

GOALS

- Argonne National Laboratory's (Argonne) goal is to support the CREDC project team and the U.S. Department of Energy (DOE) in multidisciplinary research and development (R&D) to fulfill the DOE Roadmap's 2020 vision of resilient energy delivery systems (EDS).
- Argonne's goal is to provide subject matter expertise in the Oil and Gas (O&G) sector outreach, guidance, verification and validation of the R&D security research, framework, models and tools developed by the CREDC team under the long- and mid- term CREDC R&D goals of resilient EDS.

FUNDAMENTAL QUESTIONS/CHALLENGES

- What are the fundamentally new and different requirements and challenges for implementing the security standards of industrial control systems?
- Achieving and maintaining security of the point-to-point communication legacy industrial control systems are two of the biggest challenges. How is the Energy sector addressing the business case to replace these legacy systems in the light of advanced persistent threats?
- Which threat vectors are currently of significant concern to the Energy sector, and is there a need for CREDC to identify new approaches for mitigation?
- How can the Energy sector's awareness to these threats be increased under the CREDC project? How can we best achieve industry buy-in?

RESEARCH PLAN

- Argonne will support the CREDC research plan through the provision of O&G sector-related research, outreach, and technical support to achieve the desired goals of the project.
- Argonne will coordinate with O&G sector-related entities to validate CREDC research and development of security solutions relevant to the O&G sector application.
- Argonne will provide technical and subject matter expertise on research, participation in CREDC team meetings, and other support as applicable to achieve the goals of the research.
- Argonne will reach out to the O&G sector and provide up-to-date and relevant EDS security-related practices and tools from CREDC research for use by the O&G sector.
- Argonne will actively participate, both directly and through industry outreach efforts, in annual stakeholder workshops conducted as part of the CREDC goals.

RESEARCH RESULTS

Argonne will provide subject matter expertise, and will validate practical application of CREDC cybersecurity research as applicable to the O&G sector in terms of solutions, tools, best practices, pilot deployment, training and outreach.

The CREDC research focus goals are outlined below:

- *Research excellence:* Scientific and engineering leadership in EDS cybersecurity innovation, influential publications; graduates who assume engineering and leadership positions in industry and academia.
- *Demonstration and transition of solutions addressing critical sector needs:* validated in realistic environments, at test facilities in the partner institutions and/or at industry sites.
- *Workforce development in EDS cybersecurity:* through industry outreach such as workshops and focused training activity, with the aim of developing security/resiliency engineering professionals in EDS.
- *Advancing the culture of security:* through research, outreach, and education efforts. The CREDC impact will increase the level of security awareness among members of industry at all managerial and workplace levels, as well as among the general public.

BROADER IMPACT

- Increased awareness by the Energy sector and by the public of the current capabilities of and challenges to the Oil and Gas sector vis-à-vis cybersecurity exposures.
- Work with the Energy sector to identify areas of cybersecurity concerns for research under the CREDC project:
 - next generation operational technology and tools specific to the Oil and Gas sector; and,
 - identifying areas of education and workforce training efforts in advancing the culture of security.
- Argonne is working with O&G sector organizations and encouraging the sector to attend CREDC workshops and Summer Program. Argonne continues to develop closer working relationships within the Energy sector with the objective of mutual cooperation vis-à-vis increasing awareness and outreach on CREDC EDS security research.

INTERACTION WITH OTHER PROJECTS

- Argonne will reach out to CREDC and Energy sector industry partners on other research projects found to be exploring developments in relevant areas, as identified under CREDC goals and outreach to Energy sector industry partners. A primary objective of such outreach is to facilitate an exchange of information when such an exchange is mutually beneficial.
- Argonne will make CREDC aware of any existing or proposed research and solutions or findings with relevance to EDS and provide appropriate support to the CREDC team.

FUTURE EFFORTS

- Over the CREDC project lifecycle, Argonne will continue to provide, in the form of subject matter expertise, support of industry outreach, support of verification/validation by the O&G sector of cybersecurity research and development of solutions, and support of training aimed at helping to accomplish the main objective of U.S. Department of Energy Roadmap's 2020 vision of resilient energy delivery systems