

PERA Development and Update Program

PERA is a GERAM (a General Enterprise Reference Architecture and Methodology). As such, it is intended to address all enterprises in all industries during all phases of their enterprise lifecycles.

PERA has been used for decades to design enterprises in many industries; however Enterprise Integration Technology is actually accelerating, and it is now time to update the material on the www.pera.net website.

NEW TOPICS

A number of new concepts and technologies have evolved that were not considered in the original PERA architectures and methodologies including:

- **New Enterprise Integration** developments such as Cloud Computing, Industry 4.0 and remote maintenance and support strategies.
- **Cybersecurity**, including Firewalls, Network Monitoring, Configuration Management, etc.
- **New Technologies** such as Artificial Intelligence (AI), robotics, IoT and IIoT.
- **New Networks** such as Radio, Industrial Ethernets, satellite and cloud computing
- **Risk Management** including human and organizational risks, facilities and equipment risks, and Control and Information Systems risks)

New topics have been added to the www.pera.net website to address the above. These will be updated progressively and user feedback will be encouraged to help us update and continue to evolve this material. Take a moment to view these new topics in the lefthand menu of the home page.

PERA USER GUIDES

The “PERA Reference Model for Computer Integrated Manufacturing” and the “PERA Master Planning Handbook” were originally developed as “Concept Documents”. These were subsequently used by enterprises to address corporate and plant requirements of their company, industry, geography, and regulatory environments.

However, with the rapid rate of new EI developments it was considered necessary to facilitate the many corporate programs that will be needed to address cybersecurity, risk management, artificial intelligence (AI), Industry 4.0 integration, and other technologies that were not significant when PERA was originally published.

To address these new developments, the PERA+ team is creating a set of “PERA User Guides” for industries, and industry groups that have similar requirements. Each PERA User Guide will use terminology, products and requirements that are common in that industry as well as enterprise lifecycle phases and Professional Roles that someone experienced in that industry would be familiar with.

SUMMARY

Thus, the updated www.pera.net website will present:

- “PERA principles” that are common to most industries (as described in the original PERA materials)
- A set of important “Topics” that did not exist when PERA was initially published, and
- “PERA User Guides” that address requirements of specific industries using terminology, products and professional roles used in that industry.

Each User Guide will describe special requirements of that industry as well as enterprise lifecycle phases and Professional Roles as they are typically implemented in that in industry.

Each Industry User Guide will also include implementation guidance for that industry, including “Template” master plans for Topics such as cybersecurity, risk management, and artificial intelligence (see current “Cybersecurity” Topic on the left menu of the www.pera.net home page).

Appendix

PERA is based on the following principles that apply to all Enterprises:

1. Enterprises are comprised of People, Facilities and Systems. More accurately, PERA defines 3 architectures for an Enterprise:
 - **PEOPLE:**
A Human and Organizational Architecture that is defined by Organization Charts, Position Descriptions, and Human workflows.
 - **FACILITIES:**
A set of Industrial, Commercial and Office Facilities that are defined by Process Flow Diagrams (PFD), Mechanical Flow Diagrams (MFD), physical equipment and facilities drawings
 - **SYSTEMS:**
Control and Information Systems are defined by various standardized overview system diagrams as well as more detailed hardware and software architecture diagrams. Overview diagrams may be “resolved” into multiple more detailed diagrams, especially where large systems are involved
2. PERA addresses all Enterprise Phases including
 - Studies and Master Planning
 - Conceptual Engineering
 - Preliminary Engineering
 - Detail Engineering
 - Construction
 - Operations
 - Maintenance and Turnaround,
 - Renewal or Demolition.

Note some industries or enterprises may combine or rename some of these phases. If so, this may be addressed in the PERA User Guide for that industry

3. Human and Organizational architectures include “Principal Roles” including:
 - Owner/Operators
 - Equipment and software vendors
 - Engineering, Procurement and Construction contractors
 - Maintenance Services and Operations Support providers
 - Insurers
 - Regulatory Bodies
 - Educators and Training Groups

4. Enterprise architectures include Organization Charts that contain Positions. During the Master Planning Phase, “Generic Professional “Disciplines” are used for planning resources, however, as part of the Implementation Plan, Professional Disciplines are assigned to Positions in the Organization Chart.

Positions are usually industry-specific, however PERA uses standardized professional roles so that:

- educational organizations can develop curricula
- vendors or regulatory bodies can define qualifications to operate or maintain equipment or systems
- Internal LMS (Learning Management Systems) can establish continuing education credits
- Audits, equipment acceptance testing and other approvals may be accomplished by certified personnel

A list of standard Professional Roles and Org Chart Position Descriptions is established as part of the Implementation plan for each PERA Master Plan.

5. During each Enterprise Phase, Professional Disciplines produce standardized “Deliverables”. Deliverables are typically associated with projects, studies or programs and while some may be industry-specific, most electrical, mechanical, civil, control systems, and network deliverables are standard across industries.

6. The standardized set of PERA industry codes is based on the US Critical Infrastructure Sectors and US SIC Code list as follows.

Critical Infrastructure Sectors

- [Chemical Sector](#)
- [Commercial Facilities Sector](#)
- [Communications Sector](#)
- [Critical Manufacturing Sector](#)
- [Dams Sector](#)
- [Defense Industrial Base Sector](#)
- [Emergency Services Sector](#)
- [Energy Sector](#)
- [Financial Services Sector](#)
- [Food and Agriculture Sector](#)
- [Government Services and Facilities Sector](#)
- [Healthcare and Public Health Sector](#)
- [Information Technology Sector](#)
- [Nuclear Reactors, Materials, and Waste Sector](#)
- [Transportation Systems Sector](#)
- [Water and Wastewater Sector](#)

For industries not included above, the [US Standard Industrial Classification \(SIC\) Code](#) may be substituted.