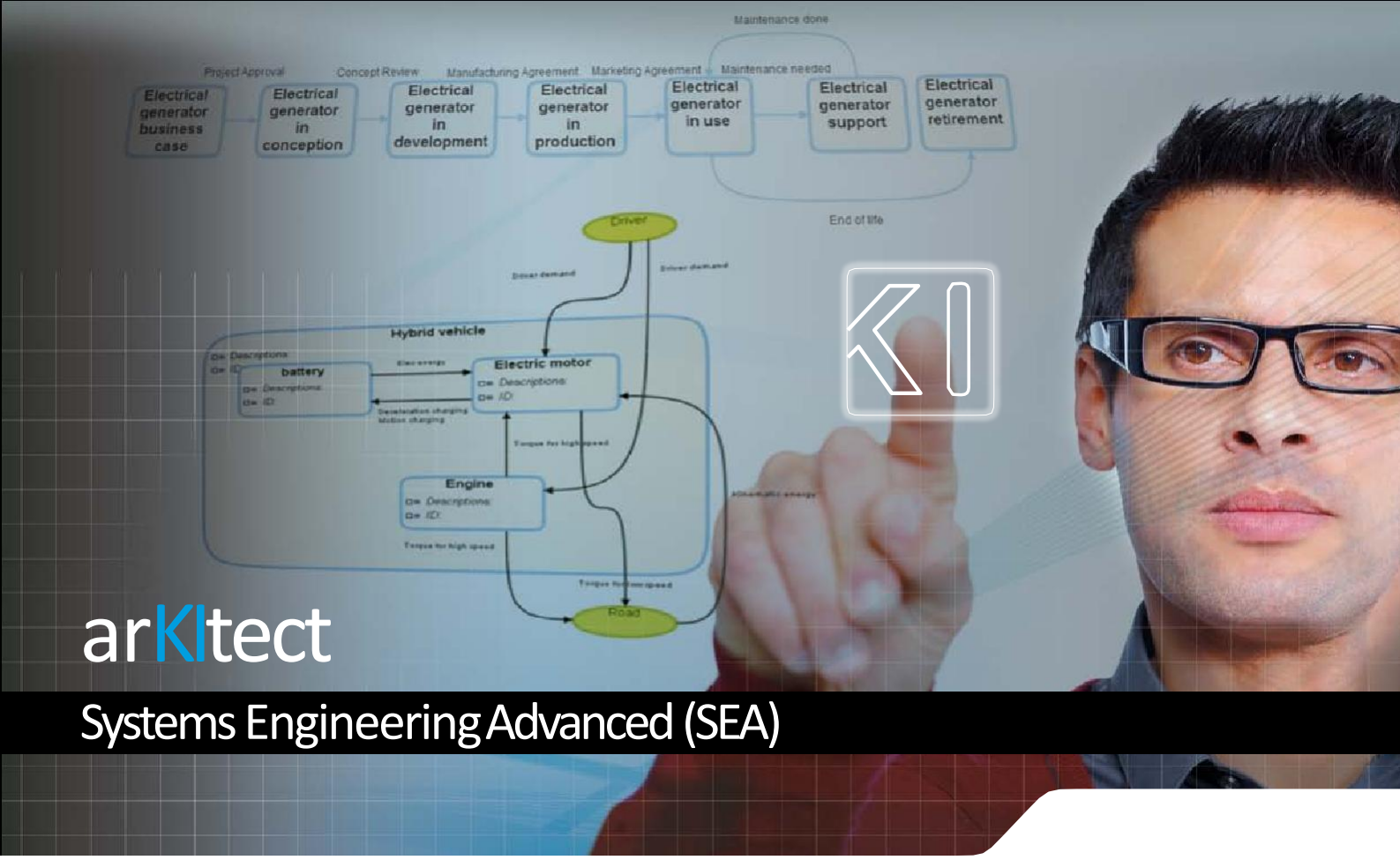
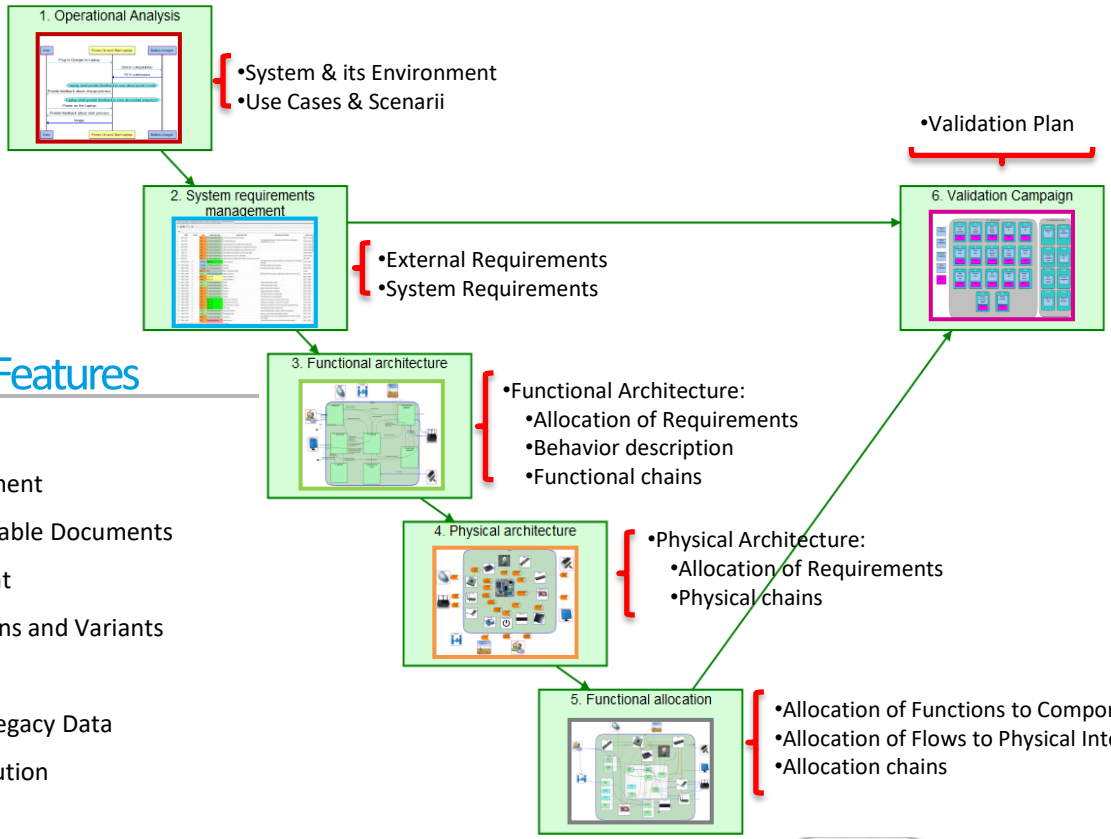


arKItect

Systems Engineering Advanced (SEA)

Systems Engineering Advanced (SEA) is a single engineering database to synchronize, verify the consistency and completness of all engineering data. It offers an easy-to-use collaborative environment for the modeling of complex systems and for the definition of systems specifications.



Key Supporting Features

- Reporting / KPI
- Configuration Management
  - Baselining of Deliverable Documents
  - Version Management
  - Product Lines, Options and Variants
- Documents Generation
- Interfacing Tools and Legacy Data
- References and Substitution
- Flow Chains

SEA is co-designed with RENAULT

This information booklet applies for arKItect SEA 6.0 or later version

arKItect is a trademark of Knowledge Inside

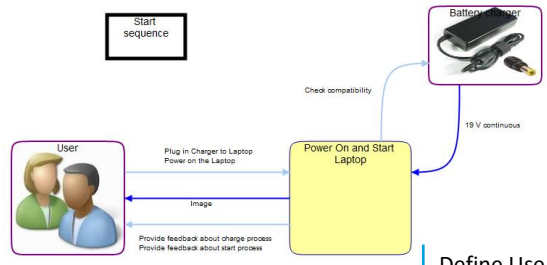
Knowledge Inside
arKItect your system

SEA supports Systems Engineering Processes

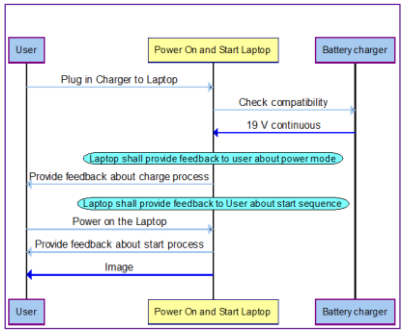
Use Cases

SEA allows you, through Use Cases (UC), to capture all the relevant needs of your system-of-interest along its whole life cycle.

- ✓ Define Use Cases
- ✓ Define physical or functional interfaces between the system and its environment
- ✓ Define other interactions between the system and its environment
- ✓ Elicit external requirements from UC analysis and add them in the UC
- ✓ Transfer automatically UC requirements in the Requirements Management view downstream
- ✓ Describe expected behavior by adding Message Sequence Chart (MSC) objects:
  - Generate automatically MSC content for any UC
  - Display and/or insert new requirements in the MSC diagram
  - See section MSC for additional information



Define Use Case

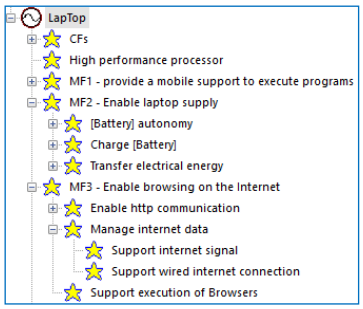


Insert requirements in MSC diagram and tell the UC story

Requirements Management

SEA allows you to define system specifications by refining existing requirements.

- ✓ Refine external requirements into system requirements
- ✓ Define/build requirements and refine them
- ✓ Set requirements types (functional, performance, safety, title …)

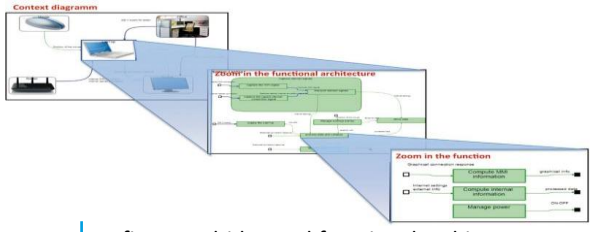


Capture and refine stakeholder requirements

Functional Architecture

SEA allows you to specify the functional architecture of your system.

- ✓ Define Functional Breakdown Structure (FBS) in a hierarchical manner
- ✓ Define physical or data flows to describe internal and external interactions
- ✓ Allocate system requirements to functions and flows
- ✓ Define behavior through state machines, phases, modes and triggers

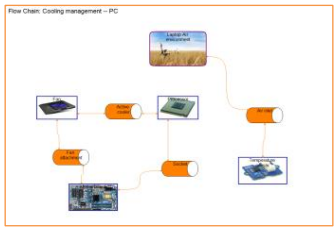


Define a multi-layered functional architecture

Physical Architecture

SEA allows you to define the physical architecture of your system.

- ✓ Define Product Breakdown Structure (PBS) in a hierarchical manner
- ✓ Define physical interfaces between components
- ✓ Allocate requirements to components and interfaces

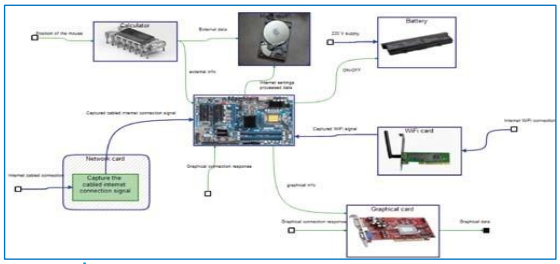


Define physical interfaces

Functional Allocation Architecture

SEA allows you to map the functional architecture onto the physical architecture.

- ✓ Allocate functions to components
- ✓ Allocate flows to physical interfaces
- ✓ Highlights allocation inconsistencies
- ✓ Define behavior through state machines, phases, modes and triggers
- ✓ Generate allocation chains from functional chains



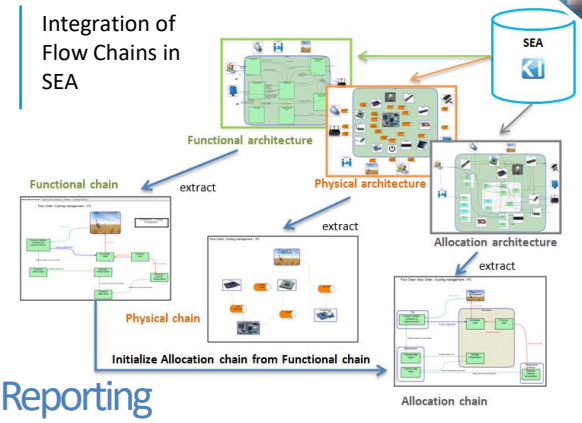
Allocate Functions to Components

Validation Plan

SEA allows you to integrate validation plans for hardware and software components.

- ✓ Define tests for requirements
- ✓ Define validation environment: validation means (Mil, SIL…), scope of requirements to be tested (from functions, components…)
- ✓ Define validation campaigns
- ✓ Capitalize tests results

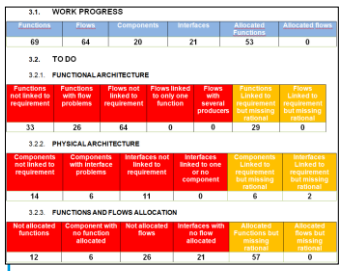
Integration of Flow Chains in SEA



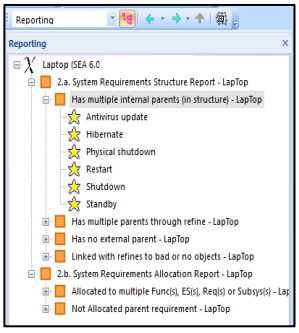
Reporting

SEA provides a Reporting enabling monitoring project progress.

- ✓ Overview of work progress
- ✓ Indicator on inconsistencies and incompleteness of requirements management (e.g. not allocated requirements, wrong requirement structure...)
- ✓ Direct link from any error to related faulty object or relation
- ✓ Reporting document generation for external requirements, internal requirements and architecture (functional and physical)



Reporting - Work progress and data checking



Reporting – Bad allocated requirements

References and substitution

SEA enables:

- ✓ Reference to any other object in an object name or description (e.g. for requirements referring to a particular function or component)
- ✓ Propagation of any change of a referenced object to all its citations

Interfacing Tools and Legacy Data

SEA includes import/export tools.

- ✓ Reqif import/export to interface with DOORS and other RM tools
- ✓ Import/Export Simulink models
- ✓ Generic import/export to Excel (Model GateWay)
- ✓ Custom import of Word documents based on templates
- ✓ Opened python API allowing interfacing with any XML, standard format or any other opened tools

Flow Chains in Functional, Physical and Allocation Architecture

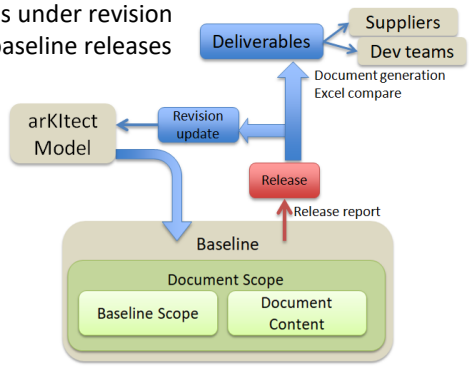
SEA allows you to focus on a set of connected objects realizing a particular feature or behavior.

- ✓ Build allocation chains from selected components
- ✓ Initialize allocation chains from functional chains
- ✓ See section Flow Chains for additional information

Baseline Management

SEA allows you to manage revisions and changes of all the requirements in generated documents.

- ✓ Define baseline scope and related document type
- ✓ Identify all changes related to requirements in the scope
- ✓ Version revision of requirements
- ✓ Generate documents under revision
- ✓ Diff comparison of baseline releases

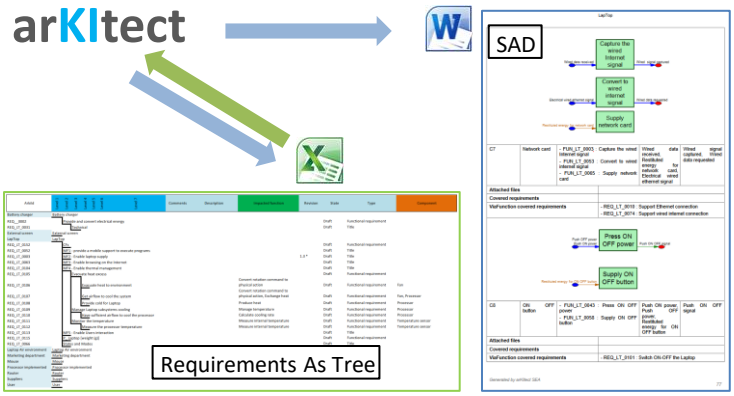


Baseline life cycle

Documents Generation

SEA allows you to automatically generate documents such as:

- ✓ System Architecture Design (SAD)
- ✓ System Technical Requirement (STR)
- ✓ System Technical Requirement Comp
- ✓ Technical Specification
- ✓ Deliverables can be generated in Excel format or in Word format
- ✓ Excel import/export to extract the needed information (e.g. Requirements allocated to a function)
- ✓ Configure scope of documents and set parameters (attributes, variants, impacted functions/components...)

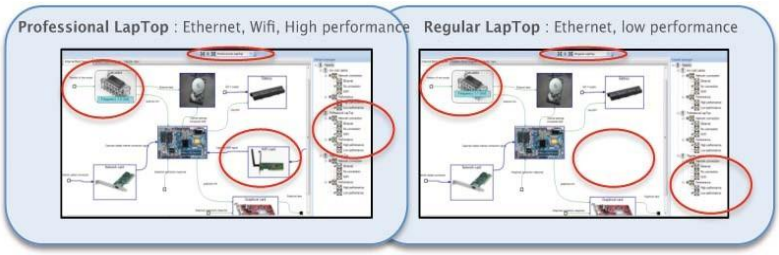


Documents format generated by arKItect

arKItect Features Benefitting to SEA

Ergonomics

- ✓ Generative views: any object relation, properties and interfaces added to the database are automatically displayed in all views
- ✓ Viewpoints available: Internal Block Diagram (IBD), Relation Block Diagram (RBD), Treeview, Tabular View and Matdraw
- ✓ Graphical drag&drop for reorganizing architecture easily
- ✓ Expand/collapse objects to visualize children objects in IBD, RBD
- ✓ Navigation: show location of an object, search by name, type, attributes… go to object location in any view and viewpoint



Variants for product line management – show/hide objects depending on selected variant

Flow Chains

Flow Chains are a powerful mechanism to describe pieces of architecture related to a particular topic.

- ✓ Objects in chains come with all their flows
- ✓ Show or hide objects, their children and the flows
- ✓ Merge several chains
- ✓ Drag & drop objects from « location window » enables performing an impact analysis based on propagation through flows

Integrated Import/Export

- ✓ Meta model
- ✓ Data from a projection/variant partially or completely
- ✓ Structure of options and variants

Other arKItect products

- ✓ arKitect Designer: build your own application

http://www.k-inside.com/web/arkitect-designer/

- ✓ arKItect WBS Builder: build your project management plan

http://www.k-inside.com/web/wbs/en/

- ✓ arKItect SoS (custom): build services or products

Key Advantages

- Intuitive tool with short learning curve
- Guaranteed coherence of all systems engineering data
- Native traceability of requirements and impact analysis through allocation mechanism
- Automated generation of documents
- Automated update and consistency of all diagrams for all users after each user modification
- Agile data model and scripting
- Return on experience and expertise of support team in systems engineering and project management

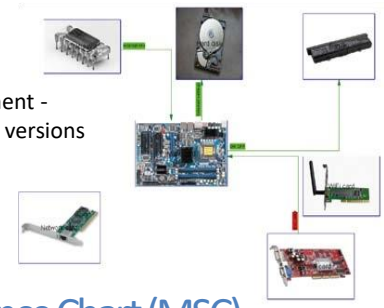
Collaborative

- ✓ Enable multi-access to the systems engineering database and manage collisions
- ✓ Keep track of any modification by any user

Configuration Management

arKItect provides support for change and diversity management.

- ✓ Database version management
- ✓ Object version management
- ✓ Diff and merge at database level.
- ✓ Variants management transverse to the database:
  - Define options for objects
  - Configure variants for a set of options
  - Show/hide objects in views and viewpoints
  - Run all programs according to selected variant



Configuration Management - Diagrams for comparing versions

Message Sequence Chart (MSC)

arKItect provides a behavior description according to UML Message Sequence Chart (MSC).

- ✓ Auto generation of MSC for any chain diagram
- ✓ Synchronization between IBD and MSC diagram
- ✓ Possibility to insert any object (e.g. Requirement) under any actor
- ✓ Can be customed for any meta model and view

Agility

- ✓ A custom Gateway with Excel to create import/export
- ✓ Comprehensive scripting API in Python programming language enables programming any sequence of user actions

Administration

- ✓ Show/hide views
- ✓ Manage users' rights

Custom Complementary Modules

System Engineering Advanced can be complemented by:

- ✓ Safety analysis HARA, FMEA
- ✓ ISO 26262 Functional Safety Concept modelling
- ✓ Interfacing System Engineering and Simulation: Model Identity Cards
- ✓ Parameters: capture and manage dimensioning parameters under requirements

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