Five C’s of the Future

Michael J. Assante
Successful strategies must proceed from the premise that cyberspace is continuously contested territory in which we can control memory and operating capabilities some of the time but cannot be assured of complete control all of the time or even of an control at any particular time.

-Richard Danzig, Surviving on a Diet of Poisoned Fruit
- Convergence/Concentration
- Connectivity
• Complexity
Growing complexity & consequences
Not being able to appreciate the extent of risk in a software-reliant system-of-systems
Complexity increases opaqueness, attack surfaces/path, and reduces predictability
Speed of change inside a system increases inter/dependencies
Cyber Consequence Informed Engineering
“Handelsblatt, Airbus Chief Strategy Officer Marwan Lahoud blamed the crash on engine control software that was incorrectly installed during final assembly.”

“This is what the computers apparently did on the doomed flight, just as they were designed to do.” A person familiar with the engines added, “Nobody imagined a problem like this could happen to three engines.” When it did, without the data parameters it was impossible for pilots to keep the aircraft airborne.

“A more insidious source of common-mode failures is a design fault that causes redundant copies of the same software process to fail under identical conditions” -- is exactly that which can be masked by complexity precisely because complexity ensures under-appreciated mutual dependence.

Dan Greer, Blackhat 2014
Eye’s wide open

• Mission
• Mindset
• Determination

• Design requirements
• Protect the bus
• Sensor integration
• Controller decision making
• Assigning confidence
• Detecting suspect data
• Assigning confidence
• Safety oversight/over watch
• Authentication
Intellectual energy and ability to learn & act

- Competency
- Collaboration
Successful organization’s

• Possess the right culture to be a learning organization
• Develop skilled people and integrated functional teams
  – Identify desired competencies
  – Invest in training programs
  – Reward excellence and team accomplishments
• Are the product of practice & teamwork
• Shift from highly structured groups to loosely structured groups
  ▪ Everyone supports the people with the best skills for the problem at hand
Integrating disciplines & skills

• People from diverse specialties are different
  ▪ Don’t naturally speak the same language
  ▪ Adhere to different mental models
  ▪ Use different lens
  ▪ Apply different tools

• Requires training and shared perspective
  ▪ Begins by filling knowledge gaps & shared understanding
  ▪ Continues through shared experience and purpose

• Skills must be practiced
  ▪ Individually and in functional teams
Thank You

Michael J. Assante
The SANS Institute
www.sans.org

ics-community.sans.org

Participate in the SANS ICS Community Forum where ICS professionals discuss current security events, share tips, ask questions and connect with others passionate about securing our critical infrastructure!