



Research Opportunity Notice

Control and Communications Integration

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Background

- ◆ **Multitude of separate information networks**
 - ◆ Transmission grid
 - ◆ Distribution grid
 - ◆ Substations
 - ◆ Automatic Meter Reading (AMR)
 - ◆ Resource aggregation
 - ◆ Other energy services



Background

- ◆ **Networks are owned by**
 - ◆ CAISO
 - ◆ IOUs (PG&E, SCE, and SDG&E)
 - ◆ Municipal Utilities (SMUD, SVP)
 - ◆ Load Serving Entities (LSE)
 - ◆ Energy Service Providers (ESP)

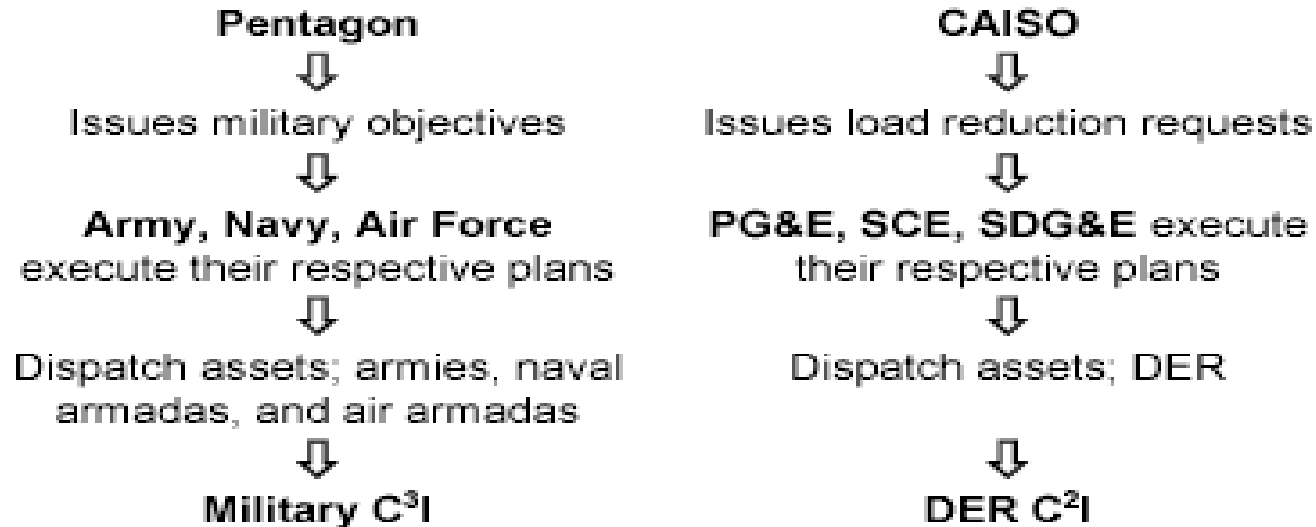


What Can Be Done?

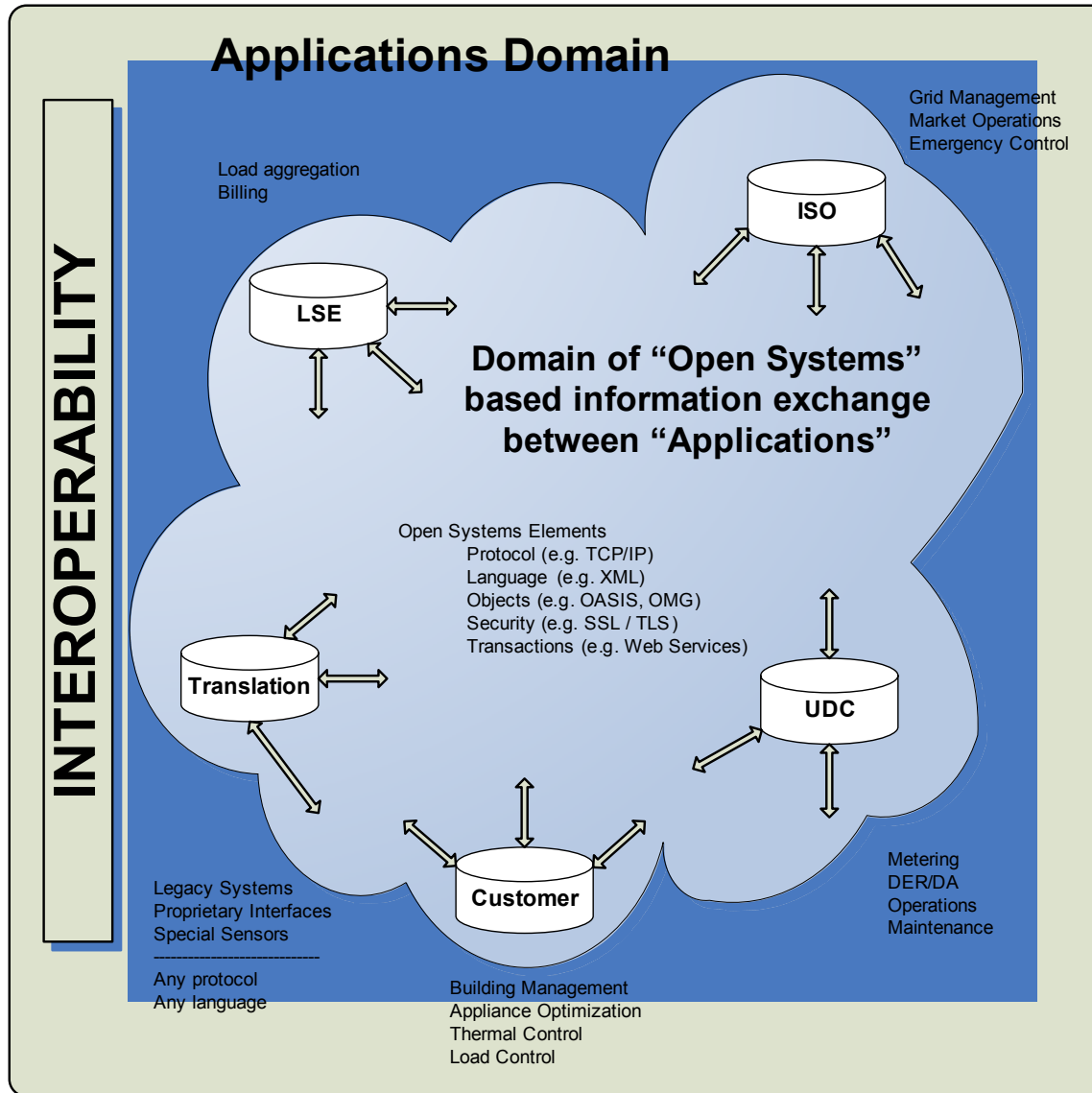
- ◆ **Control and Communications Integration (C²I) Strategy**
 - ◆ **Orchestrate the various networks**
 - ◆ **This strategy has similarities to military C³I (Command, control, and communications integration)**



C³I and C²I Parallels



- Real-time collection of data and information dissemination
- Sharing of data and information
- Integrated communications systems
- Simplified coordination between operating entities



Reference Model for Open Information Exchange



Reference Model

- ◆ **High-level blueprint for adopting standards-based building blocks to enable open information exchange**
 - ◆ **Protocol (e.g. TCP/IP)**
 - ◆ **Language (e.g. XML)**
 - ◆ **Objects (e.g. OASIS, OMG)**
 - ◆ **Security (e.g. SSL/TLS)**
 - ◆ **Transactions (e.g. Web Services)**



Candidate Research Topics

- ◆ **Using a military (or another) C³I system as a model**
 - Adapt it to conceptually deal with C²I electricity applications such as dispatching DER.
 - Compare and contrast the chosen C³I model with the requirements for implementing a C²I strategy for integrating utility information and communications systems.
 - Are there analogies that indicate CAISO or an UDC can operate in a similar fashion? If not, what are the gaps that need to be filled and is it feasible to fill the gaps?
- ◆ **How would the CAISO or an UDC operate its control centers in a military (or another) C³I style?**
 - With C²I ability to control all available assets, given a particular operational scenario, how would a plan to address the scenario be executed using C³I-based strategies?



Summary

The purpose of this RON is to solicit proposals.

- ◆ **For research and enabling technologies development for new and innovative C²I-based operational strategies (not product development).**
- ◆ **Multi-phase proposals – initial phase < \$250K.**
- ◆ **Initial phase defines milestone for funding approval for remaining phases.**