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ENGINEERING SUMMER SCHOOL



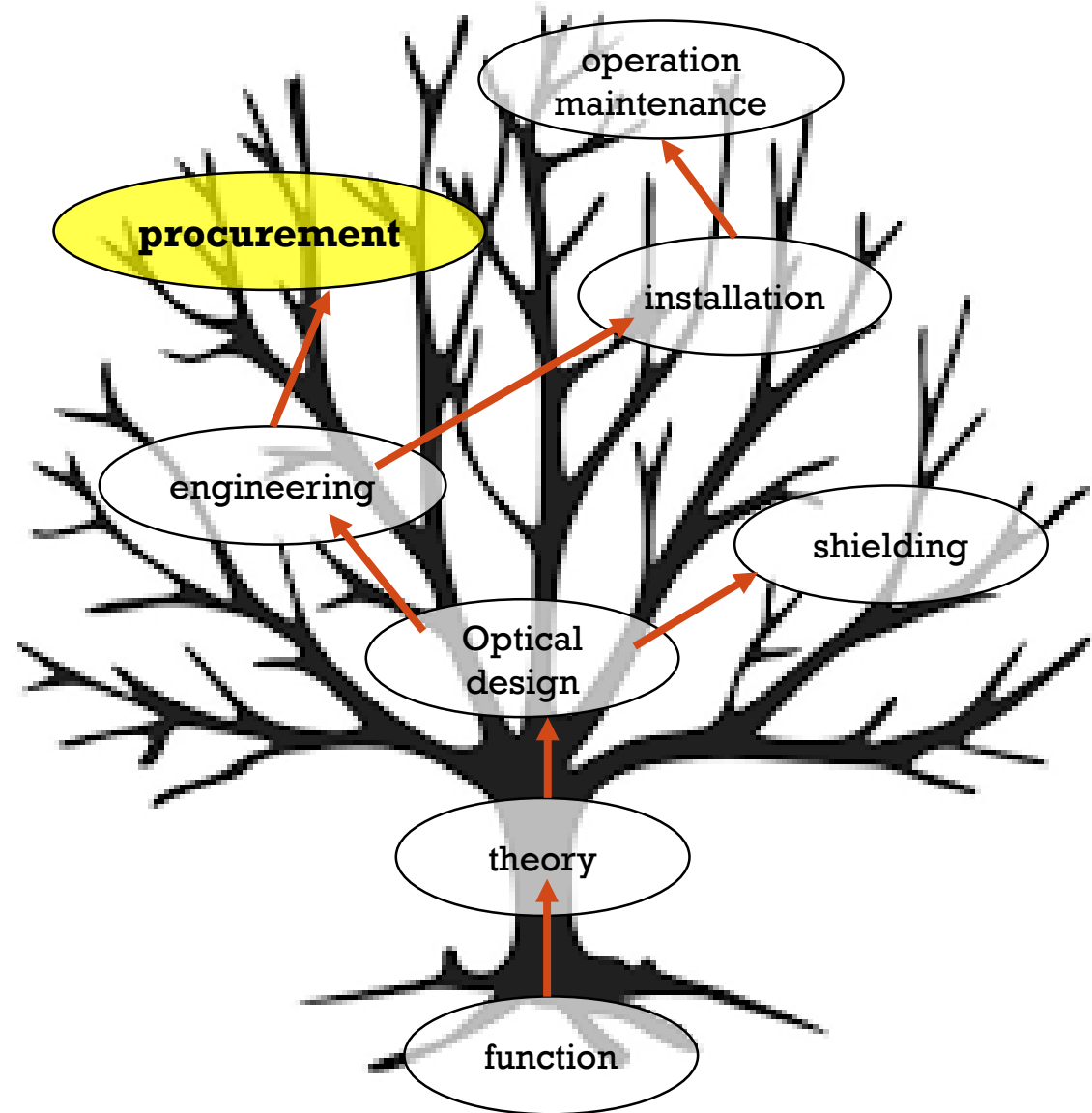
Part VII

Procurement (getting what you want)



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BRANCHES



GETTING WHAT YOU WANT

- What
- How
- When

and

- How much ?





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CLARITY IS EVERYTHING

PROCUREMENT DOCUMENTS

Splitting your information into a document package saves time in the long run

- Cover letter
- Technical specification
- Terms and conditions
- Project
 - Schedule
 - Payment plan
 - Scope of supply
- Quality plan (VVP)

Cover letter

Intro
Scope of tender
Tender conditions
Outline Production Schedule
Contact details
Document list

Contract, terms & conditions

General contract terms
Warranty
Payment shedule
Payment conditions
Rights to inspection
Packing
Transport

Verification & Validation program

Document scope
Validation plan
Verification plan
Test standards
Inspection regime
Production / Inspection Schedule

Technical specification

Document scope
Intro
Description
Requirements
Manufacture standards

Annex

Test specifications
Manufacturing specifications
Preliminary drawings

TECHNICAL SPECIFICATION

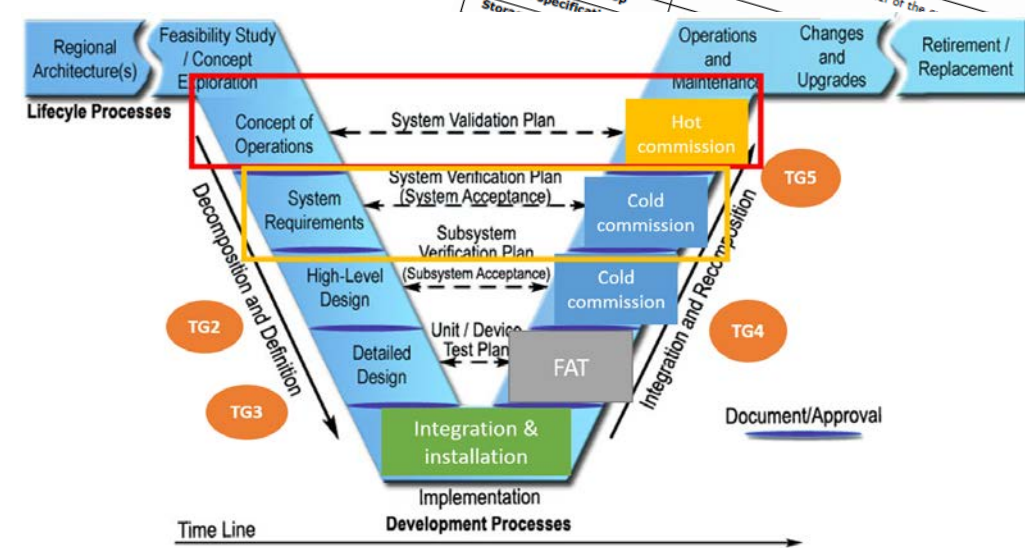
Defines

- Scope of supply
- Detailed specification of the system
- Technical requirements
 - Section
 - Trajectory
 - Coating
- Technical constraints
 - Interfaces
- Single source or Multiple

3.2 Instruments needs:

3.2.1 XtremeD :

Responsible	RODRIGUEZ-VELAMAZAN Jose Alberto
Wave Length (Å)	0.8 - 4.10 Å Optimal: 1.2-2.4 Å
Divergence (½ angle °)	± 0.5 degr at 2.4 Å
Monochromators	2 double variable focusing monochromators
Guide Section - Curvature	HOPG monochromator + Si monochromator
Super-mirror coating	W x H = 45x180 mm ² (minimum height) - p = 14 km or less
Flux (n/cm ² s)	m = 2
End of Guide Position	Factor of 3-5 increase compared to present flux
Magnetic Materials in Vicinity	Yes
Polarised neutrons	Avoid. High magnetic field (up to 17 T).
Magnetic field produced	No
Biological Shielding Requirement	Medium to high field permanently in use (9 to 15 T).
Sensitivity to Background Gamma/neutron	Non magnetic shielding
Compatibility with Neighbouring Instruments	Sensitive to neutron background. Sensitive to gamma.
Space/Access Requirements	Concrete walls needed around the experimental zone → validated by SPR.
Crane usage	
Other Observations	Space requirements of the order of the ...
Cabins and workshop	
Ground specifications	



QUALITY PLAN

VVP (quality plan)

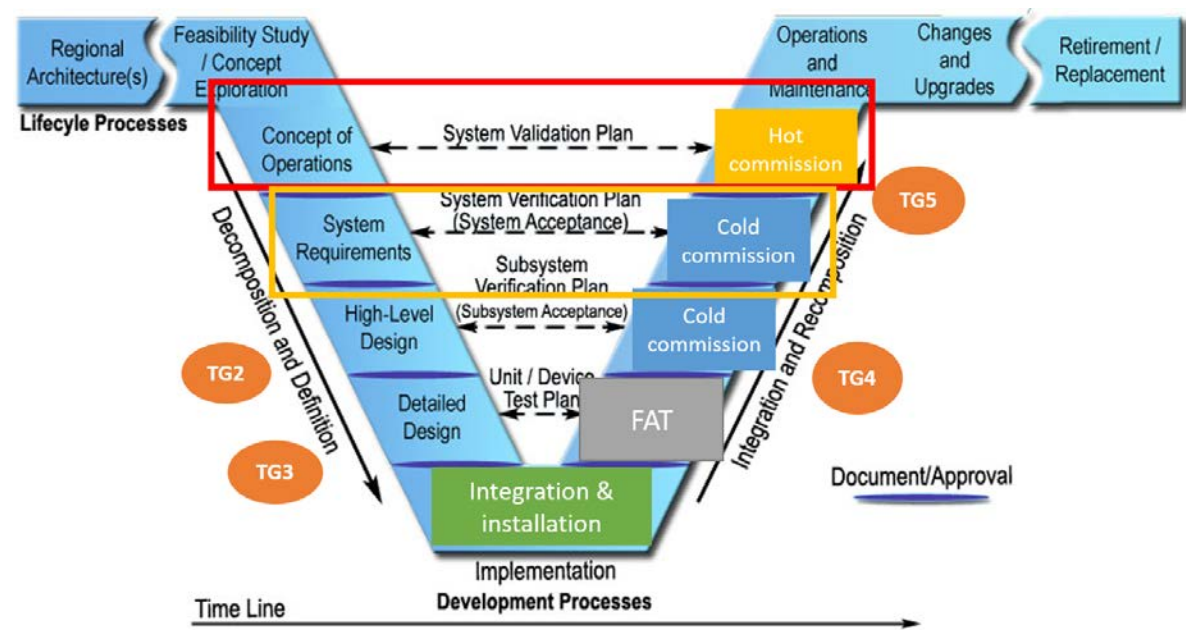
Validation and verification plan

How will the specified requirements be validated and verified

- By what means
- At what point in the project
- By who

What happens next

- Non-conformity



TERMS WARRANTY

A decision to take with reflection

- **Scope**
 - Parts
 - & Installation
 - & damages
- **Limitation**
 - Short
 - Long
 - Integrated flux
- **Conditions due**
 - Physical damage
 - Flux loss

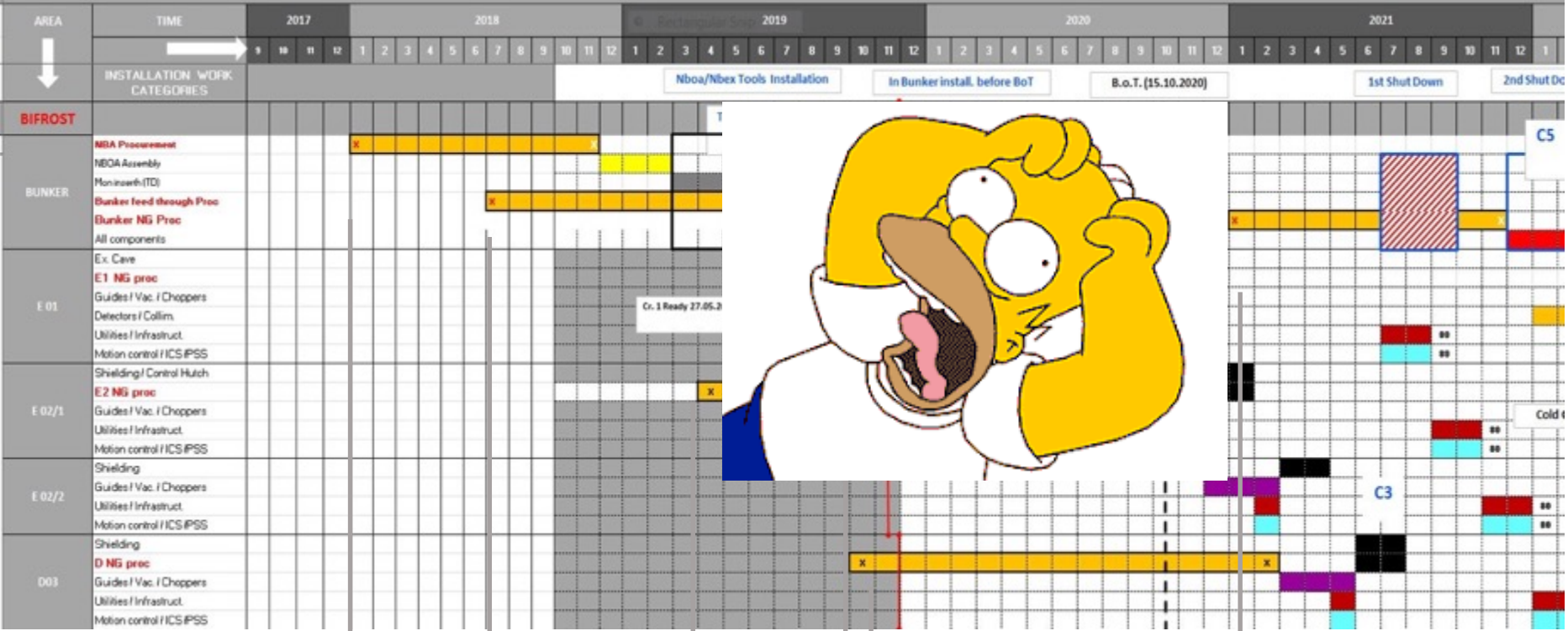




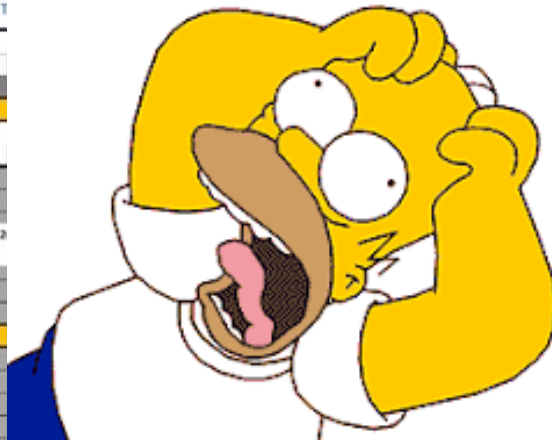
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HOW DO YOU WANT IT

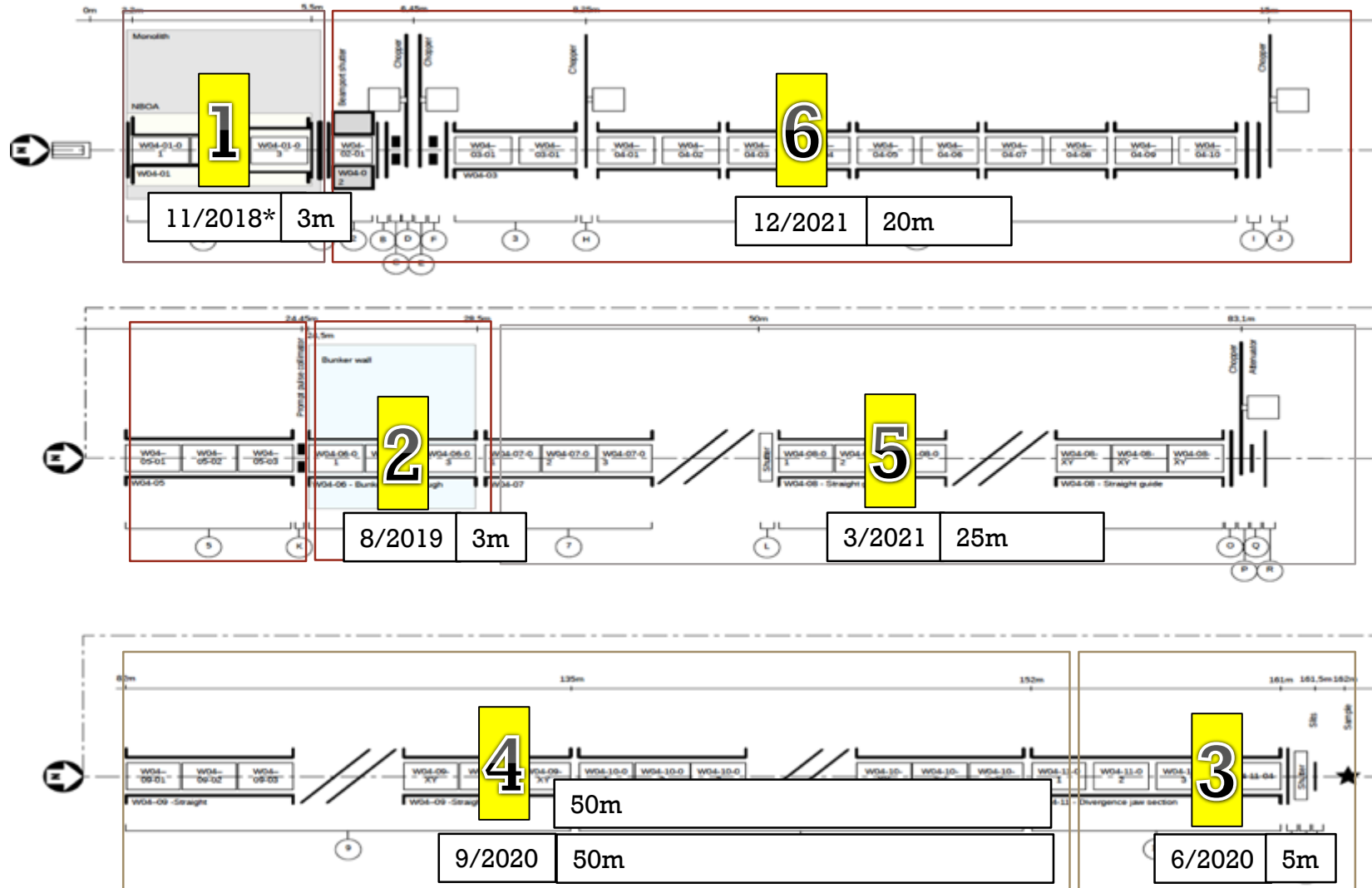
ORDER PLACEMENT SCHEDULE



- (1) NBOA Q4 2017
- (2) BUNKER FT Q2 2018
- (3) E02 Guides Q3 2019
- (4) E01 Guides Q1 2019
- (5) D GUIDES Q4 2019
- (6) IN-BUNKER Q4 2020



INSTALLATION PACKAGES = DELIVERY BATCH!!!



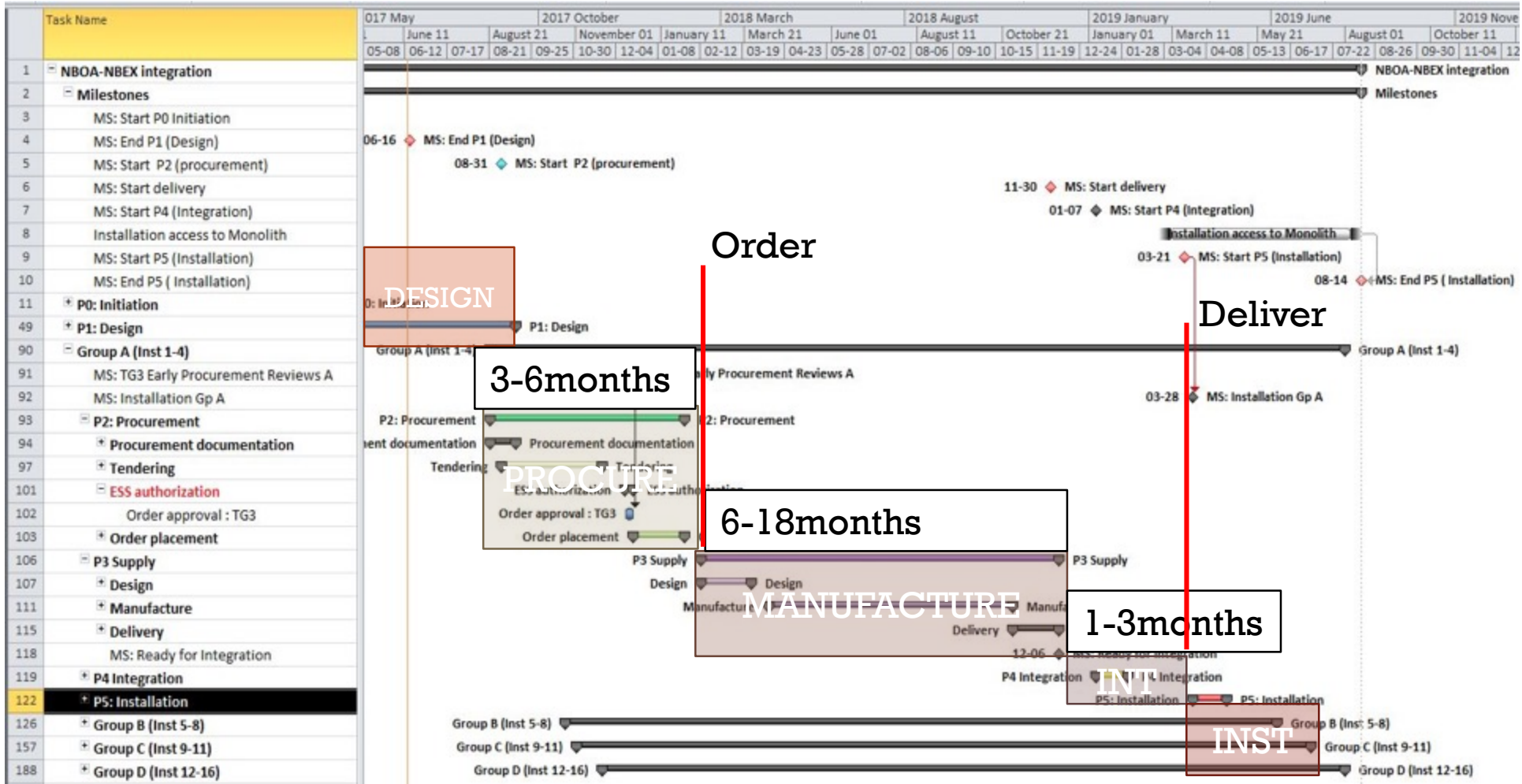


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YOU WANT IT WHEN !



RETRO-PLANNING



INTERNAL COMPLEXITY

- Build sequence
- Build Schedule
- Access dates
- Use delivery batches to manage risks.



SUPPLY CHAIN

MIRR•TRON

- 3 commercial suppliers
- 5 sputtering machines



S-DH

SwissNeutronics

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COMPETITION

- Small customer base
- Long service life
- Large order quantity
- Limited coordination



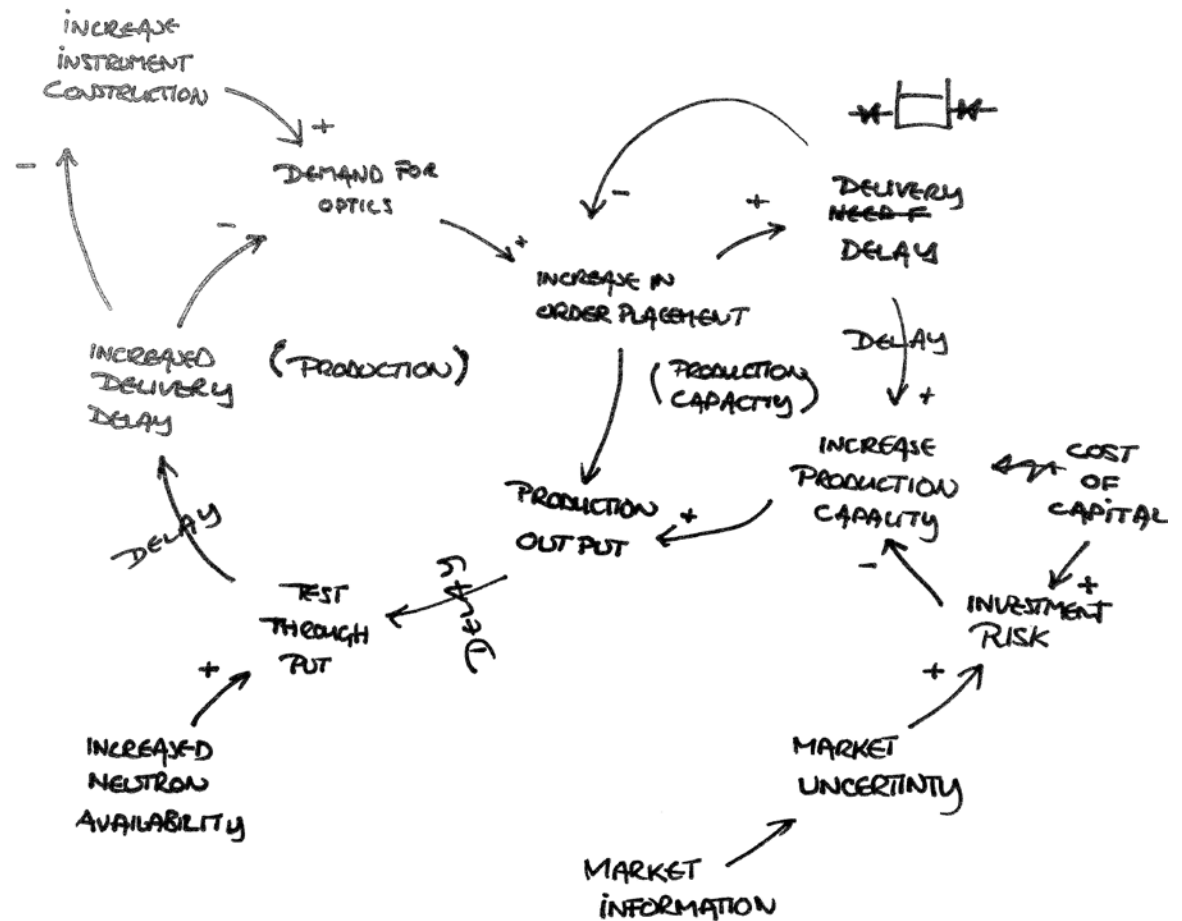
DYNAMIC RESPONSE



A typical response curve



System dynamic model of Neutron optic supply





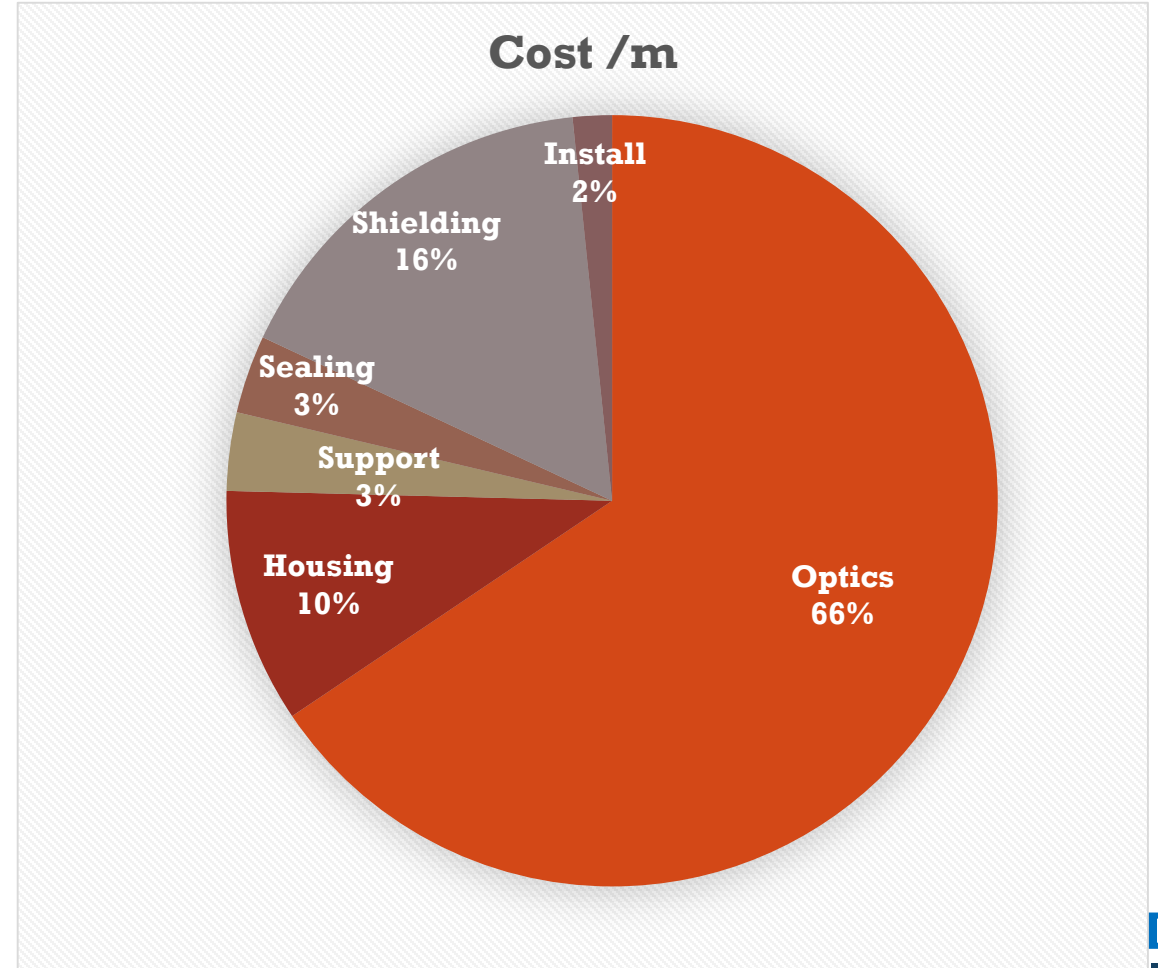
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HOW MUCH



BREAKDOWN

- Optics 15/35kE
- Housings 2.5/7kE
- Support 1kE unit
- Shielding 9/15kE
- Seals 500/1000 pc
- Install 2kE/day



GUIDE PROJECT - COSTS COMPARISON

						
DURATION * <i>Year</i> <i>Com. Year</i>	3,5y 2011	3,5y 2012	5y 2014	4y 2020	4y 2020	3y 2019
LENGTH ** <i>Meter</i>	148	305	325 (250 replaced)	160	130	36
COST ** * €	3200	7100	7200	5100	4200	1000
Mean cost - K€/m	22 K€	23 K€	29 K€	32K€	32K€	28K€

* Execution + Commissioning phases

** equivalent single guide

*** Manpower + Procurement



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KEY POINTS

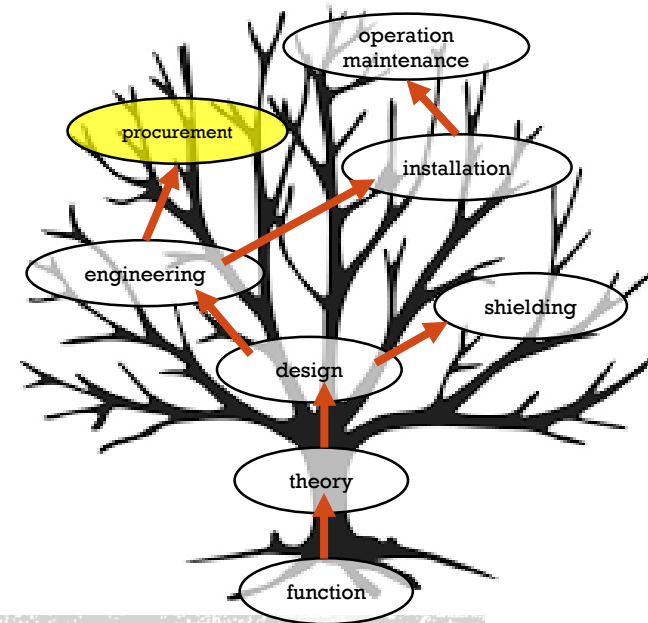
DESIGN FOR PROCUREMENT

- Specification
- Quality
- Schedule
- Cost



The success of your project and potentially you instrument may depend on how effectively you integrate constraints of procurement into the planning and engineering of you guide system

END OF THE LINE PROCUREMENT



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