Abstract

The fundamental concepts and approach to project oriented Systems Engineering are explained. We look at project phasing, phase transition, processes, and organization.
Project Life Cycle

- **Concept Study**
- **Tender**
- **Design and Engineering**
- **Manufacturing and Installation**
- **Operation and Maintenance**
- **Disposal**

Steps:
- Order
- Offer
- Acceptance
- Final Payment
Phased Project Approach

Legend:
- Core information in draft
- 50%
- Most information available in concept
- Information is stable enough to use heavier change control
- Full under development
- Preparing or updating work

0. feasibility
1. definition
2. system design
3. engineering
4. integration & test
5. field monitoring

needs
specification
design
verification
engineering

Project Systems Engineering Introduction; Phasing, Process, Organization

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PSEIphases
All Business Functions Participate

0. feasibility
1. definition
2. system design
3. engineering
4. integration & test
5. field monitoring

sales
logistics
production
service
development & engineering: marketing, project management, design
Evolutionary PCP model

- test and evaluate
- requirements specification
- design
- build
- test and evaluate
- requirements specification
- design
- build

2% of budget (EVO)
2 weeks (XP)
up to 2 months per cycle
Reuse and Products
Simplified Process; Money and Feedback

strategy
process
supplying business
value
people, process and technology
long term
know how (soft) assets
feedback
product creation
customer oriented
short term; cashflow!
mid term; cashflow next year!
long term know how (soft) assets
Simplified process diagram for project business
Decomposition of the Product Creation Process

Operational Management
- specification
- budget
- time
- planning
- progress control
- resource management
- risk management
- project log

Design Control
- technical
- needs
- what is needed
- specification
- what will be realized
- design
- how to realize
- verification
- meeting specs
- following design
- engineering
- how to produce
- and to maintain

Marketing
- profitability
- saleability
- customer input
- customer expectations
- commercial structure
- product pricing
- market introduction
- introduction at customer
- feedback
Operational Organization of the PCP

- entire portfolio:
  - portfolio operational manager
- product family:
  - family operational manager
- single product:
  - (single product) project leader
- subsystem:
  - subsystem project leader
- module:
  - developers

- technical:
  - portfolio architect
  - family architect
  - product architect
  - subsystem architect

- commercial:
  - portfolio marketing manager
  - family marketing manager
  - product manager

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Project Systems Engineering Introduction; Phasing, Process, Organization

Gerrit Muller
Prime Responsibilities of the Operational Leader

Specification

Quality

Resources

Time
The Rules of the Operational Game

business management

define project
update project

specification, resources, time
accept or reject

project leader

assess risks
determine feasibility
accept

execute project within normal quality rules
accept
Operational Teams

- Operational Leader (project leader)
- Operational Support (project manager)
- Marketing or Product Manager
- Application Manager
- Test Engineer
- Requirements Analyst
- Subsystem Operational Leaders
- Subsystem Specific Architects
- Technology-Specific Architects
- Development support
- Quality Assurance
- Logistics
- Sales Manager
- Manufacturing
- Service
What Service Level to Deliver?

- Use results
- Functional capability
- Technical capability
- Expert support
- Initial production

- Performance-based or service-level agreement
- Capability management
- Facility management
- Customer support
- Factory

- Conventional maintenance contract
- Product acceptance and warranty
How the project will perform the systems engineering process:

- main events and activities
- roles and responsibilities
- work products
- procedures and standards

Bridge between project management and engineering (NASA 2016)