

# energytech

*lighting the way to a brighter future*

[www.energytech.org](http://www.energytech.org)

Cleveland I-X Center

Cleveland, Ohio

October 31-November 2, 2017

## Key Sponsors



The University of Texas at Austin

Center for Electromechanics

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**CITY OF CLEVELAND**

Mayor Frank G. Jackson



Greetings Energy Tech Conference Attendees!

On behalf of the citizens of our great city, welcome to Cleveland – a vibrant, 24hour city, with a hometown feeling. Our city prides itself on the outstanding services we provide to every neighborhood and all of the amenities we offer our residents and visitors alike.

From the famous Playhouse Square Theater District to the energy of our professional sports teams and the JACK Casino, Cleveland is full of exciting things to do. Tour the world’s only Rock and Roll Hall of Fame and Museum or eat at one of our many award-winning restaurants downtown or in neighborhood hotspots like Tremont and Little Italy. While you are visiting any of our historic and culturally diverse neighborhoods, check out the West Side Market in Ohio City, Severance Hall in University Circle or any one of our world-renowned museums.

Cleveland is also home to the Huntington Cleveland Convention Center, the Global Center for Health Innovation, four world-class healthcare institutions, 80+ biomedical companies, leading manufacturers and professional services firms, four higher-education institutions and so much more.

We are a city connected to our greatest natural asset – Lake Erie – and its many recreational offerings. And with countless trails, parks and public spaces, you are certain to find something to love.

Once again, welcome! Enjoy all that we have to offer and share in the experiences that are uniquely Cleveland.

Sincerely,

Frank G. Jackson, Mayor

# Letter from the Chair



**Welcome to Cleveland, and EnergyTech 2017**, being held in our new venue, Cleveland's IX center, with our collaborating partners ISS (Information Security Summit),. Our annual conference continues addressing the broad challenge of "Energy Technology" and "Securing our Energy Future". As we enter our seventh year, with the help of our sponsors and collaborating entities, our conference series continues to gain momentum and recognition as the premier national conference examining the full spectrum of energy systems and critical infrastructure topics.

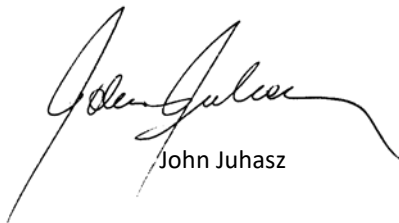
The Energy sector is currently undergoing a fundamental shift, a transformation from the architecture that has served our society for over a century. The transformation is evident in both terrestrial systems as well as in the modernized, continually evolving aerospace sector. This year EnergyTech expands its scope to focus on exciting developments in both areas.

World airline passenger transportation is expected to double within the next twenty years, with increased pressure to provide future aircraft with lower operating costs, fuel consumption, noise, and pollution, while increasing safety. The electrification of aircraft through turbo-electric and hybrid electric propulsion will play a significant part in achieving these future aircraft benefits.

These are some of the ponderous issues and questions that are in focus at EnergyTech. Our speakers / contributors will discuss these issues and seek rational methods and pathways for resolving problems and reducing risk in our complex infrastructures. The application of rigorous methods in Systems Engineering, coupled with the most advanced tools and methods, will inevitably be at the core of the solution roadmap.

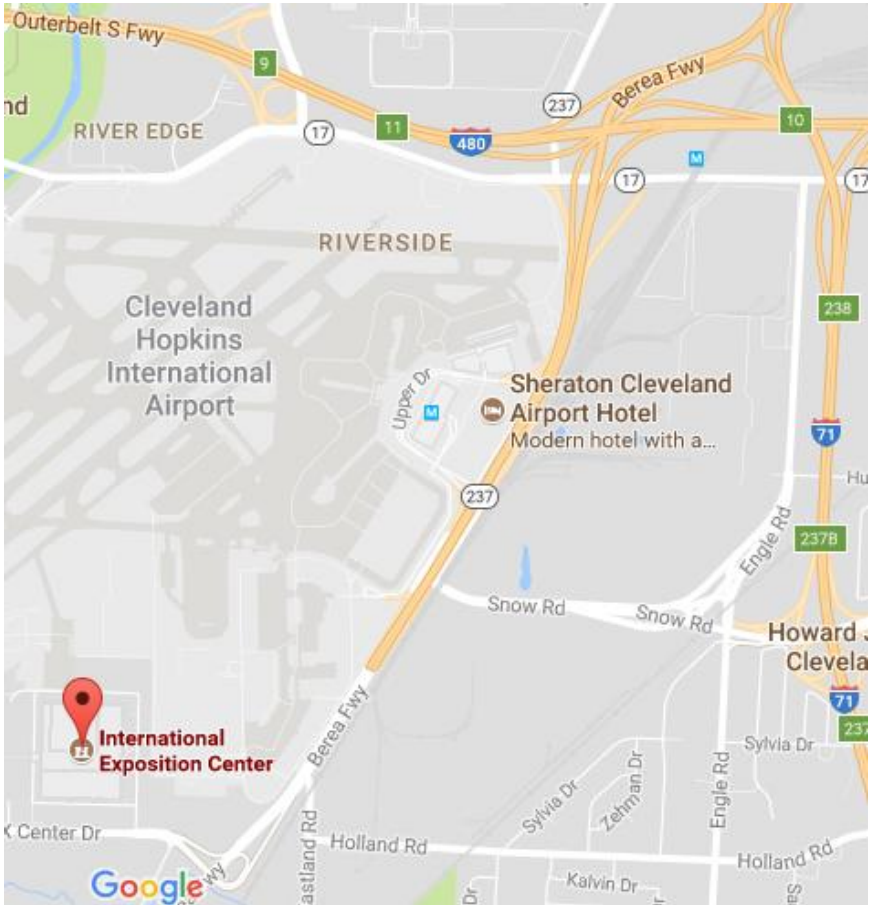
On behalf of the EnergyTech planning committee, its sponsors and collaborators, and our conference co-chairs, my colleagues Ray Beach of NASA and Dr. Charles Alexander of CSU, we thank you for your participation and look forward to our long-term partnership.

Sincerely,



John Juhasz

# Conference Area Map



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# Conference Quick Locator

- **Keynotes - Grand Ballroom (Lobby Level)**
- **Track 1: Systems Engineering/MBSE - ROOM 19**
- **Track 2: Energy System Security & CI - ROOM 20**
- **Track 3: Energy Policy, DER & Grid Evolution - ROOM 21**
- **Track 4: Vehicle Systems/System of Systems - ROOM 24**
- **Track 5: Distributed Aero Electrical Systems - ROOM 25**
- **Track 6: Turbo/hybrid Electric Components - ROOM 26**
- **Community Resiliency Workshop - ROOM 19**
- **Autonomous/Intelligent Control Workshop - ROOM 26**
- **Executive Panels - Grand Ballroom**

**NOTE: Lunch and Evening Events in Concourse Exhibit Hall**

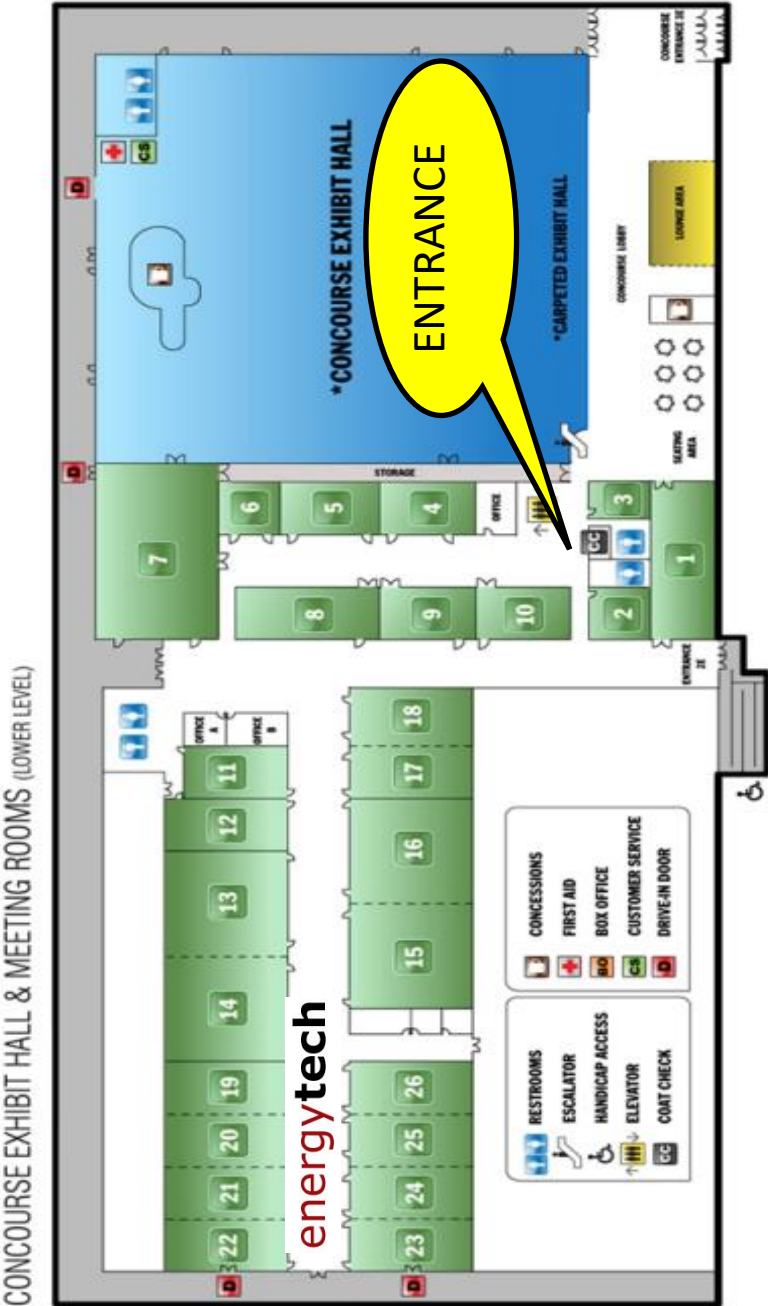
## **GUIDEBOOK—DETAILED PROGRAM INFO**

Information Security Summit has provided ISS event information via Guidebook since 2015 at no cost to attendees. **As part of the ISS event, EnergyTech information is included.**

To access the ISS Guidebook, download the app to your device (Apple, Android, & Blackberry). Create a simple user profile and password to be able to access guides. Then search for the “Security Summit Week 2017” guide through the search feature.

**NOTE:** The ISS Guidebook will be available and will feature all agendas, speakers, sponsors, and will serve as the communication channel for agenda or room changes.

# Conference Hall Map



## Tuesday Keynote



Dr. Ajay Misra serves as the deputy director of Research and Engineering at NASA's John H. Glenn Research Center in Cleveland. He shares responsibility with the director of Research and Engineering for leading and managing approximately 1,100 scientists, engineers and administrative staff dedicated to Glenn's research and development in propulsion, communications, power, and materials and structures for extreme environments in support of NASA's aeronautics and space missions.

### ABSTRACT

#### Technical Challenges and Barriers Affecting Turbo-electric and Hybrid electric Aircraft Propulsion

In order to meet aggressive aircraft performance goals set by NASA's Aeronautics Research Mission Directorate, the Glenn Research Center (GRC) is leading research and development of electrified aircraft propulsion systems with electricity being generated from a gas turbine engine or combination of gas turbine engine and an alternate energy source. The presentation will provide an overview of technical challenges and barriers affecting the development and implementation of turboelectric and hybrid electric systems. Advances will be required in multiple areas, which include energy storage, electrical machines, power transmission, power electronics, control systems, materials, thermal management, and multi-scale modeling tools. The presentation will summarize current GRC activities in these areas. Challenges associated with integration and demonstration of multiple technologies at the system level will be presented.





# Wednesday and Thursday Executive Panels

**WEDNESDAY (2:45 in Grand Ballroom)**

## **Model-based Systems Engineering Panel**

Title: Role of Models in Complex Systems Development

Moderator: Mike Vinarcik, Systems Architect - Booz Allen Hamilton

Panelists: Hummell, Geary. Briggs, Walters, Peterson

**THURSDAY (Grand Ballroom)**

## **Leader Panel #1: Technology and Systems (9:45)**

Moderator: Larry Fobes, Co-Founder - Learning With Leaders

Panelists:

- ◆ Wanda Reder, Chief Strategy Officer - S&C Electric Company
- ◆ David Long, President - Vitech Corporation
- ◆ Therese Griebel, Associate Director for Strategy - NASA

## **Leader panel #2: State of National Infrastructure & Challenges of Securing (2:45)**

Moderator: Larry Fobes, Co-Founder - Learning With Leaders

Panelists:

- ◆ John Thomas, Founder - John A Thomas & Associates
- ◆ Virginia Greiman , Assistant Professor - Boston University
- ◆ Eric Rebentish , Research Associate, M.I.T.
- ◆ Charles Manto , CEO - Instant Access Networks



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The NASA Glenn Research Center in Cleveland, Ohio, is the driving force in air and space propulsion, communications and power systems. In almost every aircraft or spacecraft you will find that Glenn technology is inside. Their work expands the reach of human and robotic explorers and inspires the next generation. More than 3,400 people form a highly skilled, diverse workforce of scientists, engineers, technicians and administrative and support personnel. They have a decades-long tradition of excellence in aeronautics and spaceflight, making significant contributions to the research, design, development and testing of technology. They partner with local and national businesses, colleges and universities.

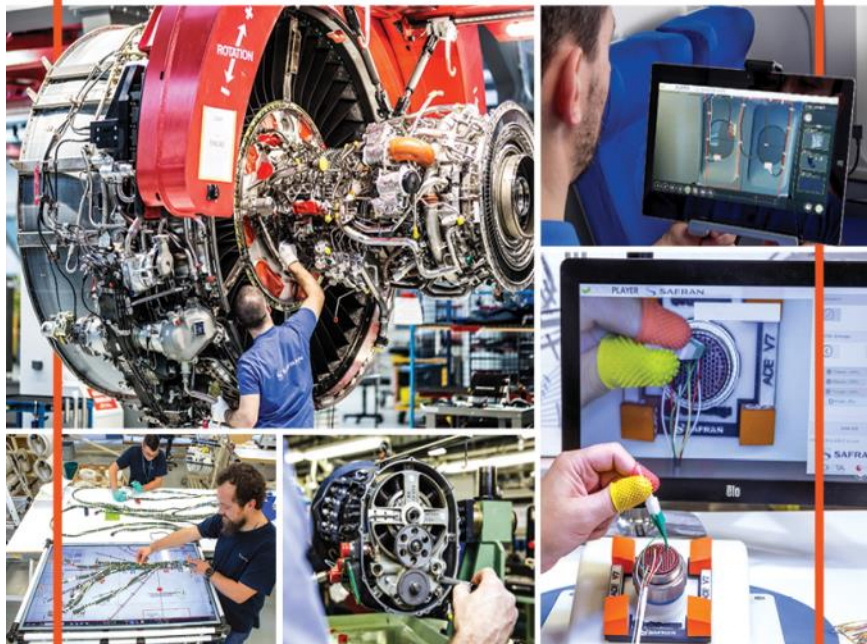
Glenn is an integral contributor to the economy of the region and is active in the community. Located near Cleveland Hopkins International Airport, Glenn's main campus, Lewis Field, is situated on 350 acres of land and contains more than 150 buildings. The world-class facilities at Lew-

is Field include wind tunnels, drop towers, vacuum chambers and an aircraft hangar. Glenn's Plum Brook Station is located in Sandusky, Ohio, on 6,400 acres of land. Plum Brook Station has large, unique facilities that simulate the environment of space. NASA Glenn's decades of experience are complemented by an enthusiasm for new challenges.

The expertise of the workforce is matched by its passion and commitment. Whether pioneering the next generation of aerospace technology or educating the next generation of aerospace pioneers, NASA Glenn dreams big.



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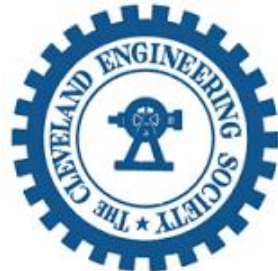


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# Additional Sponsors



The University of Texas at Austin  
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# Wednesday Evening Keynote



Dr. Jimmie McEver is a Senior Systems Scientist at the Johns Hopkins University Applied Physics Laboratory. Dr. McEver has worked extensively on applying complex systems thinking and research to challenges in systems engineering and analysis, command and control, counter-terrorism, and cyber situational awareness.

## ABSTRACT - Complexity and Systems

Complexity manifests in many ways in modern systems – in the socio-technical endeavors undertaking system design and development, in the operational ecosystems in which systems are used, and sometimes in the systems themselves. There is a growing understanding that complexity poses new and different challenges for managers, engineers, regulators, customers and other stakeholders. We are still working, though, to come to grips with how to deal with many of the phenomena associated with complexity, such as emergence, multi-scale behavior and self-organization. Our processes and methods, which typically rely on decomposition, deep analysis of problem elements, prediction and specificity, are not well aligned to the interconnected, holistic, and often dynamic nature of complex systems, resulting in consequences that can have far-reaching effects. Success requires more than just extension and enhancement of current state-of-the-art practices – we will need to understand and reason about systems and activities in fundamentally different ways. In this talk, Dr. McEver will discuss how to recognize the complexity within a systems context, why it matters, and suggest changes to our methods and mindsets that can help.

# Wednesday Night Reception



Wednesday, November 1st, 5-7 pm  
At I-X Center Concourse Exhibit Hall

Join us for good food, good drinks and  
good conversation at the Mid-Week Mixer  
and Casino Night!



**FREE TO ALL REGISTERED ATTENDEES**

## Thursday Keynote



Wanda Reder is the Chief Strategy Officer at S&C Electric Company based in Chicago. After joining S&C Electric in 2004 as Vice President of Power Systems Services, she grew the service business, expanding field service and project-related work globally.

### ABSTRACT - Lessons from the Electric Utility Industry Transformation Provides Insight for the Future of Aviation

The electric grid has been undergoing significant transformation including the introduction of digital technologies, growth of renewables and increasing engagement of electricity customers. An underlying driver of the transformation is securing a clean energy future. As the transformation is underway, consumers' expectation of performance and dependency on the grid is increasing. This presentation discusses a vision for the electric grid of the future that balances affordability, resiliency and security. Case studies that feature state-of-the-art microgrid deployments will be highlighted. The presentation will also contemplate how technology utilized for electric grid transformation can be adopted to advance and compliment research that is aimed at electrifying aircraft propulsion to achieve aviation industry



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Excellence Through Innovation



# Thursday - Conference Workshop 1

## Workshop 1: Autonomous Systems and Controls

Deep space manned missions with long communication latency times, and collaborating unmanned air vehicles all require autonomous operation with limited ground control supervision. In addition to autonomous operation, vehicle subsystems will employ digital control as replacement for the traditional analog control, allowing the development of dynamic and adaptive power control methods. When employed on-board the vehicle these technologies will change the power system control hierarchy, allowing for migration of higher level functions into smart components and additional diagnostic and prognostic health management within the higher levels.

Workshop 1 will assess the changes required in the power control hierarchy, the attributes and design issues associated with off-nominal/non-linear system behaviors, and the analytics and simulations needed to enable software development, verification, and validation.

- Autonomous/Intelligent hierarchical control structure including algorithms and functions
- Complex systems engineering for autonomous/intelligent control
- Simulations and analytics needed for design and validation of autonomous/intelligent control



# Thursday - Conference Workshop 2

## Workshop 2: Evolving Community Resiliency –

The Community Resiliency workshop is supported by InfraGard, focused on **achieving resiliency under multiple threat scenarios**. It will be facilitated by a team of professionals experienced in contingency planning and operations. It is intended to engage leading thinkers and decision makers at a "community level" who have direct interest or responsibility in preparing themselves, their families, local neighborhoods and regional communities with the assets and capabilities to ensure their survival when normal food, water and energy supplies are limited.

Workshop sessions will include:

- 1. Communications: the Foundation for Community Resiliency**
- 2. Restoring Power & Reconnecting Critical Infrastructure**
- 3. Building the Resilient Community**



See You Next Year...

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Where: Cleveland

When: Week of October 22, 2018

Hosted by: Telepath Systems Inc.



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ISS Endpoint Monday & the IoT	Benesch Law Day @ the Summit	Oswald Healthcare Day @ the Summit	15th Annual Information Security Summit	
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