



## Improvements to KPS System Way of Working

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# Content:

## Current state:

- The KPS Product and history
- Key observation of KPS WoW.
- Goal for improvements

## New Process:

- Functional structure
- Connecting requirement and architecture
- Increased availability to the documentation



# Current State:

## Current State:

Key observation of KPS WOW.

Goal for improvements

## New Process:

New proposed Process

Benefits/problems

Demo

## Cases:

MCRWS

DOK

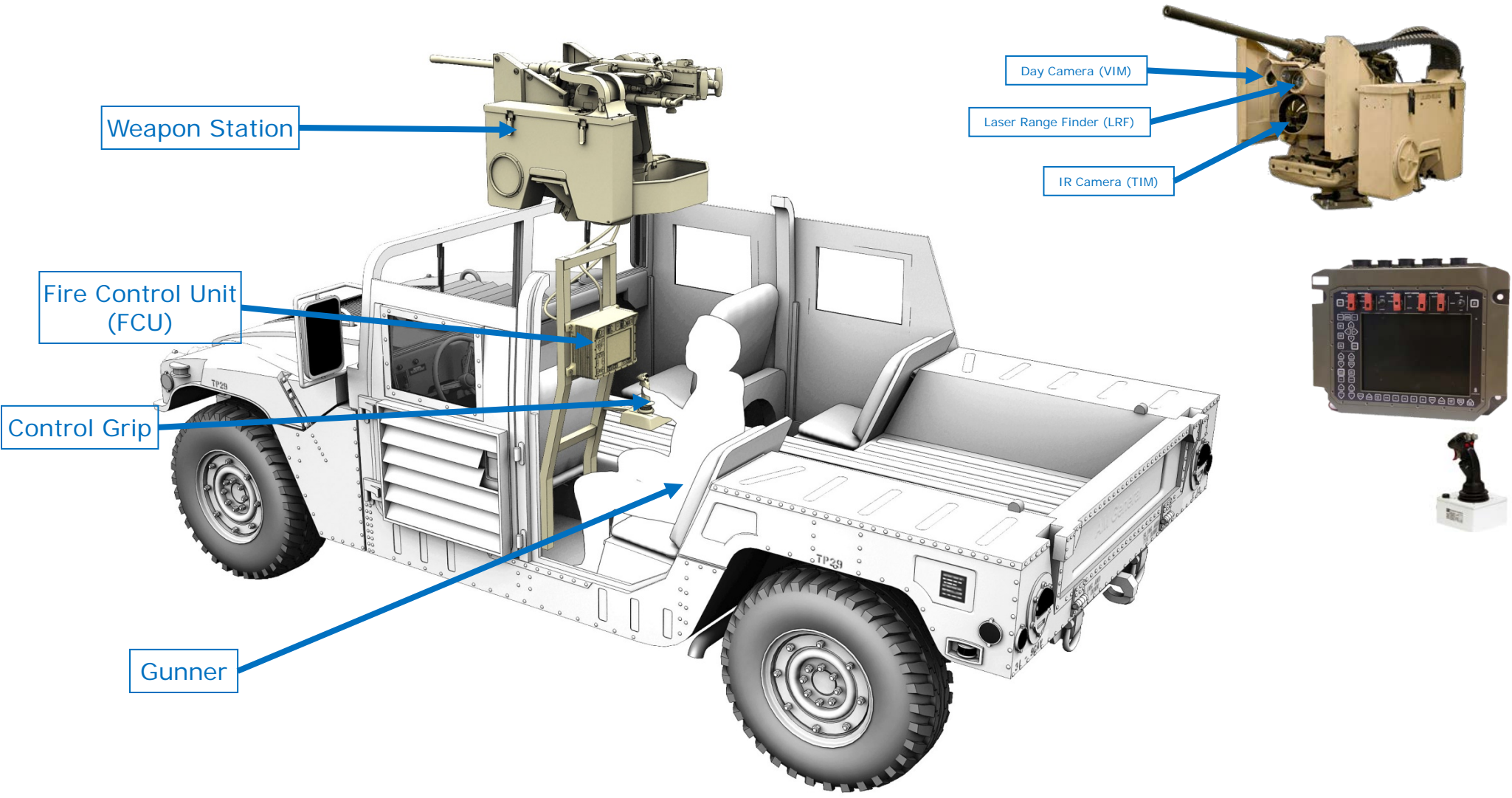
...

## Plan:

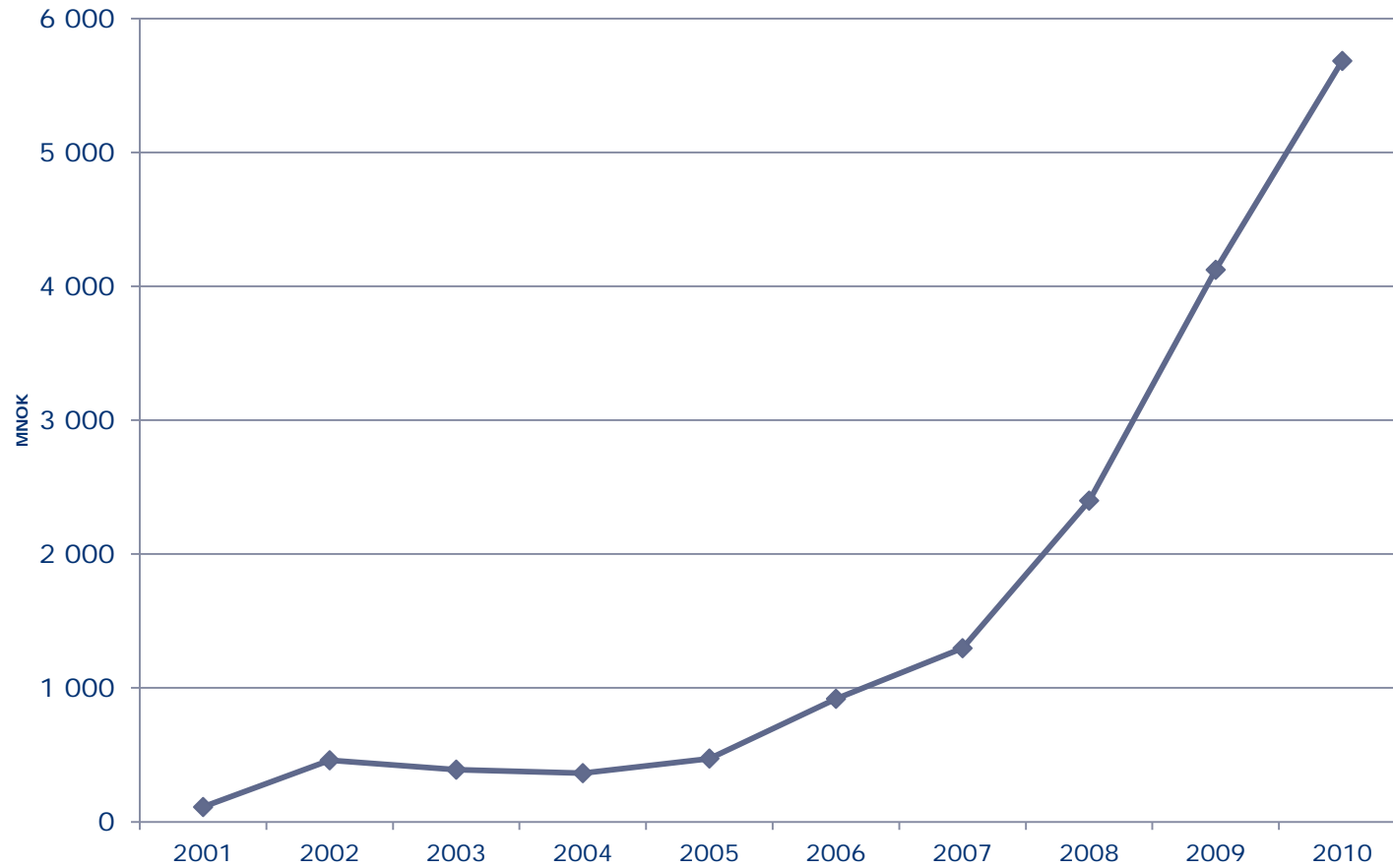
Work packages and Effort

Migration/Steps/plan

# KPS Product: Remote Weapon Station (RWS)

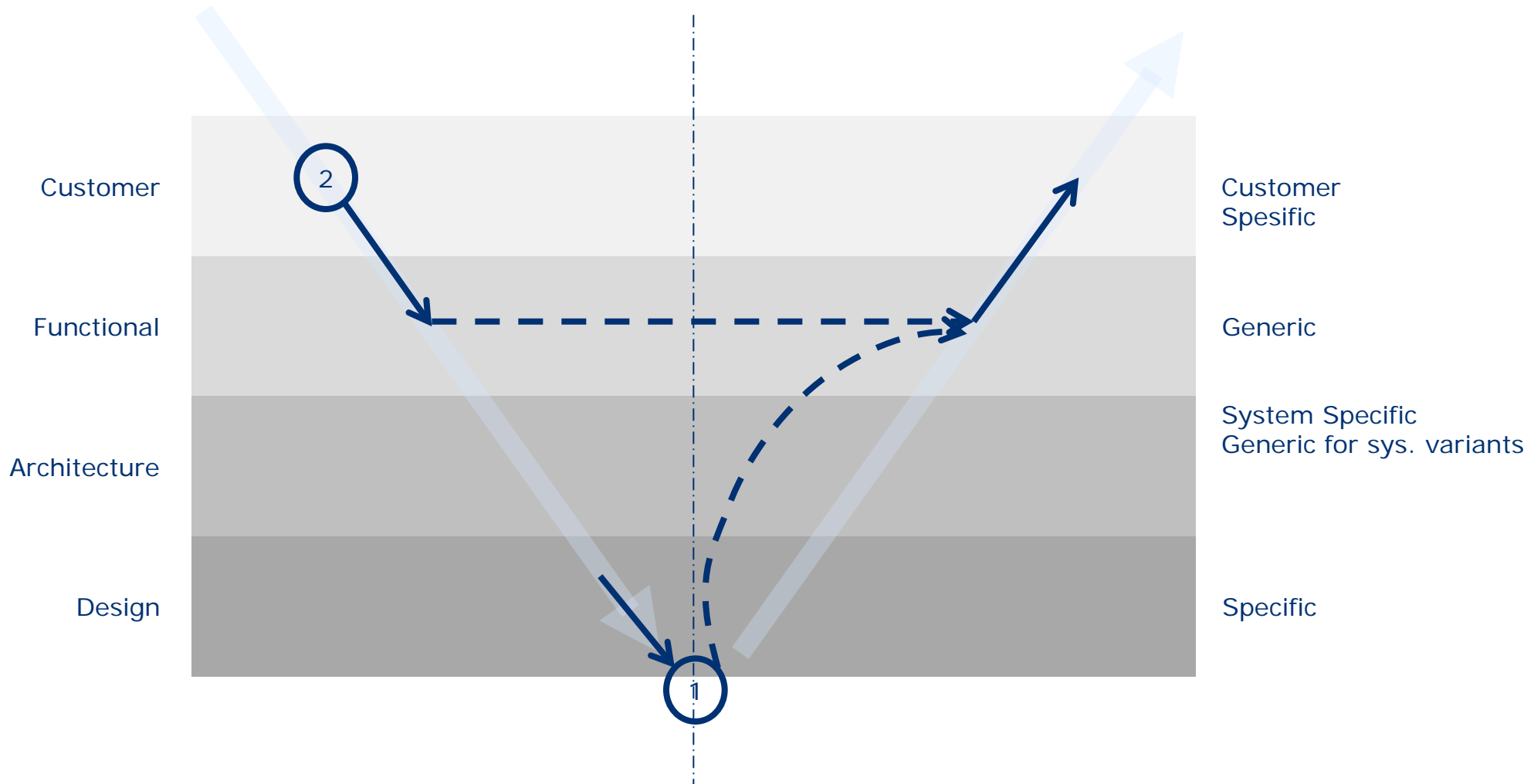


# The Industrial Adventure



# KPS observations

## Illustration attempt: current situation





# Goal for improvements

Fill in the gap of missing system documentation to achieve:

- Increased system understanding:
  - Described functionality with requirements placed in context, described architectures and solutions -> more competent and productive designers.
  - Less dependent on heroes.
  - Easier to distribute work packages – internally and externally.
- More efficient development
  - Quicker requirement definition
  - More time spent on design, less on corrections, re-runs and variant handling
  - Better test planning covering incremental testing
  - Common development methodology - Increased flexibility
  - Support for parallel activities – functional def. in parallel with architecture design and verification planning and spec.





# Goal for improvements (ctd.)

- Improved quality
  - Early catching of errors (incremental testing) - fewer releases
  - Improved first-time-right performance (follow on errors) as a consequence of increased system overview
  - More complete requirements
- Increased level of reuse
  - Fully specified, designed, verified and documented modules
- Enable a common SW:
  - Common specifications
  - Specify SW independent of system
- Incremental design and test:
  - Modular design
  - Unit test, Integration testing, Functional test, System test, Acceptance testing.





# “New” Process:

## Current State:

Key observation of KPS WOW.

Goal for improvements

## New Process:

New proposed Process

Benefits/problems

Demo

## Cases:

MCRWS

DOK

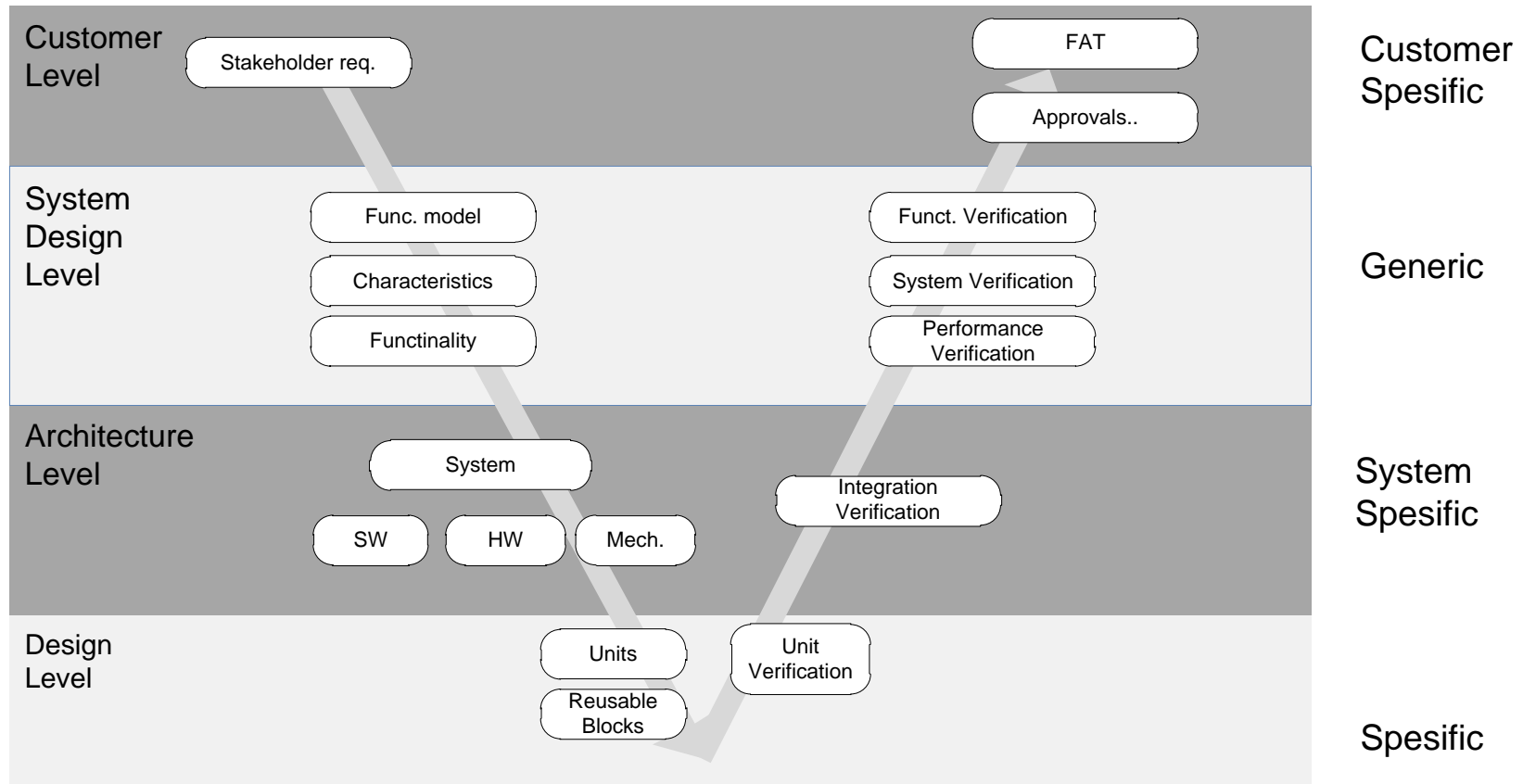
...

## Plan:

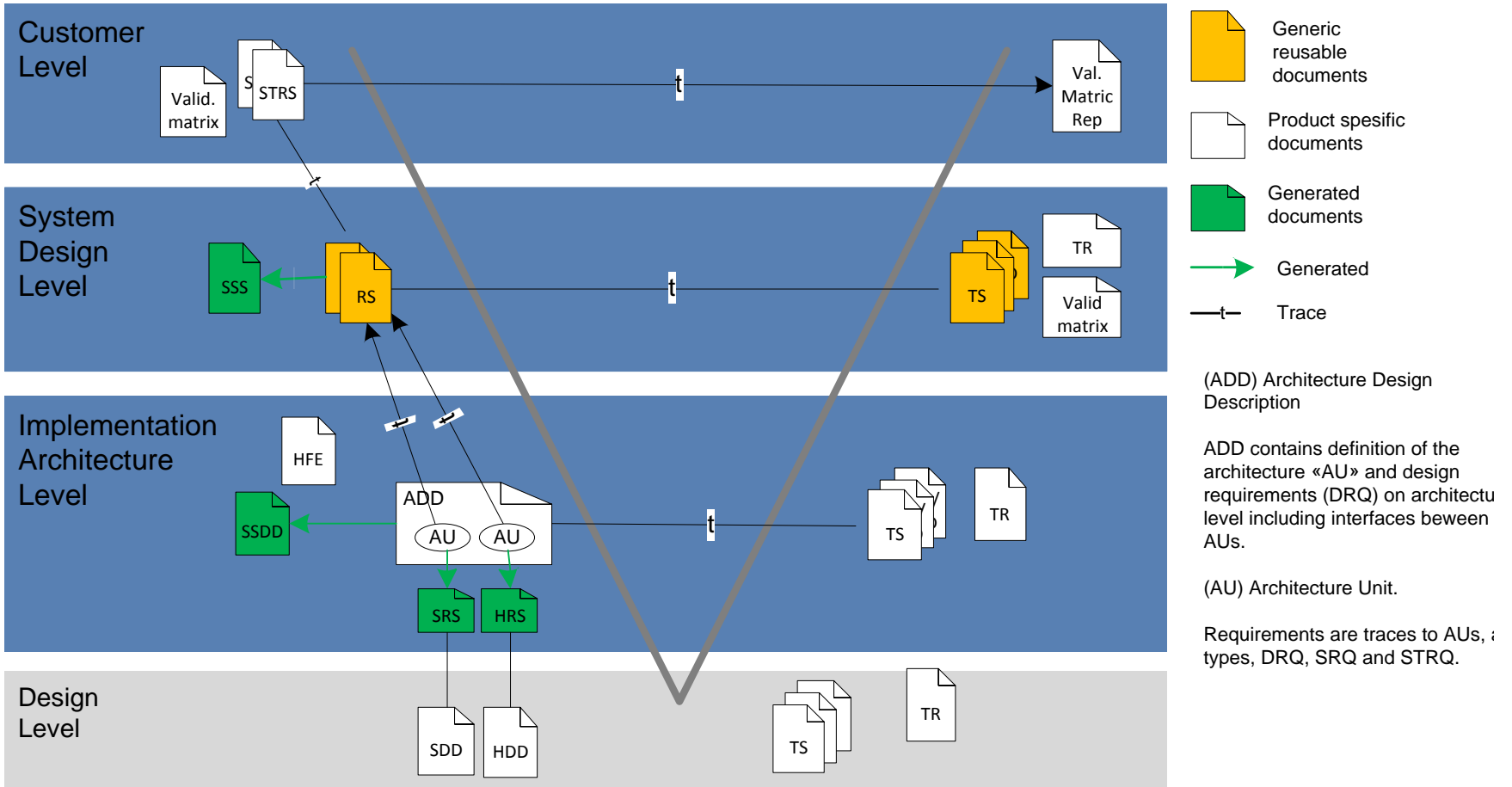
Work packages and Effort

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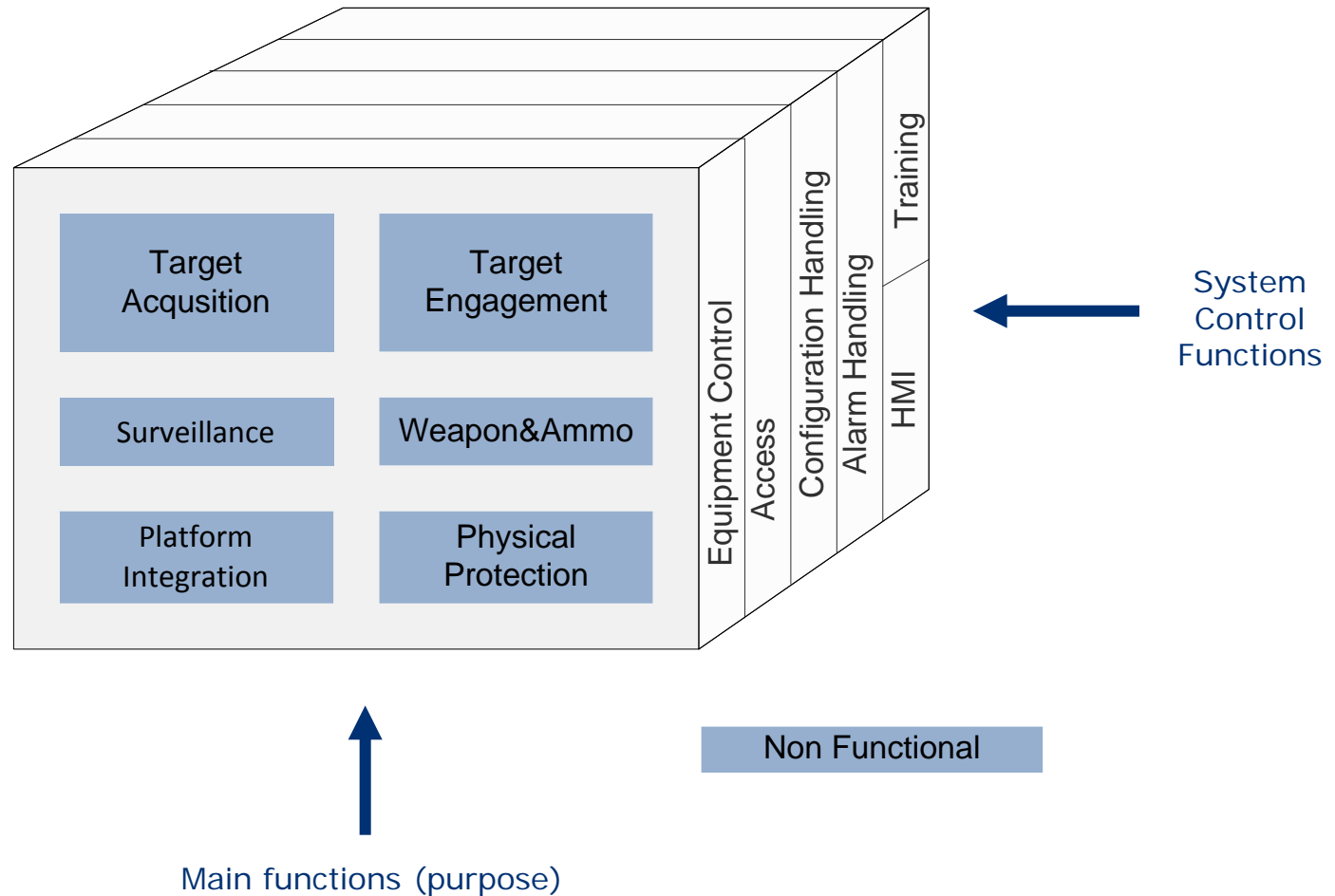
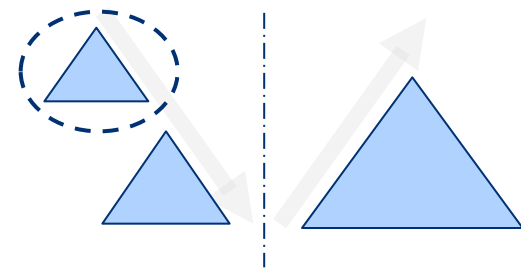
# General functional development model



# KPS document view of V-model.



# Functional Structure



# What's new?



Requirements organized according to functional model:

**Rational RequisitePro - Common database**

File Edit View Requirement Traceability Tools Window Help

Common database

- 00-Common veivs
- 10-Stakeholder Requirements
- 20-System Requirements
  - 01-General
  - 02-Platform Interface (PI)
  - 03-Target Acquisition (TA)
  - 04-Surveillance
  - 05-Target Engagement (TE)
  - 06-WeaponAndAmmo
  - 07-Physical Protection (PP)
  - 08-Trainer
  - 09-HMI
  - 10-Non Functional
  - 11-Equipment Handling (EH)
    - 11-00 Equipment Handling
    - 11-01 Hardware Handling
    - 11-02 Software Handling
    - Equipment control
    - RSQ View
    - SRQ3: IT he user interface for EC shall be similar to the CROWS/RWS user interface.
    - SRQ5: IT he operational status shall use the following levels:
    - SRQ6: If the LRU or SRU operational status is NOK or degraded then the operational st...
    - SRQ7: ITn low temperature, equipment errors shall be reported as "low temp condition". ...
    - SRQ8: IT he Operational Information for the System shall contain info as follows:
    - SRQ13: The inventory shall for all LRUs as a minimum contain the following information:
    - SRQ14: The Sys. Log. shall be stored persistently in the system.
    - SRQ15: The Sys. Log shall follow the following format:
    - SRQ16: The following shall as a minimum be logged in the Sys. Log:
    - SRQ17: The LRU Log. shall be stored persistently on the LRU.
    - SRQ18: The LRU Log shall have the following format:
    - SRQ19: The following shall as a minimum be logged in the LRU Log:
    - SRQ34: The system false detection of failure shall not exceed [FailurRate] of the report...
    - SRQ35: Detected faults shall be logged with error code that uniquely identifies the fault.
    - SRQ36: A fault on data-plane shall trigger a fault identification procedure.



# What's new?

## Working in documents – not in database:

Rational RequisitePro - Common database

File Edit View Requirement Traceability Tools Window Help

Common database

- 00-Common veivs
- 10-Stakeholder Requirements
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  - 11-Equipment Handling (EH)
    - 11-00 Equipment Handling
    - 11-01 Hardware Handling
    - 11-02 Software Handling
    - Equipment control
    - RSQ View

SRQ3: If the user interface for EC shall be similar to the LRUW5/RWS user interface.

SRQ5: If the operational status shall use the following levels:

SRQ6: If the LRU or SRU operational status is NOK or degraded then the operational st...

SRQ7: If in low temperature, equipment errors shall be reported as "low temp condition". ...

SRQ8: If the Operational Information for the System shall contain info as follows:

SRQ13: The inventory shall for all LRUs as a minimum contain the following information:

SRQ14: The Sys. Log. shall be stored persistently in the system.

SRQ15: The Sys. Log shall follow the following format:

SRQ16: The following shall as a minimum be logged in the Sys. Log:

SRQ17: The LRU Log. shall be stored persistently on the LRU.

SRQ18: The LRU Log shall have the following format:

SRQ19: The following shall as a minimum be logged in the LRU Log:

SRQ34: The system false detection of failure shall not exceed [FailureRate] of the report...

SRQ35: Detected faults shall be logged with error code that uniquely identifies the fault.

SRQ36: A fault on data-plane shall trigger a fault identification procedure.

01RS60231119-00 PROTECTOR

Rev: Hardware Handling Page Page 8 of 30

**2.1.1 Equipment**

Equipment within the system will be seen from user perspective as illustrated in *Figure 3*. The system consists of one or more line replaceable units (LRU) which contains one or more System Replaceable Units (SRU).

*Figure 3 PROTECTOR, user service view*

**2.1.2 Operational status**

Hardware Handling uses the concept of operational status.

- The operational status reflects the equipments ability to operate.
- The operational status is defined for SRUs, LRUs and the system as a whole.

*Figure 4 – operational status*

SRQ5: The operational status shall use the following levels:

System:

- Initializing - The system is starting – status is undetermined
- OK - No reported errors on Equipment
- Degraded - NOK/Degraded operational status on LRU – system may continue without LRU.
- NOK -

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# What's new?



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## Easy availability to the documentation:

## WEB access to the database

The screenshot displays the Rational RequisiteWeb interface in a Windows Internet Explorer browser. The main content area shows a table of requirements with the following columns: Requirements, ReqStatus, System Baseline, Safety, Verification Level, Verification Method, Verification specification, Capability, MC RWS, MW RWS 151, MW RWS 153, LW RWS, Release comment, Unique ID, Location, and Package. The table contains several rows of requirements, including SRQ2, SRQ5, SRQ657, SRQ658, SRQ659, SRQ660, SRQ661, SRQ662, SRQ663, SRQ664, SRQ665, SRQ666, SRQ667, SRQ668, SRQ69, SRQ7, and SRQ8. The interface also includes a left-hand navigation pane with a tree view of the database structure, a search bar, and various toolbars for filtering and saving views.

Requirements	ReqStatus	System Baseline	Safety	Verification Level	Verification Method	Verification specification	Capability	MC RWS	MW RWS 151	MW RWS 153	LW RWS	Release comment	Unique ID	Location	Package
SRQ2 The user interface for EC shall be similar to the CROWS/RWS user interface.	Proposed		<>				<>						110292	Document: 11-01 Hardware Handling (En)	11- Equip Handl (En)
SRQ5 The operational status shall use the following levels: System: Initializing - The system is starting - status is undetermined OK - No reported errors on Equipment Degraded - NOK/Degraded operational status on LRU - system may continue without LRU. NOK - LRU: Initializing - The LRU is starting - status is undetermined OK - no reported errors on LRU Degraded - NOK operational status on SRU within this LRU - LRU may continue without SRU NOK - reported NOK operational status on a SRU - LRU cannot continue to operate. SRU: OK - no reported errors on SRU NOK - reported critical errors on SRU - SRU cannot continue to operate.	Proposed		<>				<>						110293	Document: 11-01 Hardware Handling (En)	11- Equip Handl (En)
SRQ69 If the LRU or SRU operational status is NOK or degraded then the operational status in the LRU Log shall be accompanied by an error code indicating the reason for failure.	Proposed		<>				<>						110294	Document: 11-01 Hardware Handling (En)	11- Equip Handl (En)
SRQ7 In low temperature, equipment errors shall be reported as "low temp condition". System shall automatically restart when temperature enters the systems operational temperature range.	Proposed		<>				<>						110295	Document: 11-01 Hardware Handling (En)	11- Equip Handl (En)
SRQ8 The Operational Information for the System shall contain info															



# What's new?



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Easy availability to the documentation:

Upon baselining of the requirements, the documents are copied into the PDM system

60231130-00 - Windows Internet Explorer

**Subsystem Bill Of Materials**  
System 60231130-00 rev: -

Add Existing Create New Remove Selected View

<input type="checkbox"/>	Name ▲	Rev	Type	Description	State	Edit
<input type="checkbox"/>	<a href="#">60231110-00</a>	-	Subsystem	Main Capability Platform Integration (PI)	Preliminary	
<input type="checkbox"/>	<a href="#">60231111-00</a>	-	Subsystem	Main Capability Target Acquisition (TA)	Preliminary	
<input type="checkbox"/>	<a href="#">60231112-00</a>	-	Subsystem	Main Capability Surveillance	Preliminary	
<input type="checkbox"/>	<a href="#">60231113-00</a>	-	Subsystem	Main Capability Target Engagement (TE)	Preliminary	
<input type="checkbox"/>	<a href="#">60231114-00</a>	-	Subsystem	Main Capability Weapon and Ammunition	Preliminary	
<input type="checkbox"/>	<a href="#">60231115-00</a>	-	Subsystem	Main Capability Physical Protection (PP)	Preliminary	
<input type="checkbox"/>	<a href="#">60231116-00</a>	-	Subsystem	Main Capability Trainer	Preliminary	
<input type="checkbox"/>	<a href="#">60231117-00</a>	-	Subsystem	Main Capability HMI	Preliminary	
<input type="checkbox"/>	<a href="#">60231118-00</a>	-	Subsystem	Main Capability Non Functional	Preliminary	
<input type="checkbox"/>	<a href="#">60231119-00</a>	-	Subsystem	Main Capability Equipment Control (EC)	Preliminary	
<input type="checkbox"/>	<a href="#">60231120-00</a>	-	Subsystem	Main Capability: Access	Preliminary	
<input type="checkbox"/>	<a href="#">60231121-00</a>	-	Subsystem	Main Capability Configuration handling	Preliminary	
<input type="checkbox"/>	<a href="#">60231122-00</a>	-	Subsystem	Main Capability Alarm Handling	Preliminary	

# What's new?



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## Reuse of information – less effort:

- Common database – common specs.
- Common functional specs. to enable common design.
- Common test specifications.

# Whats new (ctd)?



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## Described implementation architecture:

- Architecture described on multiple level to improve product understanding and delivery configuration.
- Higher speed by starting architecture phase simultaneously as system design, incremental design.
- Higher speed in design due to documented architecture and requirement mapped to design units. The designer know what to implement.
- Architecture and design requirement are used to generate, SSDD, SRS and HRS for all units in the system.

# Whats new (ctd)?



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## Focus on work processes:

- The job leader is “forced” to delay the detail design work until the system design work has reached an acceptable level
- The designers are included in the system design work
- The system engineers are involved in creating the templates used for design documentation