Overview

• About NYPA

• AGILE background

• AGILE capabilities

• Current status

• Ongoing and upcoming activities

• Future direction
About NYPAA

Founded by Franklin D. Roosevelt in 1931 - *Power Authority Act*

• 2000+ employees
• Governance
  – 7 member board
• Revenue source
  – *Power contracts*
  – *Generation*
  – *Energy Efficiency Projects*

NYS Canals transferred from the NYS Thruway Authority in 2017

• 524 miles across NYS

Mission
"Power the economic growth and competitiveness of New York State by providing customers with low-cost, clean, reliable power and the innovative energy infrastructure and services they value."
About NYPA – Generation Assets

Generation Assets ~ 6 GW
- 16 hydro and natural gas generation plants

- Niagara Power Project ~2,675 MW
- St. Lawrence Power Project ~800 MW
- Blenheim-Gilboa ~1,160 MW
- Flynn Power Plant ~167 MW
- Astoria CC Plant ~500 MW
- Small Hydro Plants ~83 MW
- Small Clean Power Plants ~461 MW
About NYPA – Transmission Assets

Transmission Assets
~ 1400 circuit miles

- 765 kV Transmission
  ~155 circuit miles
- 345 kV Transmission
  ~928 circuit miles
- 230 kV Transmission
  ~338 circuit miles
- 115 kV Transmission
  ~35 circuit miles
- Total Transmission
  ~1,456 circuit miles
- Bulk Transmission Substations
  21 substations
- Portion of Bulk NYS Grid
  ~13% (>115kV)
  ~34% (>230kV)
About NYPA – Electric Supply Customers

SENY
- Economic Development
  - Replacement Power
  - Expansion Power
  - Preservation Power
  - Industrial Economic Expansion Power
  - Recharge New York

Munis and Co-ops
- 47 municipal
- 4 rural co-operatives
### AGILe Background

<table>
<thead>
<tr>
<th>What is AGILe?</th>
<th>Electric power research laboratory with grid modeling and simulation capabilities and expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will AGILe do?</td>
<td>AGILe will conduct collaborative research with utilities and grid tech companies focused on facilitating stakeholders in solving grid related challenges</td>
</tr>
<tr>
<td>What does AGILe need?</td>
<td>AGILe’s budget will cover the initial operating and capital expenditure for the lab. More sustainable funding models will be investigated for the long-run</td>
</tr>
</tbody>
</table>

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**Advanced Grid Innovation Lab for Energy Partnerships**

- **Sponsoring Organizations**
  - e.g. NYPA, EPRI, and others

- **Strategic Collaborators**
  - e.g. NYISO, NYSERDA, DPS

- **Developers**
  - e.g. Hi Tech Electrical Apparatus & IT Firms

- **Other Funders**
  - e.g. Industry companies, vendors

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*NY Power Authority*
Create Value on Key Areas in Electric Power and Energy Sector

Five Key Areas

- SENSORS
- CONTROLS
- ADVANCED TRANSMISSION APPLICATIONS
- AUTOMATION
- SECURITY
Current AGILe Capabilities

- End-to-end grid modeling and real-time simulation
- Hardware/software-in-the-loop equipment testing for digital substation automation and control
- Simulation of communication systems and cyber security events
- Economic analysis and evaluation of technical solutions
AGILe Phase I Implementation
AGILe Phase I Implementation
# Real-Time Simulation Capabilities

<table>
<thead>
<tr>
<th></th>
<th>RTDS</th>
<th>OPAL-RT</th>
<th>OPAL-RT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NovaCore chassis</td>
<td>4 NovaCore chassis; 40-core processing power</td>
<td>1 8048B-TR4F Super Server; 40-core processing power</td>
<td>1 OP5600 simulator; Single-core processing power</td>
</tr>
<tr>
<td>Simulation</td>
<td>Simulation capability: ~800 3-phase buses (transient simulation)</td>
<td>Simulation capability: ~800 3-phase buses (transient simulation)</td>
<td>Simulation capability: ~ 12 3-phase buses (transient simulation)</td>
</tr>
<tr>
<td>Capability</td>
<td>~5,000 single-phase buses (stability simulation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog Inputs</td>
<td>132 analog output; 72 analog inputs; 64 digital outputs; 64 digital</td>
<td>128 analog output; 64 analog inputs; 64 digital outputs; 64 digital inputs</td>
<td>64 analog output; 32 analog inputs; 32 digital outputs; 32 digital inputs</td>
</tr>
<tr>
<td>No. of Channels</td>
<td>128 analog output; 64 analog inputs; 64 digital outputs; 64 digital</td>
<td></td>
<td>12-channel AE Techron 7224 amplifier via an OP8600 interconnection unit</td>
</tr>
<tr>
<td>Communication</td>
<td>Communication protocols: IEEE C37.118, IEC 61850, Modbus, DNP3, etc.</td>
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<td></td>
</tr>
<tr>
<td>Software</td>
<td>RSCAD simulation software</td>
<td>HYPERSIM and RT-LAB (ePhasorSim/eMegaSim) simulation software</td>
<td>HYPERSIM simulation software</td>
</tr>
</tbody>
</table>
Data Acquisition for Model of New York State

NYISO
- Planning Studies Models
- Short-Circuit Studies Models

Model reduction

AGILe Lab Model Management

System monitoring data (future)

Real-Time Simulators and Applications/Use Cases

NYPA and NY TOs
- Physical Equipment Models
- Substation Data
Current Status

- MOU in place with all NYS utilities, NYSERDA, and the NYISO
- Phase I lab established on 8th floor of NYPA White Plains office
- EPRI on board to manage AGILe and support operation and R&D activities
- Draft version of 3-phase transient RTDS model of NYS grid 230kV and above completed
- Draft version of NYS dynamic models in Opal-RT completed
- Ongoing establishment of a cyber security test bed
- Ongoing internal NYPA and EPRI projects
- Collaborative applications for external funding
Ongoing and Upcoming Activities

- Establishment of a flexible operational framework for a variety of collaborative projects
- Establishment of AGILe governance and advisory committees
- Model expansions and improvements
- Implementation of projects for demonstrating lab capabilities based on initial set of use cases selected by TOs
AGILe Governance

- Strategic Advisory Committee
- Technical Advisory Committee
- NYPAC Technical Steering Committee
Future Direction – AGILe Phase II

- Stand alone lab facility in the vicinity of Albany, NY
- Expansion of lab equipment and capabilities
- Extended collaborations and stakeholder engagement
- Sustainable financial support model
Discussion

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