Protecting Critical Infrastructure

HARDENING MISSION-CRITICAL SYSTEMS
What are the Benefits of Smart Cities?

- Encourage Economic Development
- Enable a Better Quality of Life
  - Minimize Traffic Jams
  - Provide Higher Availability and Efficiency of Services
  - Increase Security with Better Situational Awareness
- Enhance the Distribution of Goods and Services
Instrumenting Smart Cities

- **Autonomous Delivery Systems**
  - Automobiles, Drones, Aircraft, Trucking, Rail, Subways, Ships
    - Location, Diagnostics, Delivery Status, Traffic Control

- **Utilities and Services**
  - Health Services, Life Safety, Electricity, Water, Gas, HVAC, Lighting, Waste Management, Parking, Telecommunications

- **Security Sensors**
  - Cameras, Fire, Pollution, Radiation, Bio-Chem., Explosives, Noise
What About the Bad Guys?

Money Amplifies Good and Evil, Technology Makes Both More Efficient!

- Organized Crime
  - Extortion, Drugs, Human Trafficking, Theft
- Terrorists and Anarchists
  - Cyber-Physical (Cy-Phys) attacks
- Nation States
  - Cyber, Directed Energy & EMP Attacks
What Needs Protection?

- **Sensors, and Actuators**
  - Cameras, Pressure, Temp, RPM, Flow, Power, PH, Turbidity, Actuators, Dampers, Valves

- **Industrial Control Systems**
  - Embedded Controllers for Water, Power, Transportation, Medical, HVAC, Waste

- **Operational Technology**
  - Generators, Substations, Pumps, Gates, Locks, RADAR, Signals, Life Safety

- **Information Technology**
  - Switches, Routers, Controllers, Gateways, Identity Registries, Provisioning, Access Control, Billing, Accounting, Security Systems
Smart City: Design Considerations

- **Cyber, Physical, and EMP Hardening**
  - Power, Control, Computation, Communications, and Sensors

- **Multiple Sources of Power and Water:**
  - Solar, Wind, Hydro, Turbines, SMR...Ground, Rain Harvesting, Desalination

- **Energy Storage:**
  - Utility-scale Batteries, 3-6 Months of On-Site Fuel Storage

- **Localized Food Production and Storage:**
  - Vertical Farming, Aquaponics, Extended Shelf-life Storage
Summary:

- Smart Cities Can Deliver
  - Improved Services
  - Growth Opportunities for Businesses
  - Greater Efficiency in Resource Utilization
  - Optimized Distribution of Goods and Services

- Security is Critical!
  - Cyber, Physical, and EMP Hardening
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