

Systems Thinking and The Application of ISO/IEC 15288



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There's so much talk about the system. And so little understanding.

Pirsig, R.M., Zen and the Art of Motorcycle Maintenance, 1974

Why is there so little understanding?

"Learning within the Unknowable"



For all but trivial systems, complete knowledge is virtually impossible

Flood, R.L., Rethinking the Fifth Discipline, 1999

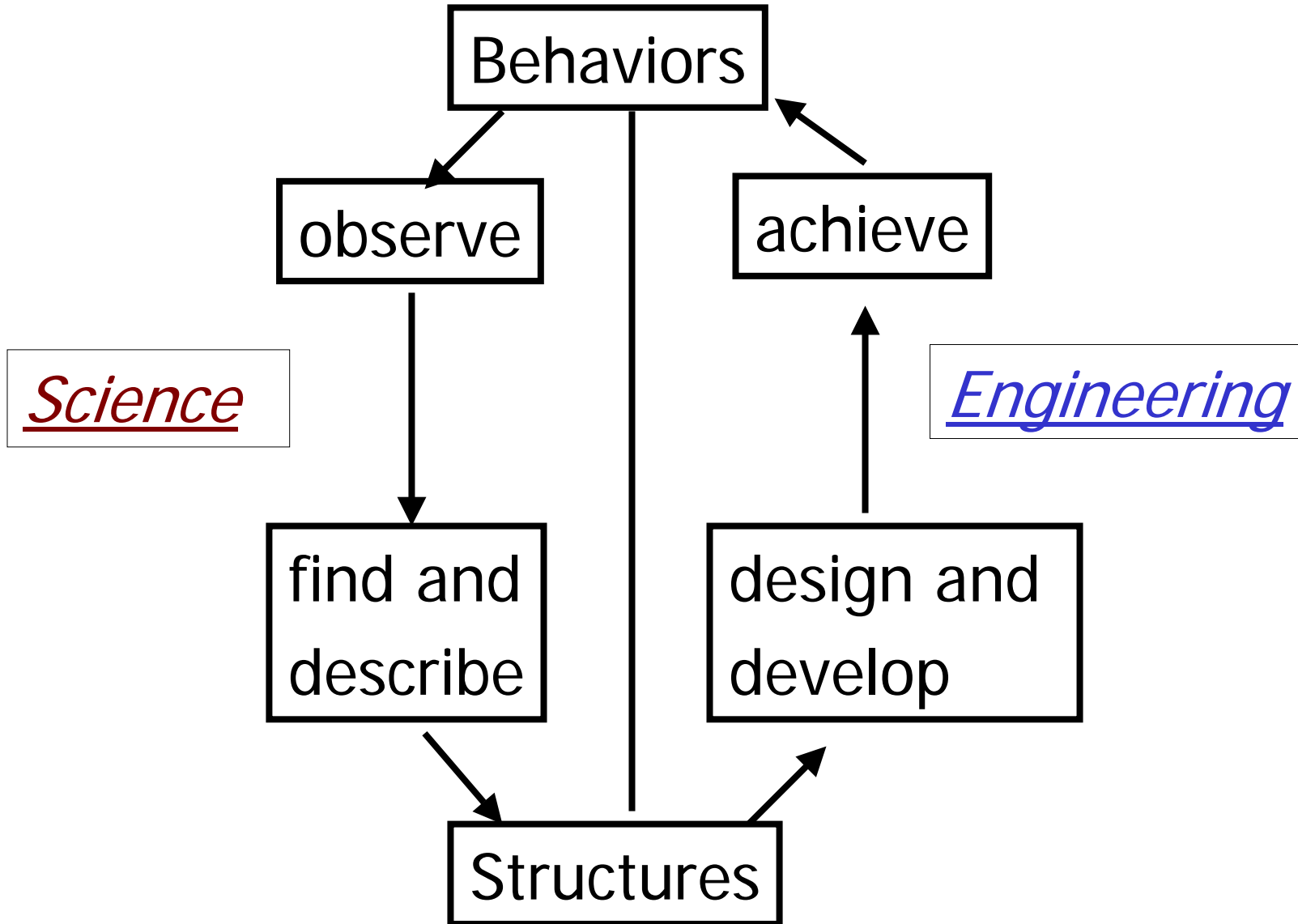
Seminar Contents


1. Introduction
2. Unification of Disciplines
3. Thinking and Acting in terms of Systems
4. The ISO/IEC 15288 Standard and its Application

Unification of Disciplines

- Newton - unified the view of the heavens and the earth
- Maxwell - unified the view of electricity and magnetism
- Einstein - unified the view of matter, energy, space, time, and gravity

Goals of Science and Engineering





What is Art in relationship to Science and Engineering?

Systems Thinking (a la Peter M. Senge)

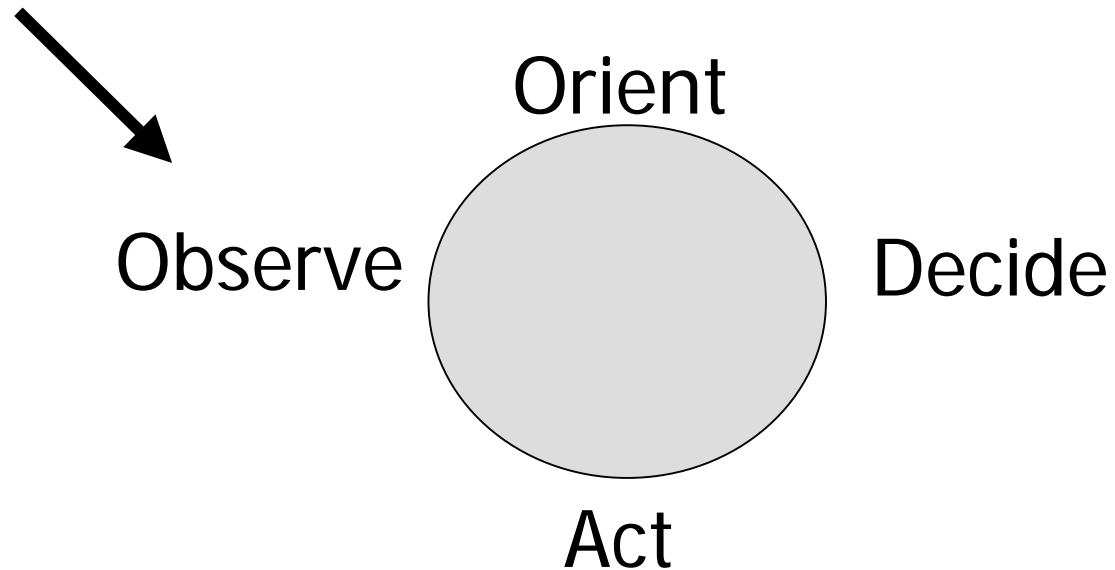
- a discipline for seeing wholes
- framework for seeing interrelationships, for seeing patterns of change rather than static "snapshots"
- set of general principles-distilled over the course of the twentieth century, spanning fields as diverse as physical and social sciences, engineering and management
- also .. a specific set of tools and techniques

Senge, P., The Fifth Discipline, 1990.

(Note: It is Peter Senge that popularized Systems Thinking)

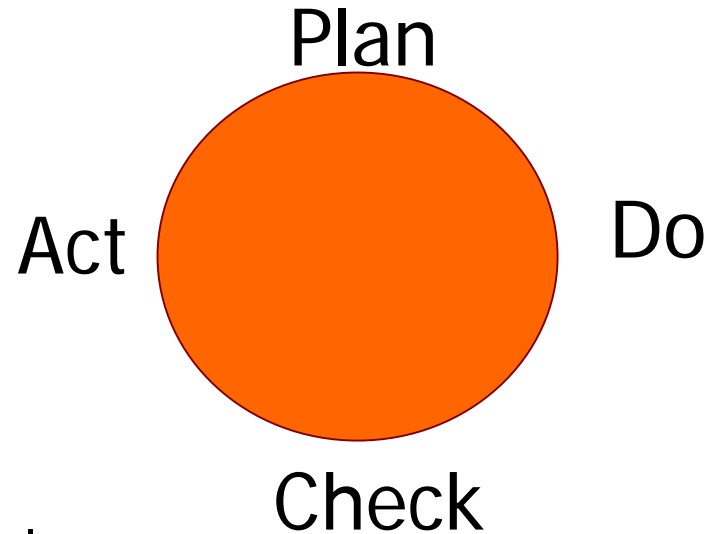
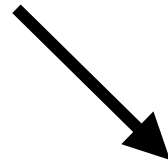
Paradigm for Thinking

- Observe
- Orient
- Decide
- Act



Paradigm for Acting

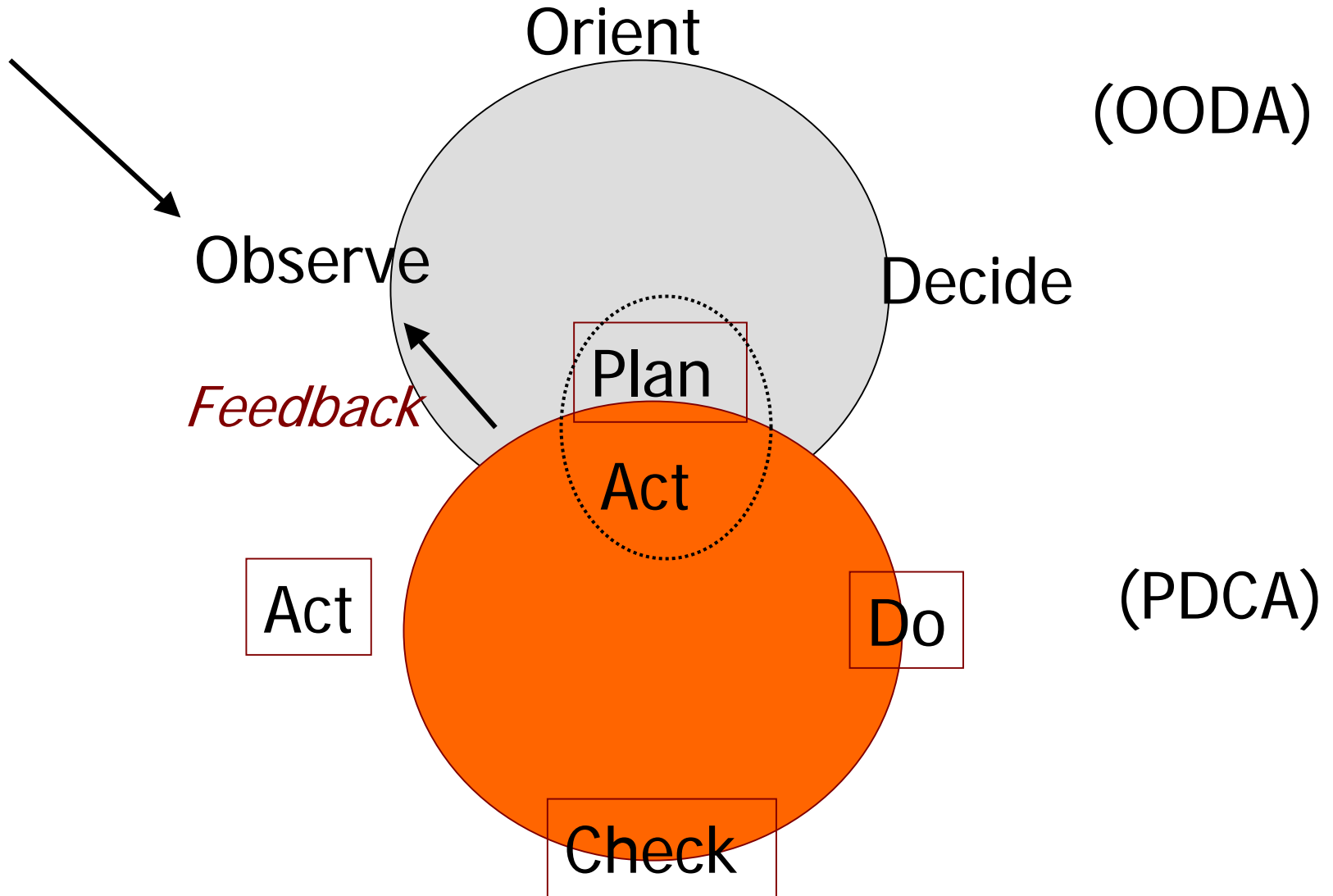
- Plan
- Do
- Check
- Act



Shewhart - Deming - TQM Principle

Note: Deming proposed Study instead of Check

Paradigm for Thinking and Acting

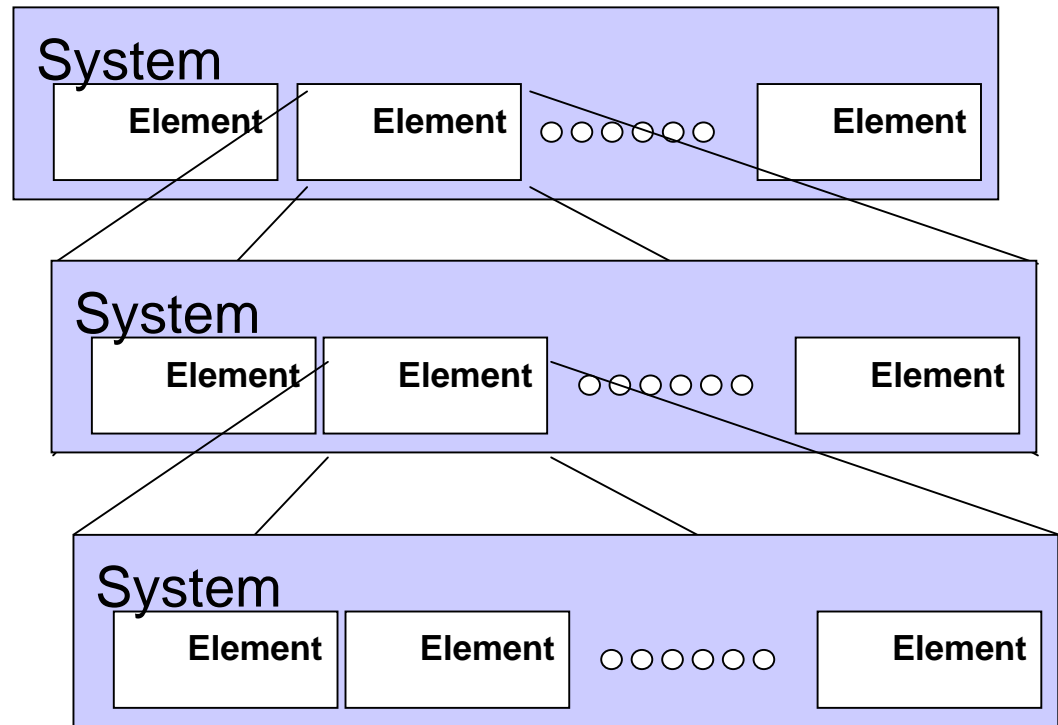


The ISO/IEC 15288 Standard (System Life Cycle Processes)

and its Application

System Composition

- System composition

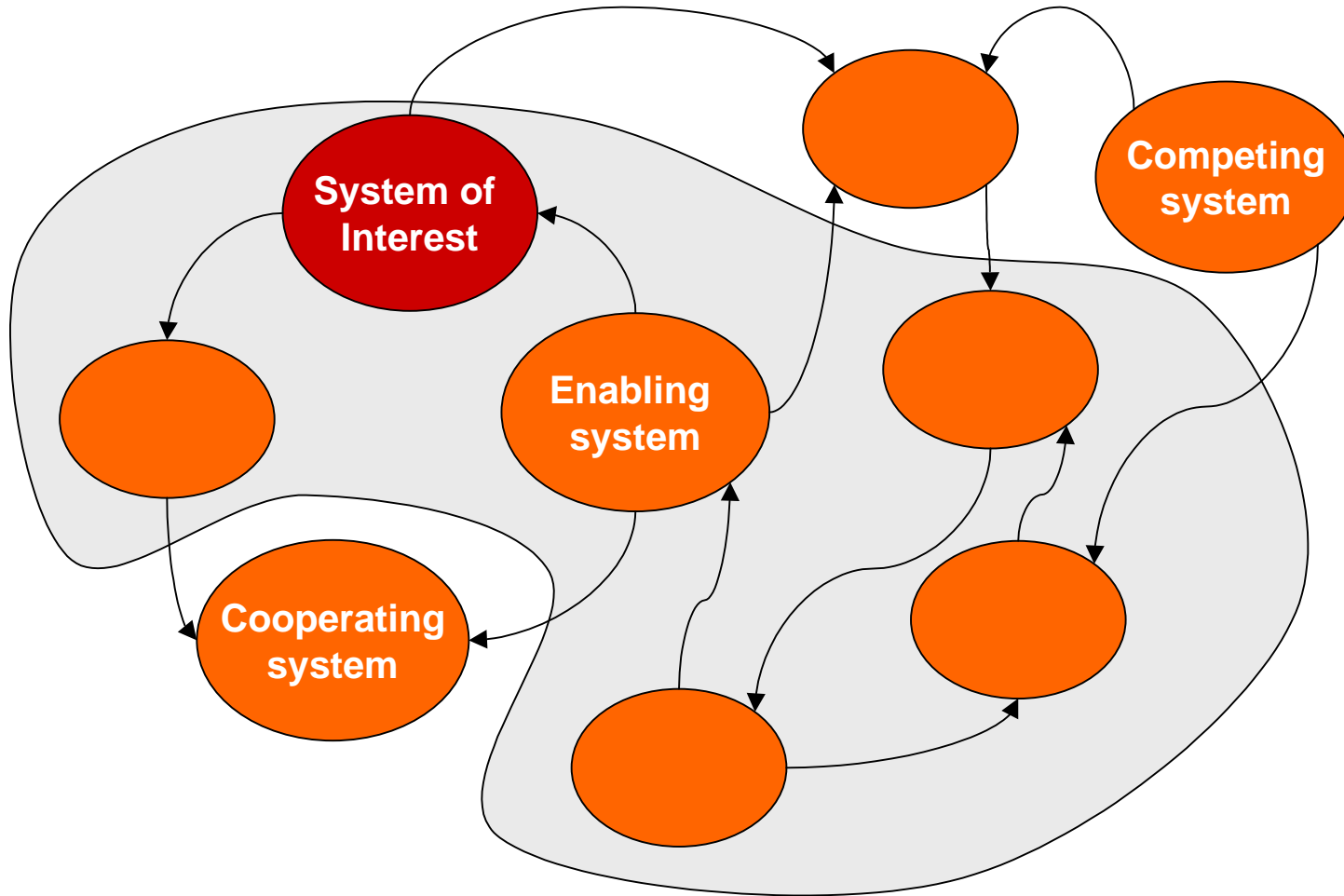


Element: Hardware, Software, Human Related
(Task, Activity, Process, Organization, Enterprise)

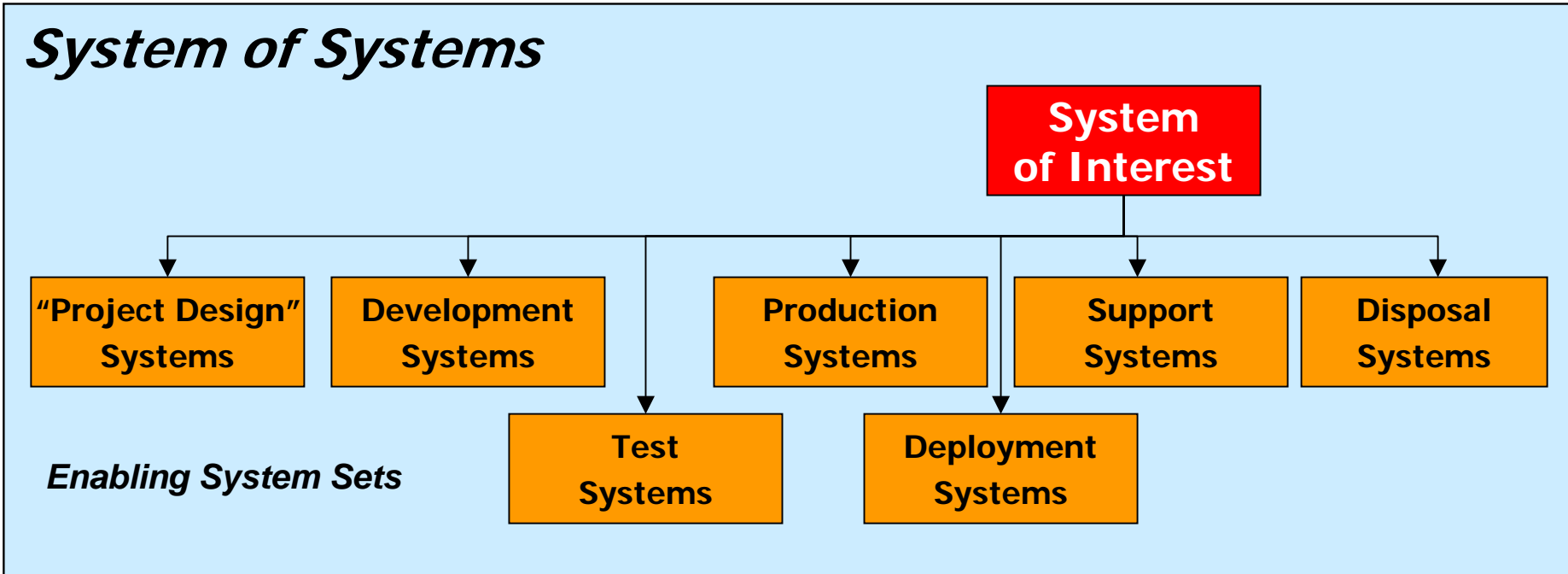
- System features

Systems have structural and behavioural properties and provide functions that are not achievable solely by the components individually.

System Relationships



System Definition and Life Cycle



ISO/IEC15288 Key Concepts

An Architecture based on:

- *Systems of Interest and Enabling Systems*
- *Project Centric View*
- *Recursive Utilization*
- *Iterative Utilization*

Use of Building Blocks:

- *Processes (25 to be tailored)*
- *Life Cycle Stages (6 illustrated)*

ISO/IEC 15288 Processes

Enterprise Processes

Enterprise Management Process

Investment Management Process

System Life Cycle Processes Mgmt Process

Resource Management Process

Quality Management Process

Agreement Processes

Acquisition Process

Supply Process

Project Processes

Planning Process

Assessment Process

Control Process

Decision Making Process

Risk Management Process

Configuration Mgmt Process

Information Mgmt Process

Technical Processes

Stakeholder Requirements Definition Process

Requirements Analysis Process

Architectural Design Process

Implementation Process

Integration Process

Verification Process

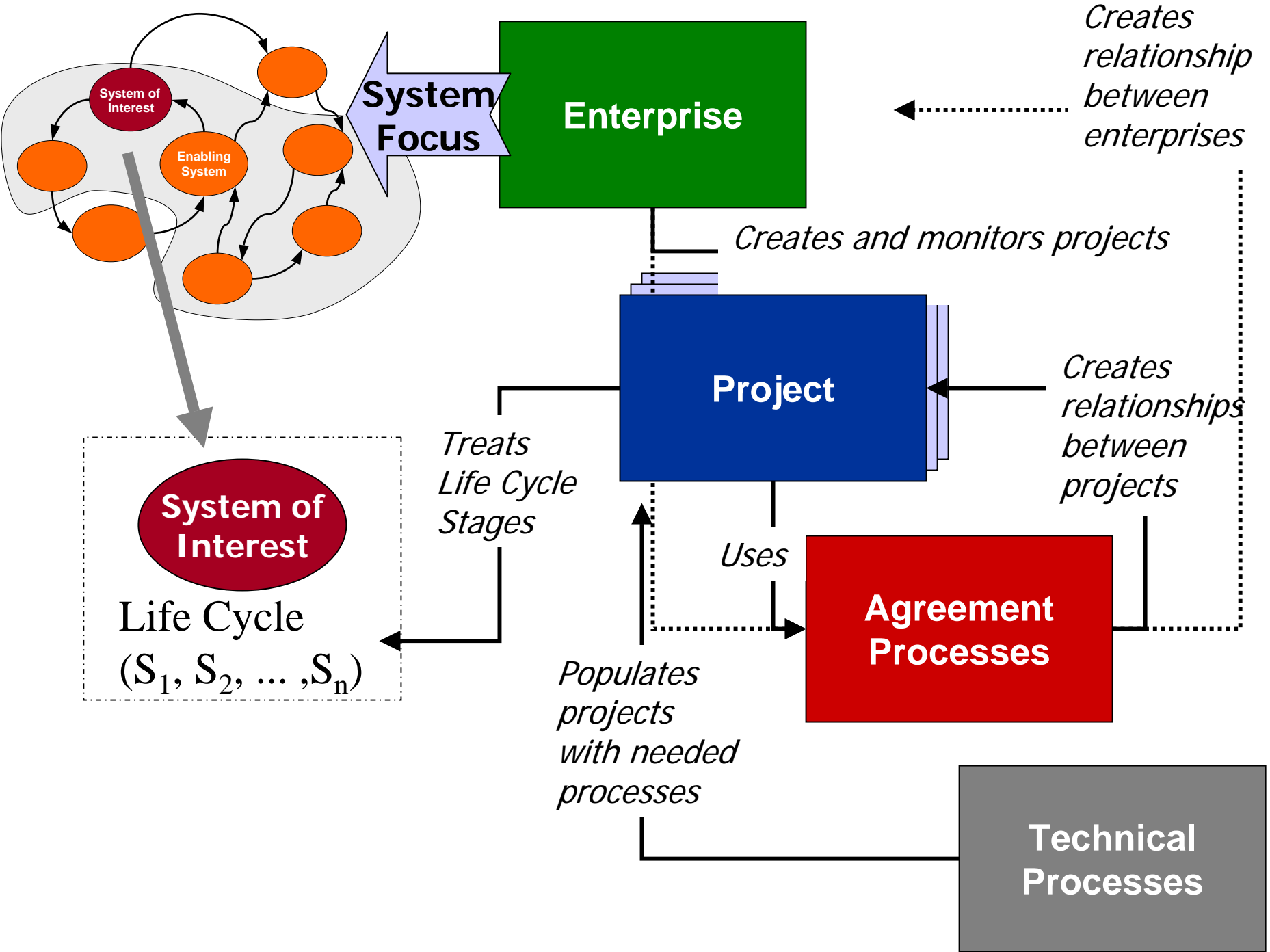
Transition Process

Validation Process

Operation Process

Maintenance Process

Disposal Process



By an organization

to establish an environment of desired processes that can be supported by an infrastructure of methods, procedures, techniques, tools and trained personnel.

The organization may then employ this environment to run and control its projects and progress systems through their life cycle stages.

This mode may be used to assess conformance of a declared, established environment with this International Standard.

By a project, within an organization

to select, structure, employ and perform the elements of the established environment to provide products and services.

This mode may be used also to assess conformance of the project with the declared, established environment.

By an acquirer and a supplier, via an agreement

to select, agree on and perform the processes and activities in this International Standard.

This mode may also be used to assess conformance of the acquirer's and the supplier's performances with the agreement.