Supplier Systems Engineering Course; Assignments

by *Gerrit Muller* USN-SE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

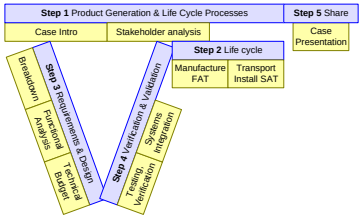
Abstract

This course focuses on systems engineering in companies that are supplying to an OEM company. The assignments use a case and guide the participants through the V-Model for that case.

Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

March 3, 2024
status: draft
version: 0.3



Create a Project Overview of the Case

Create a Project Overview for your case

Project Title

meta information, e.g. version, date, author, owner

Project Goals

- 3 to 5 specific and quantified objectives

Key Performance Parameters

- 5 to 10 specific and quantified requirements

system context

- sketch the next generation system
- indicate changes compared to the current generation system

system of interest

- sketch your next generation subsystem, module, or function
- indicate changes compared to the current generation subsystem

project master plan with timeline

- first light, prototype shipment, 1st SAT @OEM, 1st SAT @OEM's customer, start volume production

other relevant project infomation

Homework; Discuss and Update Case Overview

Contact the project and team leaders.

Have a dialogue on the case overview.

Adjust the case overview.

Annotate where uncertainties are.

Create a Project Overview for your case

Project Title — meta information, e.g. version, date, author, owner

system context

- sketch the next generation system
- indicate changes compared to the current generation system

system of interest

- sketch your next generation subsystem, module, or function
- indicate changes compared to the current generation subsystem

Project Goals

- 3 to 5 specific and quantified objectives

Key Performance Parameters

- 5 to 10 specific and quantified requirements

project master plan with timeline

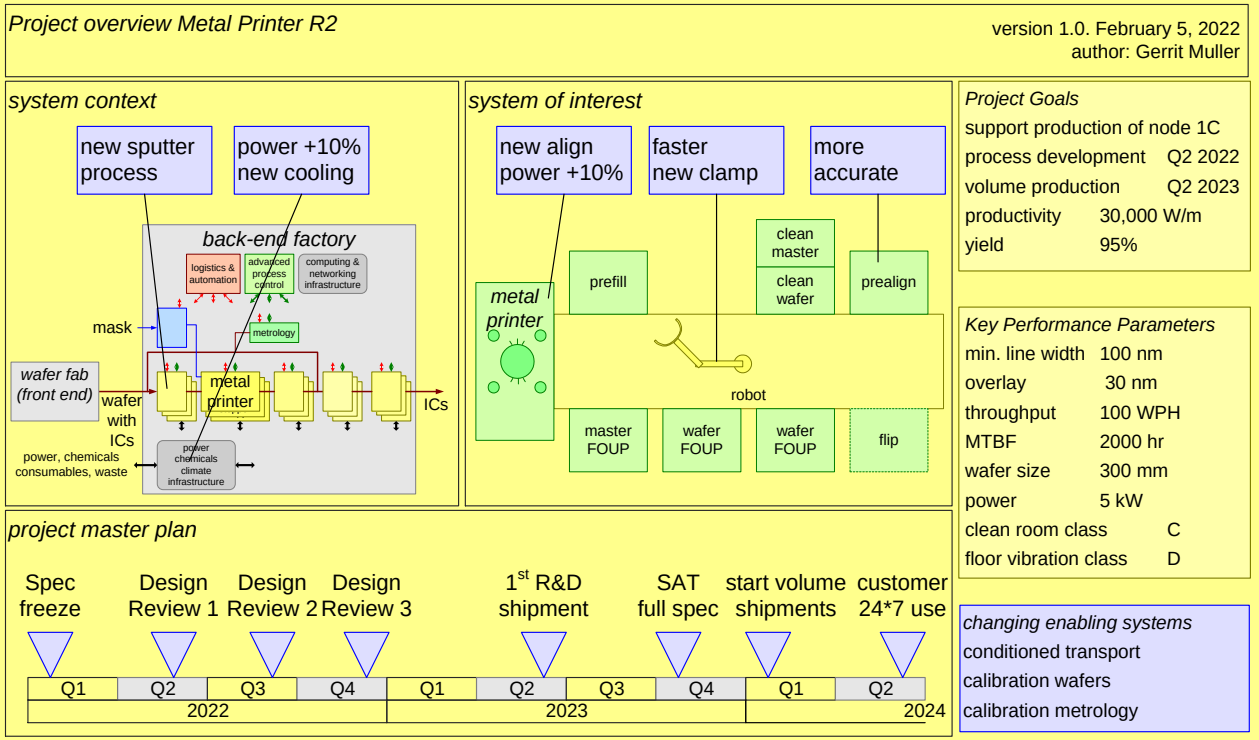
- first light, prototype shipment, 1st SAT @OEM, 1st SAT @OEM's customer, start volume production

Case Introduction

Discuss the Project Overview

What are the most relevant project goals?

What are the main milestones and their timing?



Stakeholder Analysis

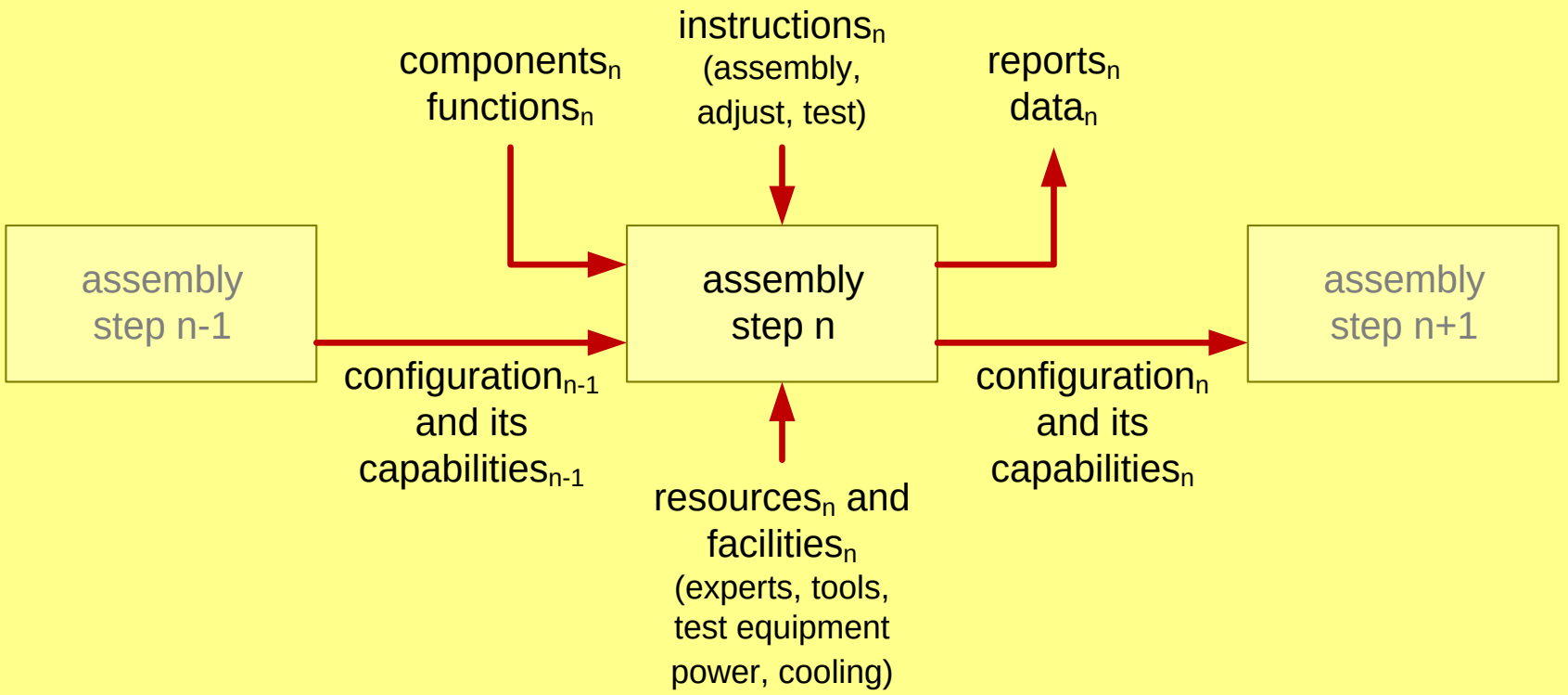
Identify ~10 stakeholders of the project

Determine per stakeholder their ~3 main concerns

stakeholders	concerns
sales manager	price, margin, value proposition
purchaser	purchasing price, delivery date
project leader	delivery date, resources, budget
developer	
integrator	
operator	
maintainer	
…	

Manufacturing and FAT

Sketch a manufacturing ConOps of the current system

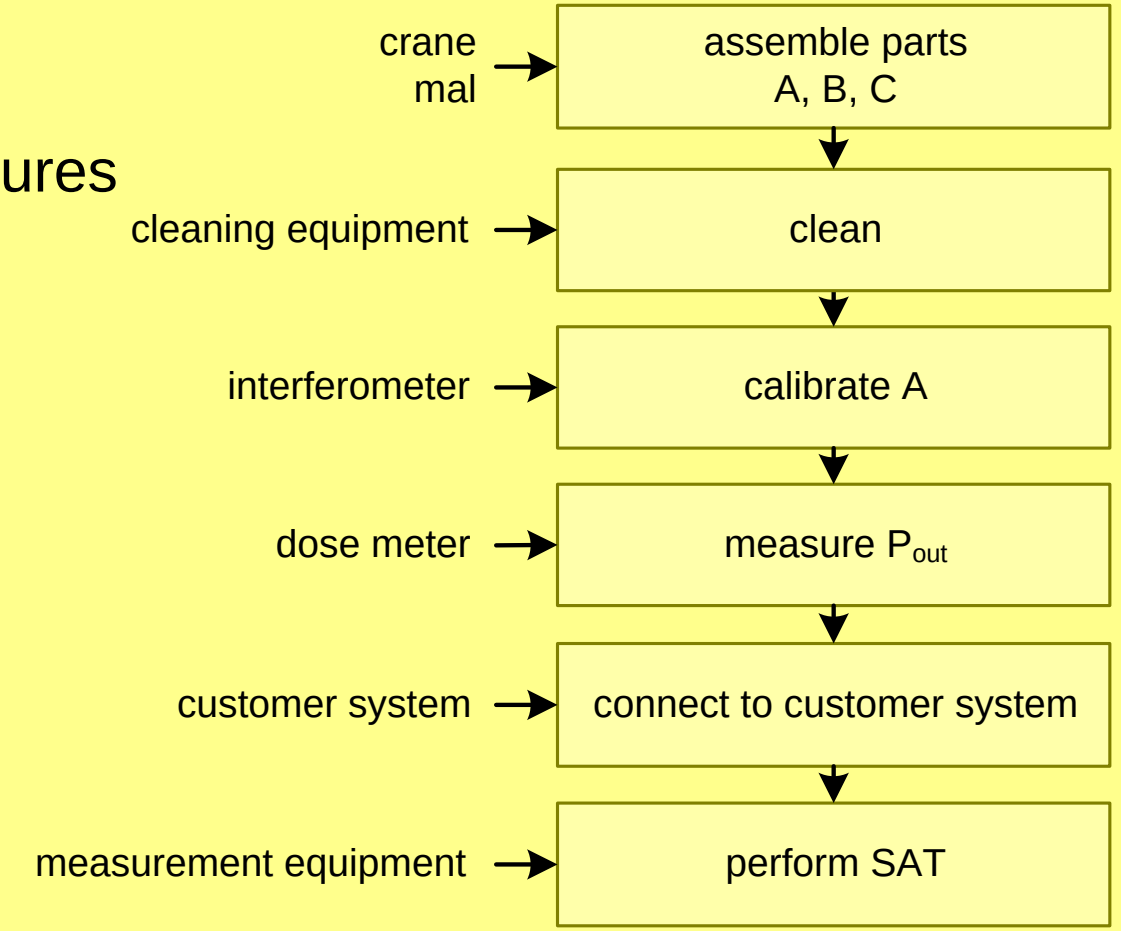


Transportation, Installation, and SAT

Sketch the installation workflow of the current system at the customer

Identify critical operations and

prerequisites like tools and fixtures



Homework; Elicit Needs from Stakeholders

Contact the major life cycle stakeholders in your company.

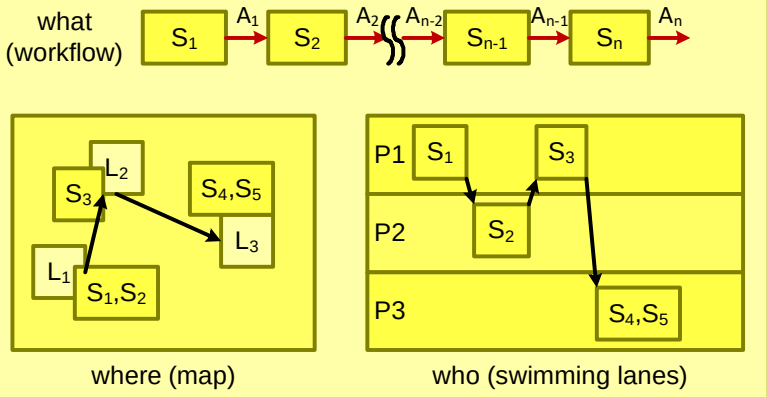
Have a dialogue on how they perform their role.

Capture their way of working in a ConOps.

Ask them for their main “pain” points.

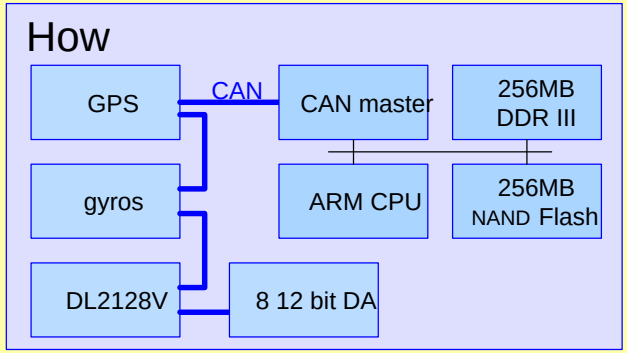
Concept of Operations (ConOps)

An envisioning of how the stakeholders will run their operation in relation to the system.

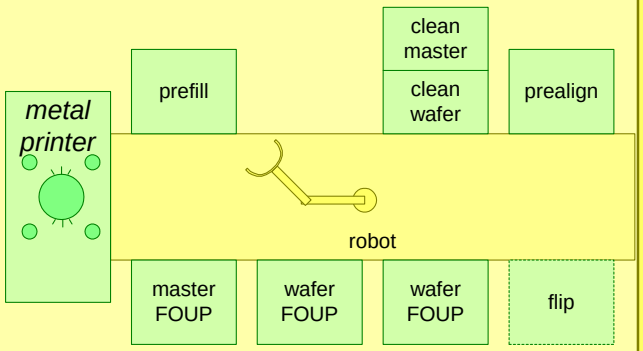


Breakdown

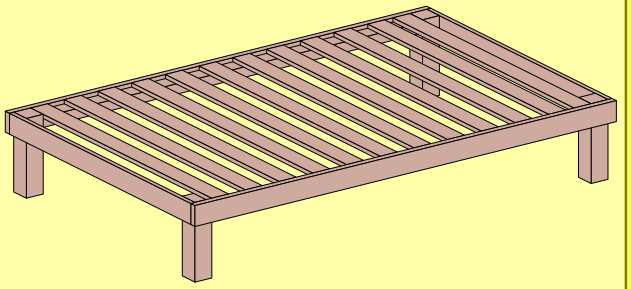
Make a breakdown of your system. Choose 1 representation from below



HW block diagram

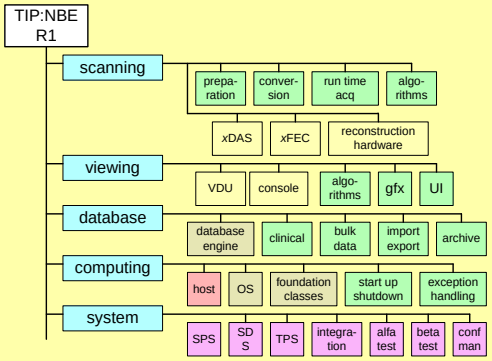


2D layout of system internals

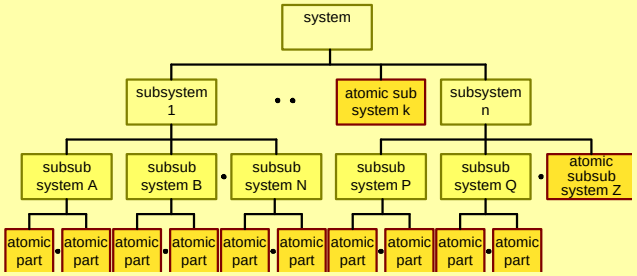


3D sketch of system internals

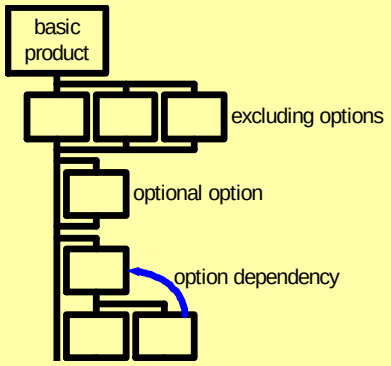
and select 1 representation from below



Work Breakdown Structure



System Breakdown

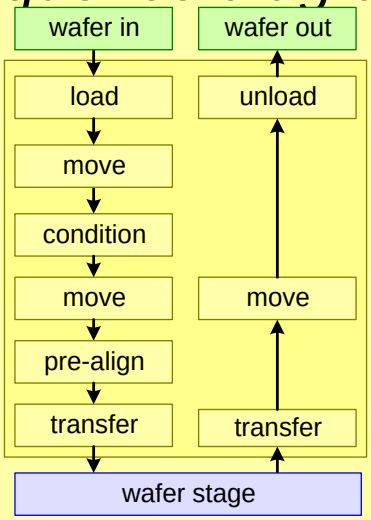


Product Configuration Tree

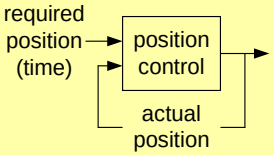
Functional Analysis

Make ~3 functional diagrams showing the behavior of part of the system

sequence diagram

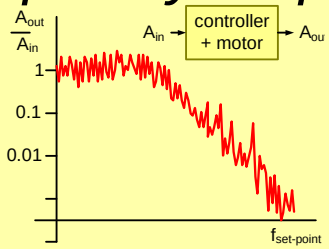


feedback control

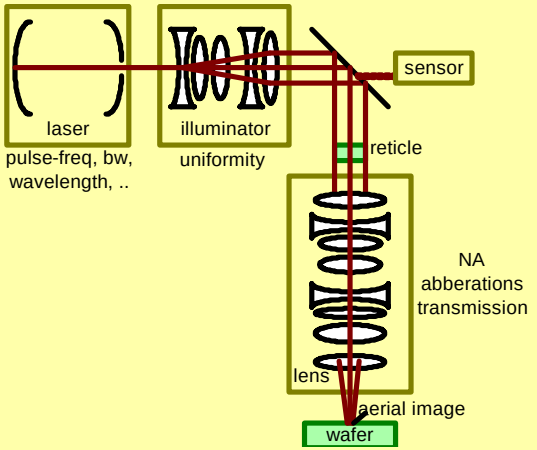


feedback frequency:
4 kHz (0.25 msec)

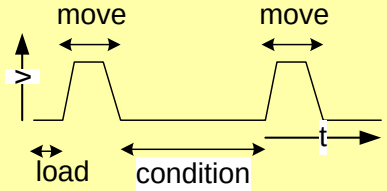
frequency response



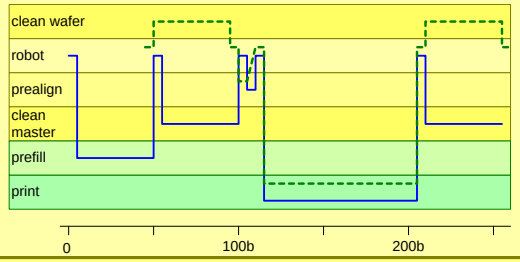
light path



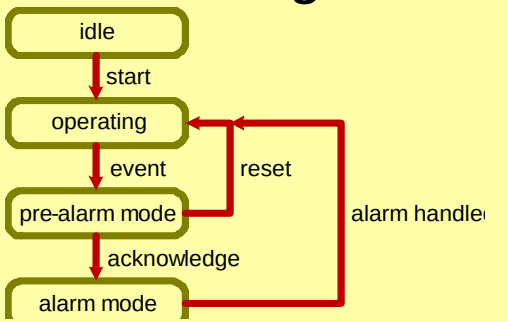
parameter as function of time



swimming lanes



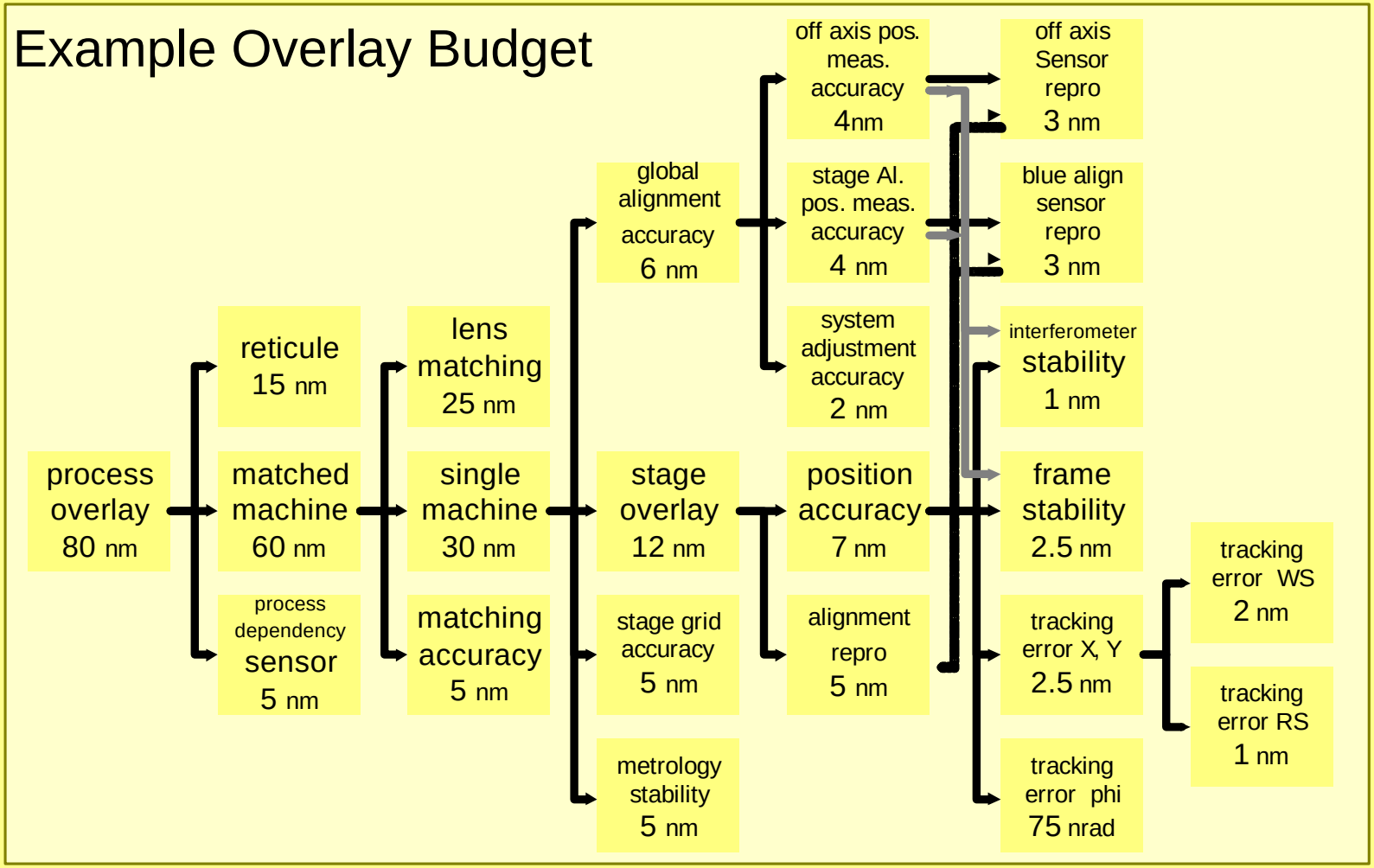
state diagram



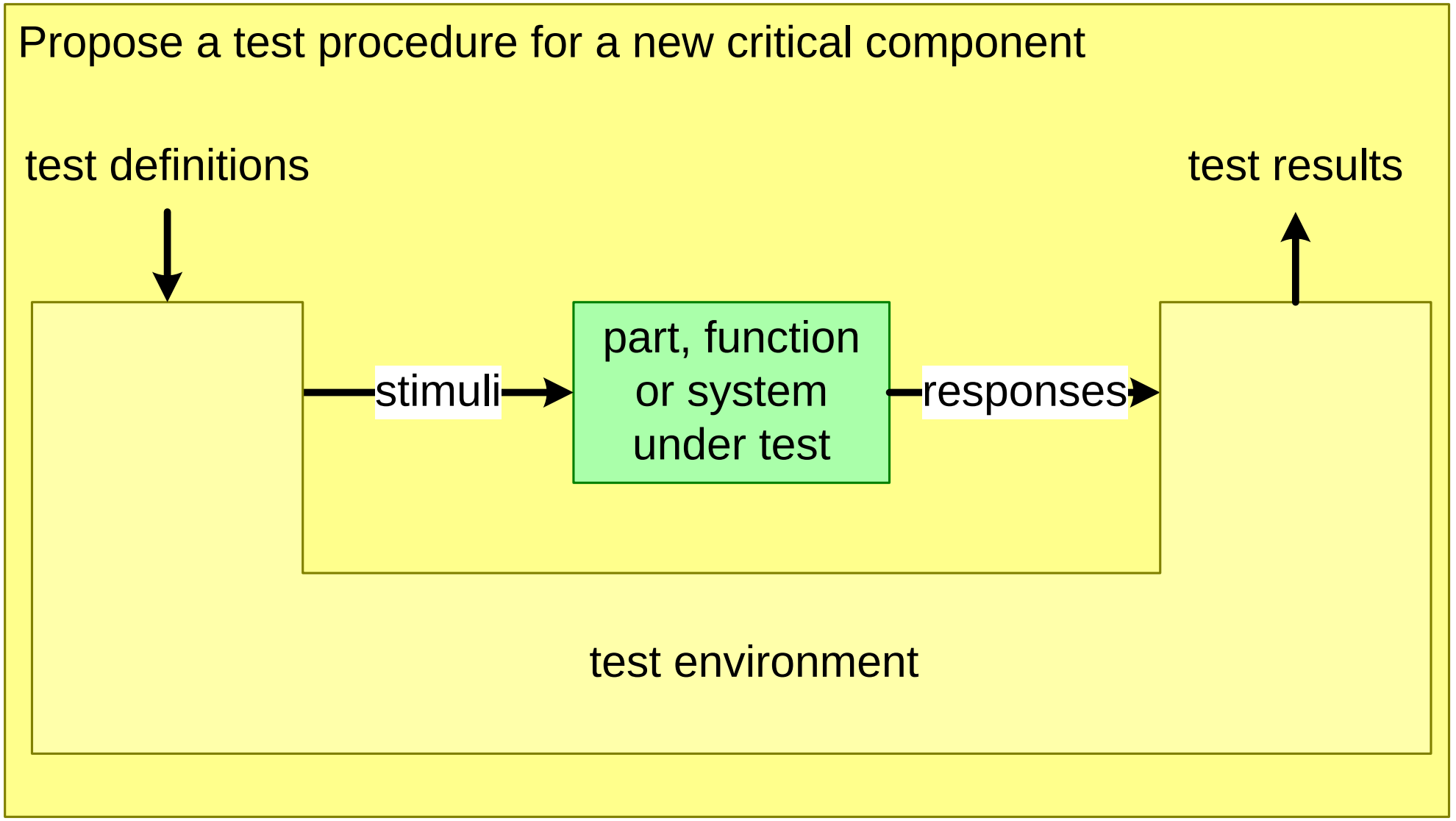
Technical Budget

Make a technical budget, a breakdown of contributions, for one KPP

Example Overlay Budget

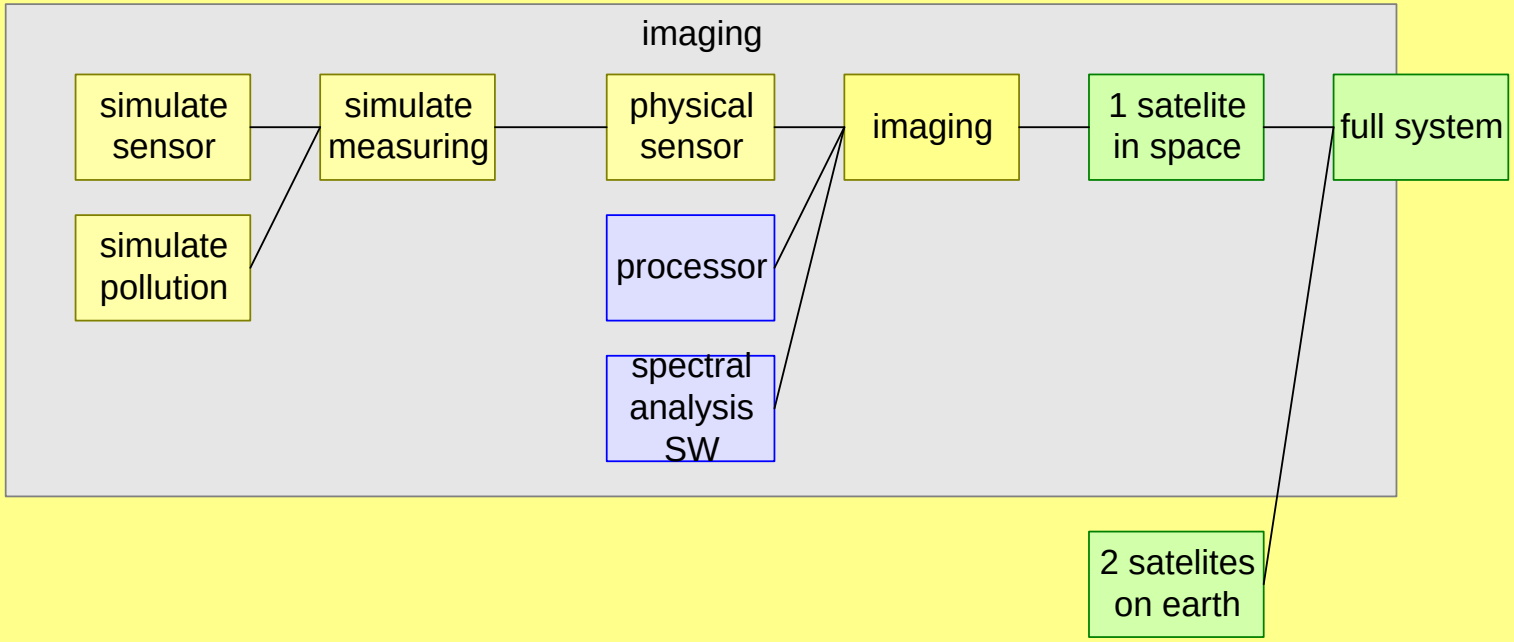


Testing and Verification



Systems Integration

Propose an integration sequence that shows the KPP early

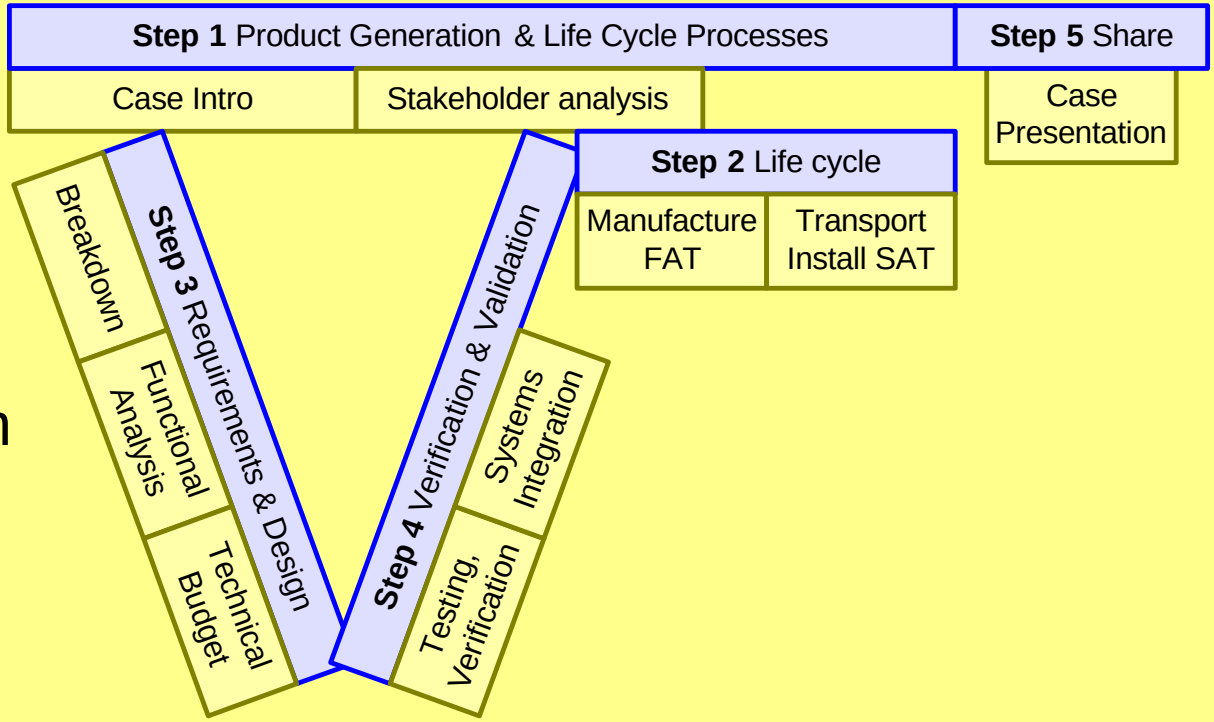


Homework; Consult Colleagues

Consult your colleagues to determine and construct:

- the top 3 Key Performance Parameters of your (sub)system
- 3 views on dynamic behavior; how does your (sub)system achieve the KPPs?

Case Presentation

Make a presentation for the Project Team to explain

- project overview
- master plan
- design
- verification & integration
- life cycle