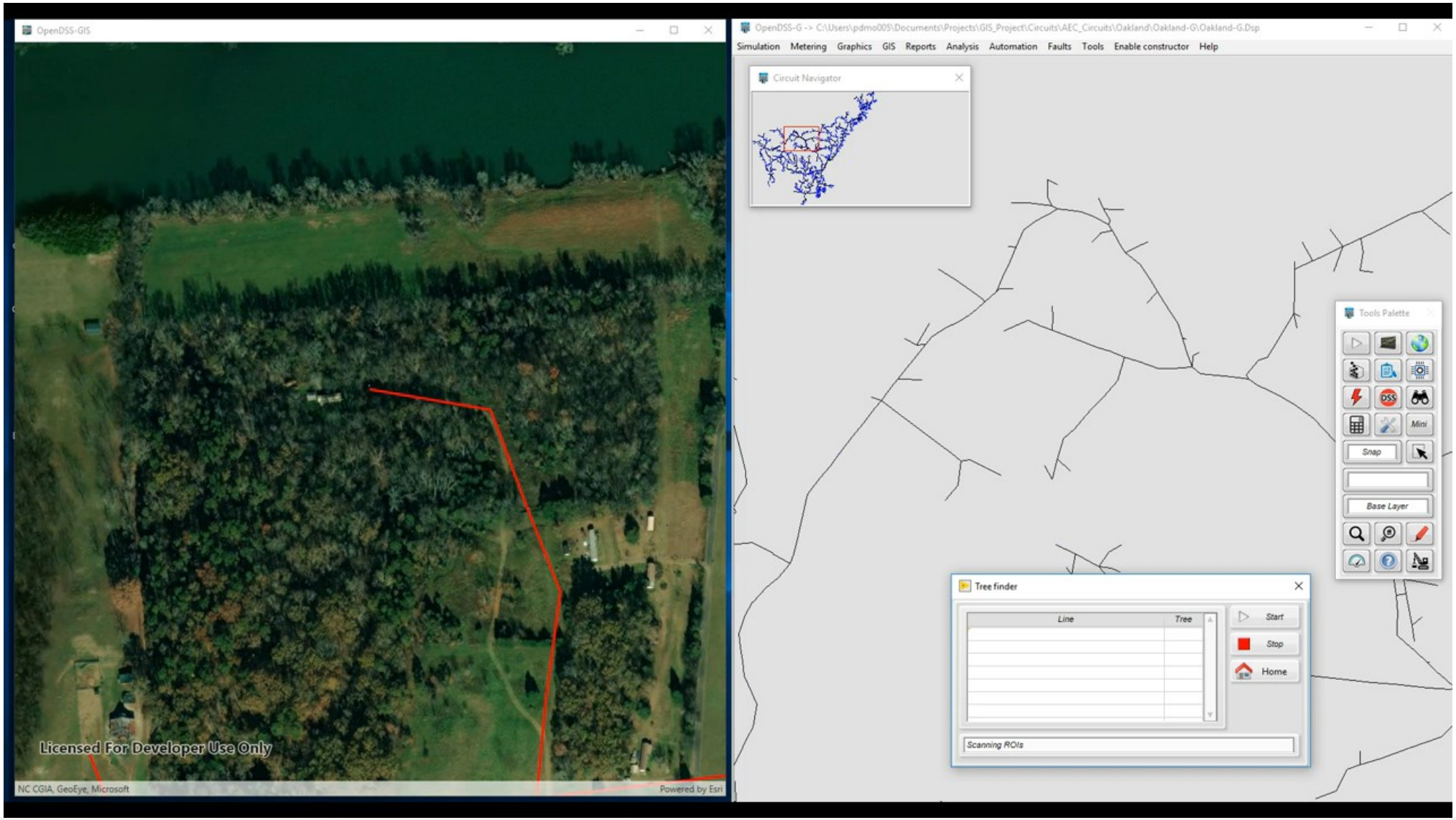
The electric utility industry is moving toward a competitive environment and having accurate information about system performance will facilitate that maintenance and grid modernization dollars are spent wisely and that customer expectations are met [1].



[1] http://www.egr.unlv.edu/~eebag/Reliability_Indices_for_Utilities.pdf

Application of Image Processing Algorithms to Improve Predictive Reliability Assessments: Identifying physical threats using GIS and Satellite imagery. EPRI, Palo Alto, CA: 2020. 3002018884.

Identifying Physical Threats to Power Systems Using GIS and Satellite Imagery



Questions?