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The some of the materials are excerpted from Stuart Jacobs's Book, and Ross Anderson's Book

SYSTEM SECURITY ENGINEERING
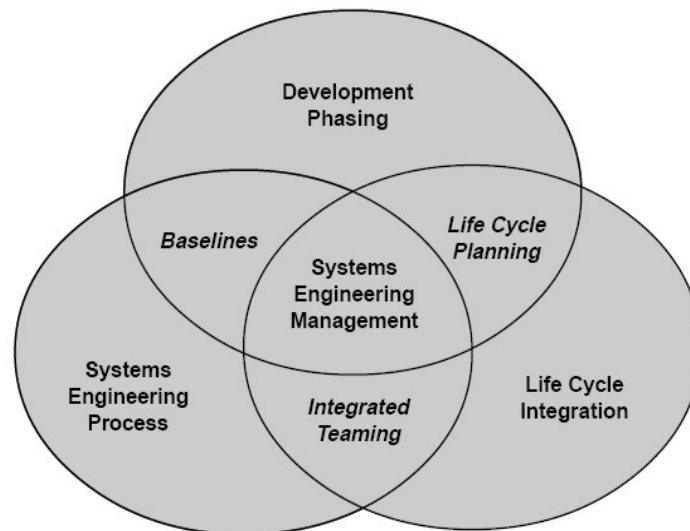
SYSTEM ENGINEERING

- Systems engineering is a methodical approach to the specification, design, creation, and operation of a function.
- System engineering is a robust approach to the design, creation, and operation of systems. In simple terms, the approach consists of identification and quantification of system goals, creation of alternative system design concepts, performance of design trades, selection and implementation of the best design, verification that the design is properly built and integrated, and post-implementation assessment of how well the system meets (or met) the goals. — *NASA Systems Engineering Handbook, 1995.*

SYSTEM ENGINEERING

- "The Art and Science of creating effective systems, using whole system, whole life principles" OR "The Art and Science of creating optimal solution systems to complex issues and problems — *Derek Hitchins, Prof. of Systems Engineering, former president of INCOSE (UK), 2007.*
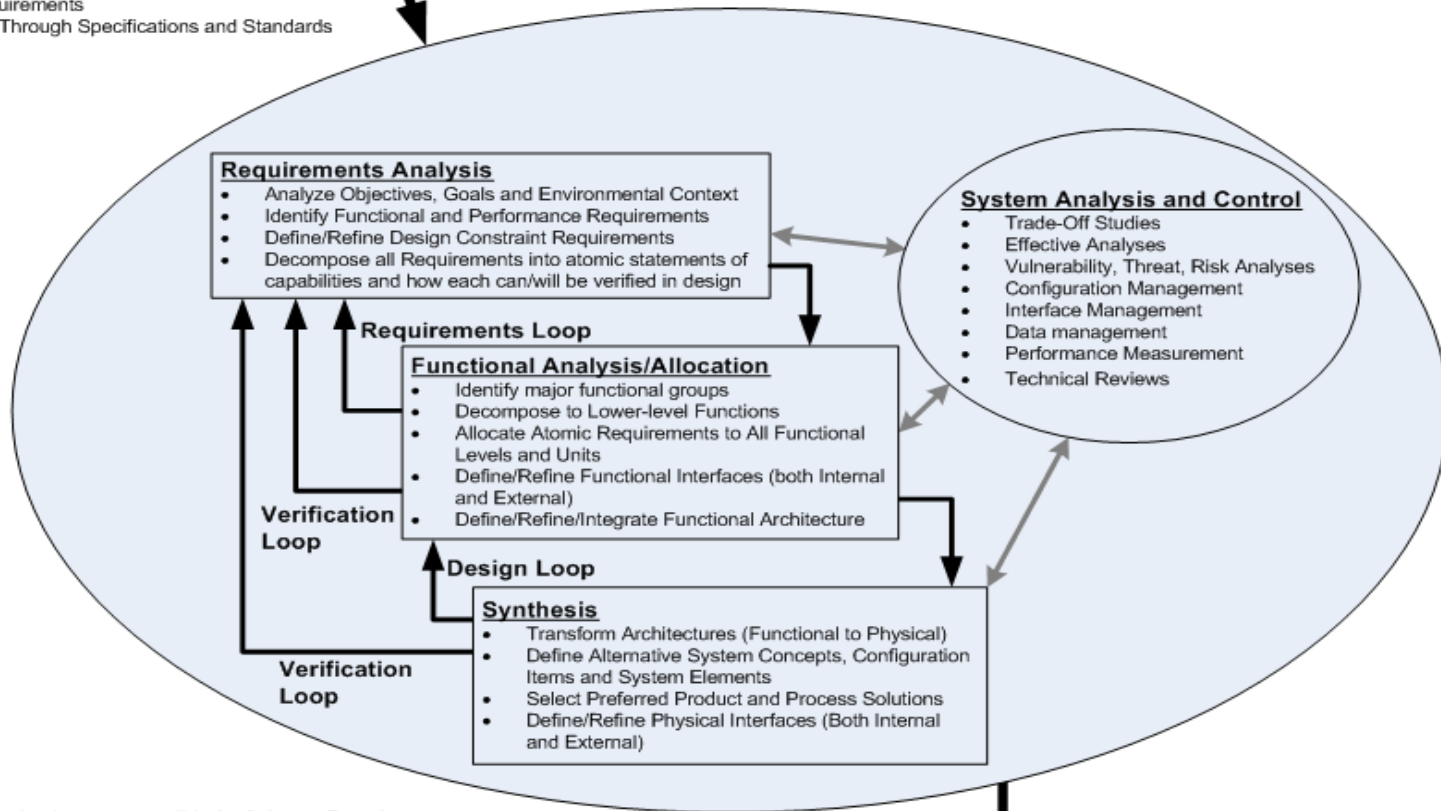
SYSTEM ENGINEERING PROCESS

Process Input
- Customer Needs/Objectives/Requirements
    - Missions
    - Measures of Effectiveness
    - Environments
    - Constraints
- Technology Base
- Output Requirements from Prior Development Effort(s)
- Program Decision Requirements
- Requirements Applied Through Specifications and Standards

Requirements Analysis
- Analyze Objectives, Goals and Environmental Context
- Identify Functional and Performance Requirements
- Define/Refine Design Constraint Requirements
- Decompose all Requirements into atomic statements of capabilities and how each can/will be verified in design

Requirements Loop

System Analysis and Control
- Trade-Off Studies
- Effective Analyses
- Vulnerability, Threat, Risk Analyses
- Configuration Management
- Interface Management
- Data management
- Performance Measurement
- Technical Reviews

Functional Analysis/Allocation
- Identify major functional groups
- Decompose to Lower-level Functions
- Allocate Atomic Requirements to All Functional Levels and Units
- Define/Refine Functional Interfaces (both Internal and External)
- Define/Refine/Integrate Functional Architecture

Verification Loop

Design Loop

Synthesis
- Transform Architectures (Functional to Physical)
- Define Alternative System Concepts, Configuration Items and System Elements
- Select Preferred Product and Process Solutions
- Define/Refine Physical Interfaces (Both Internal and External)

Verification Loop

Related Terms:
Customer = Organizations responsible for Primary Functions
Primary Functions = Development, Production/Construction/Procurement, Verification, Deployment, Operations, Support, Training, Disposal
Systems Elements = Hardware, Software, Personnel, Facilities, Data, Material, Services, Techniques
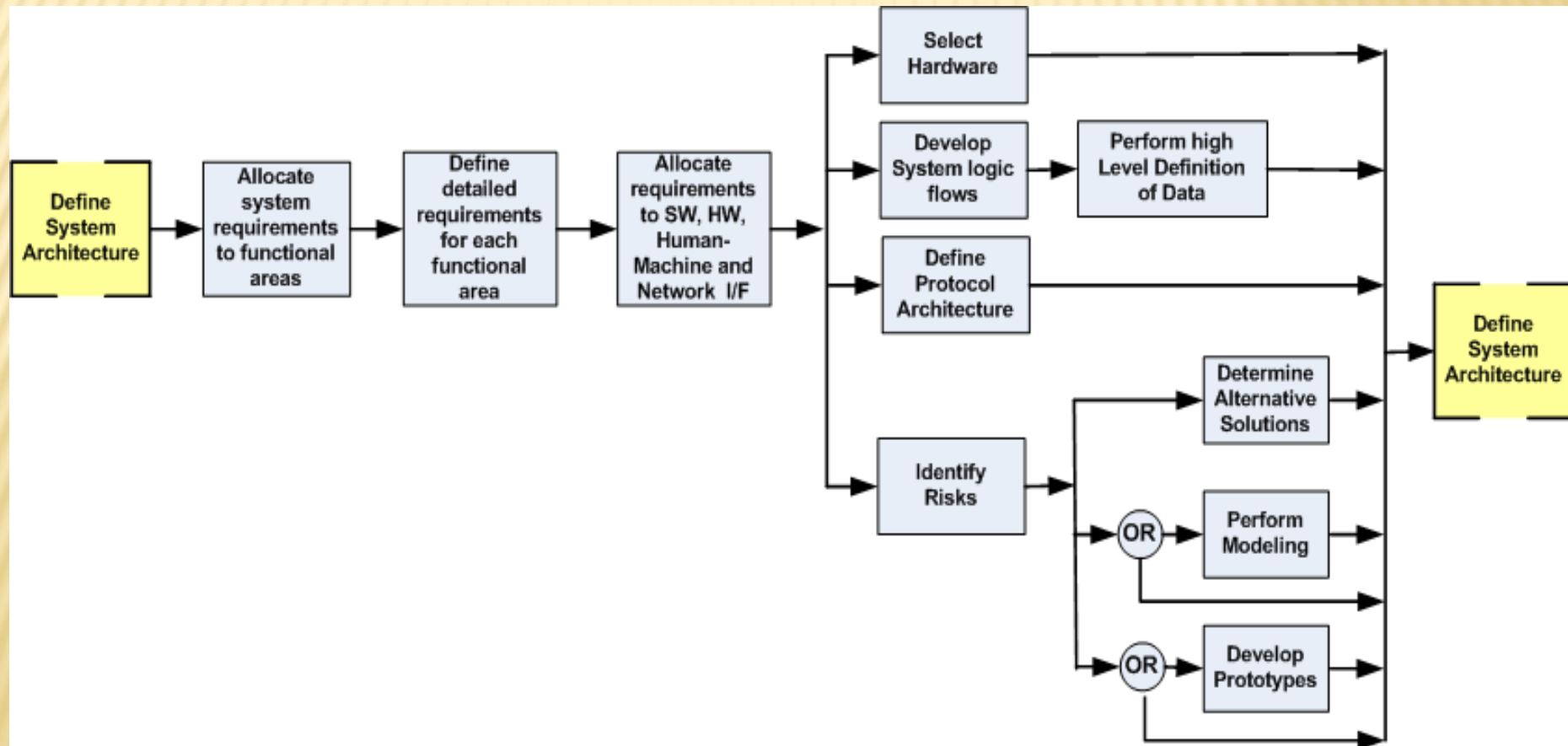
Process Output
(Development Level Dependant)
- Decision Database
- System/ Configuration Item Architecture
- Specifications and Baselines
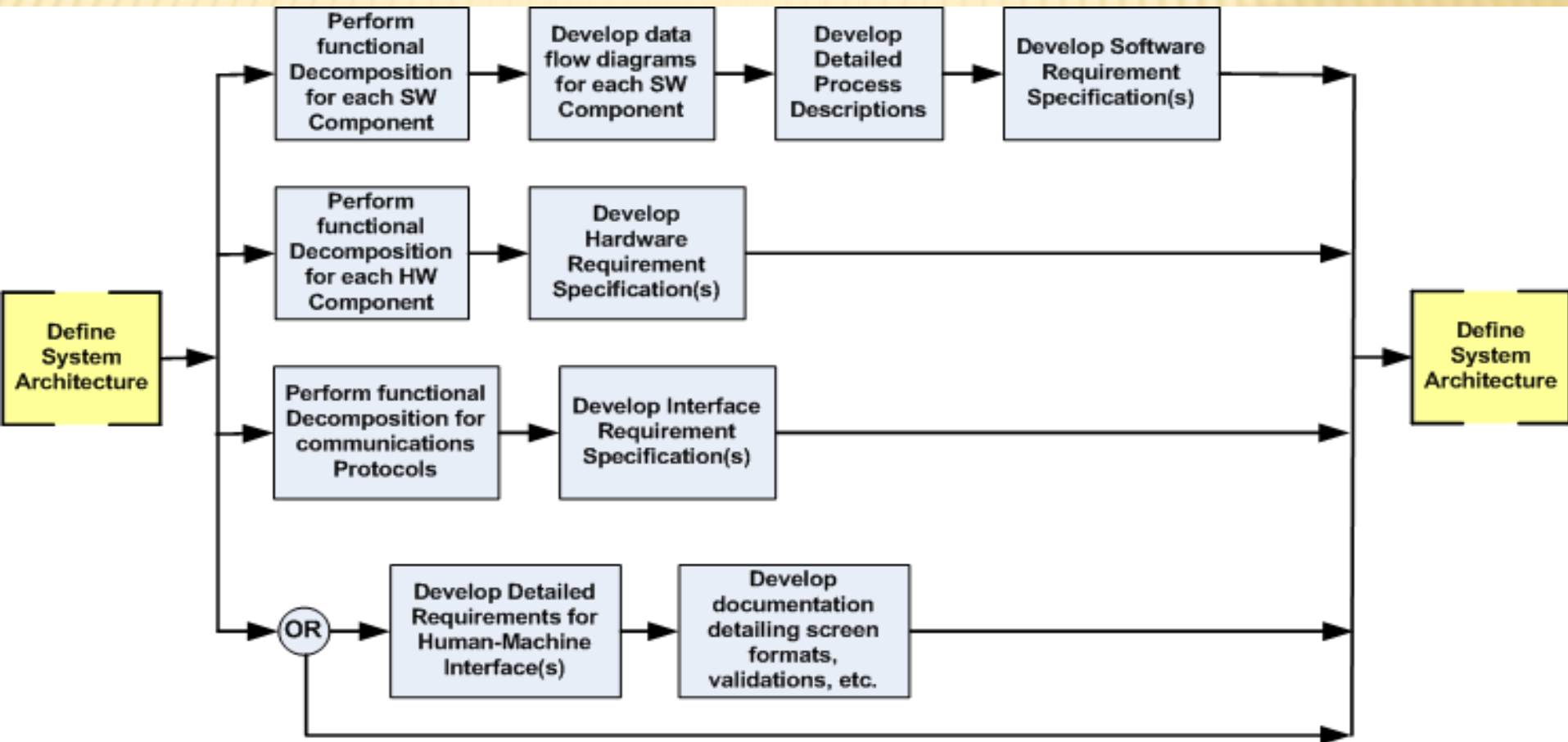
SIMILAR SYSTEM ENGINEERING PROCESS
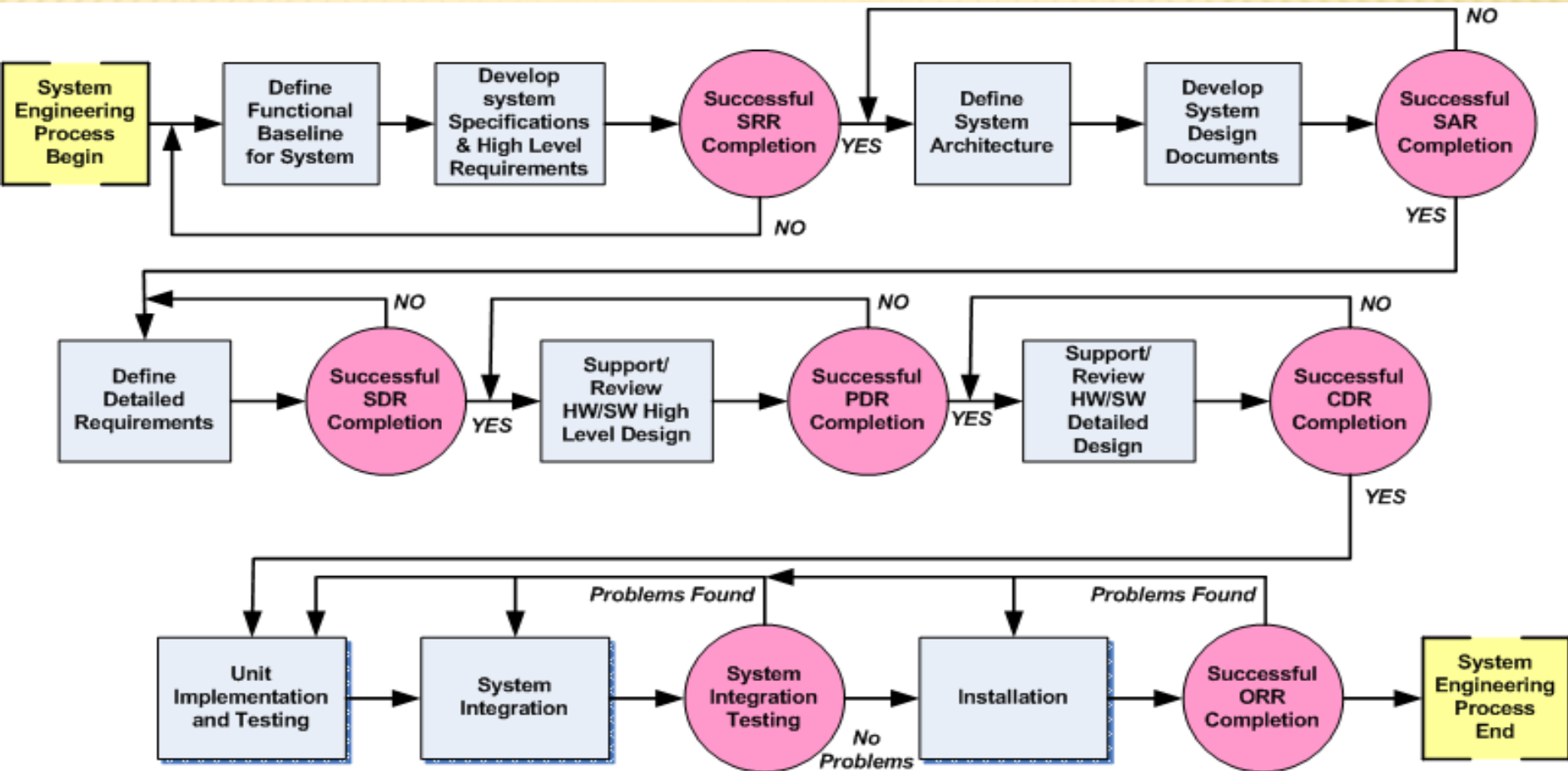

The SIMILAR Process
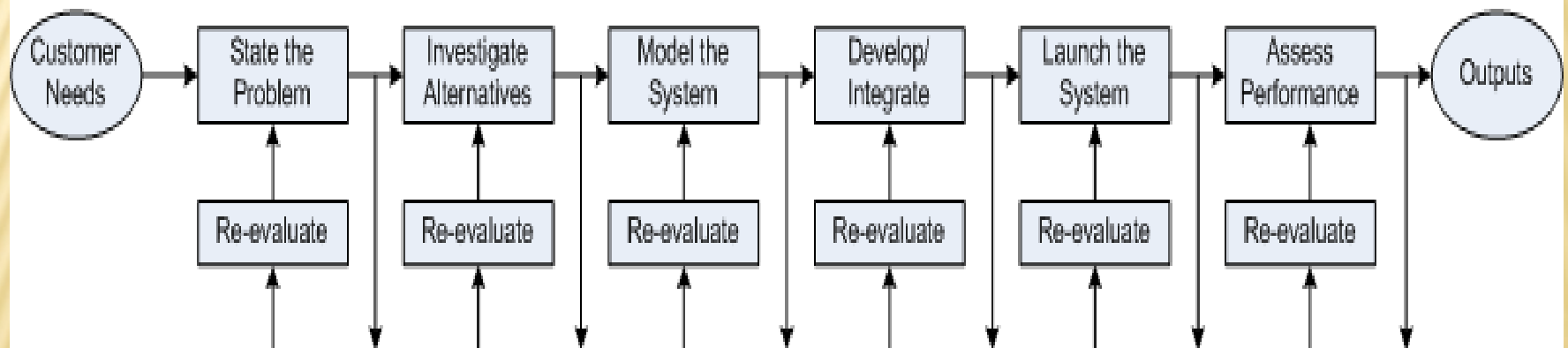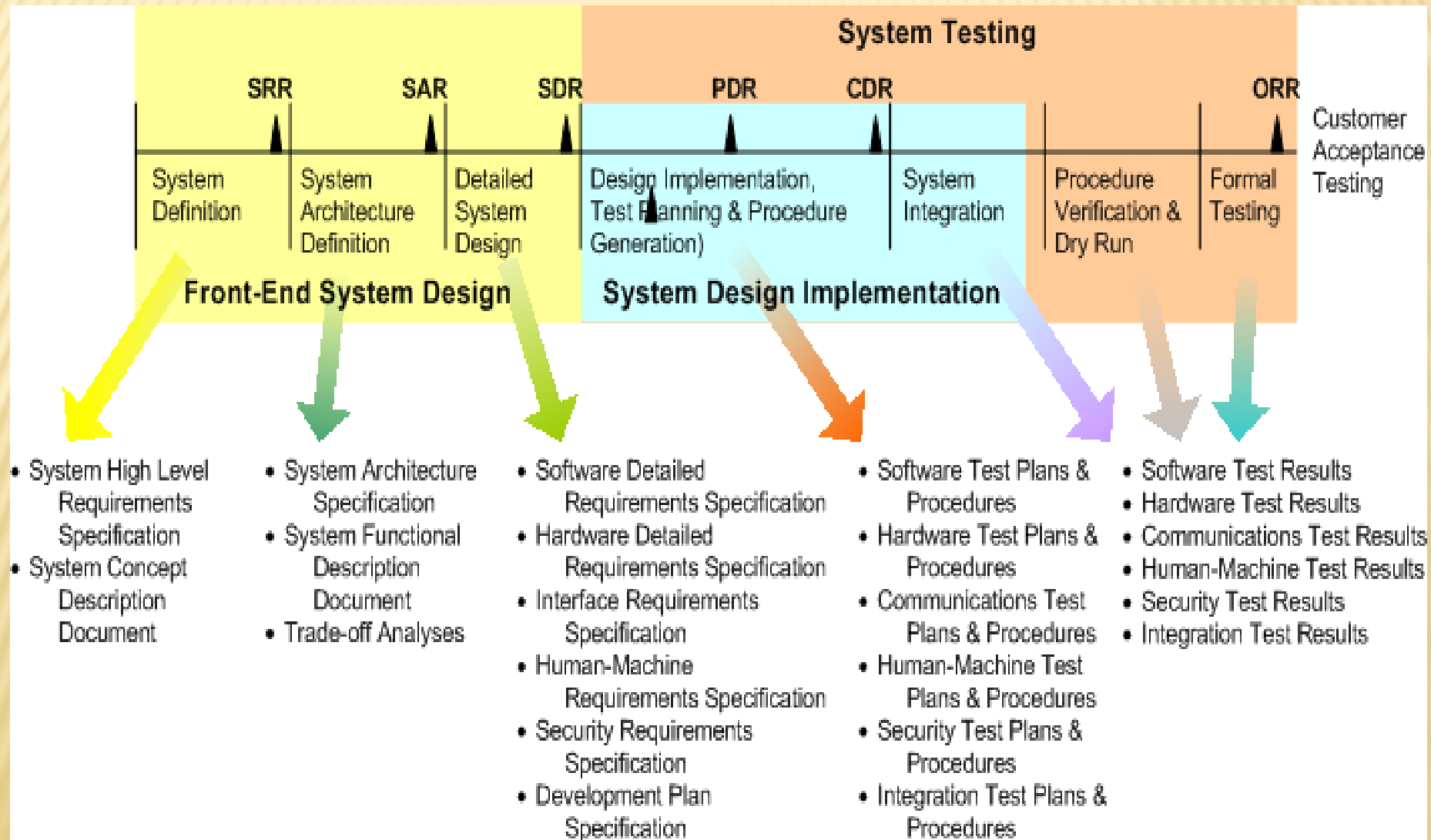
SYSTEM DEVELOPMENT ARCHITECTURE PART 1

TYPICAL ENGINEERING PROCESS FOR COMPLEX SYSTEM

SRR = System Requirements Review
SAR = System Architecture Review
SDR = System Detailed Requirements Review
PDR = Preliminary Design Review
CDR = Critical Design Review
ORR = Operational Readiness Review

COMPLEX SYSTEM ENGINEERING

SYSTEMS SECURITY ENGINEERING

Definitions: Systems security engineering is a specialty engineering field strongly related to systems engineering. It applies scientific, engineering, and information assurance principles to deliver trustworthy systems that satisfy stakeholder requirements within their established risk tolerance(NIST).