Temasek Defence Systems Institute

Experimental Validation of Resilience Models for Islanded Microgrids for Military Operations

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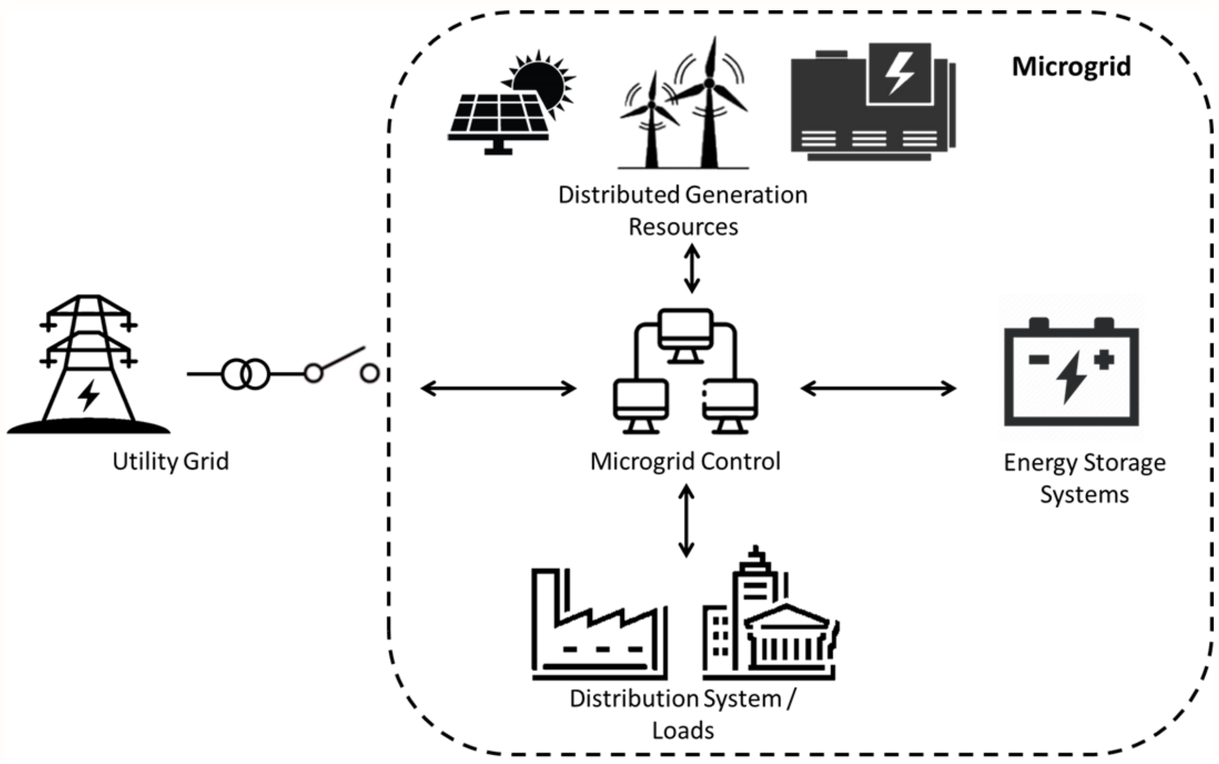
Introduction

Energy security is important to modern military installations and the use of microgrids in military installations have widely been accepted as an effective way to improve resilience. Beyond military applications, microgrids have also been deployed to support critical infrastructure like hospitals, water treatment and sanitation plants.

Objectives

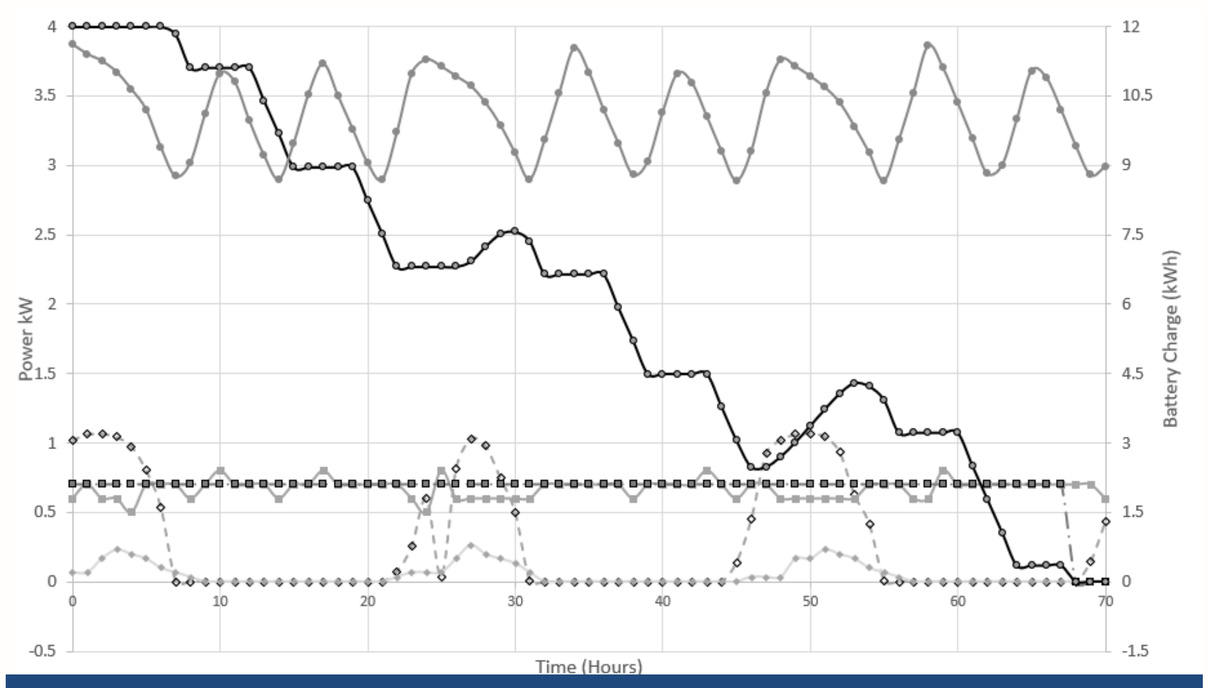
To better develop military microgrid solutions for energy resilience, research have resulted in the development of simulation models for microgrid resilience analysis. This research conducts an experimental validation on a scaled microgrid to build trust in the developed models.



Microgrid Resilience

- Microgrids can operate in both grid-connected or island-mode
- Acts as a single controllable entity
- Functionally independent

- Resilience measures microgrid performance after a disruption
- Invulnerability or absorption capacity
- Recoverability, the computed ration of power demand not met after disruption



Results

- Positive residuals in battery charge results
- High solar power generation in simulation models.

Key Takeaway

The validation of simulation models with systems tested in its operational environment builds confidence and refines the developed models. Future work can be conducted on a full scale microgrid system with power capacities close to deployed systems to include more system factors.

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