THALES

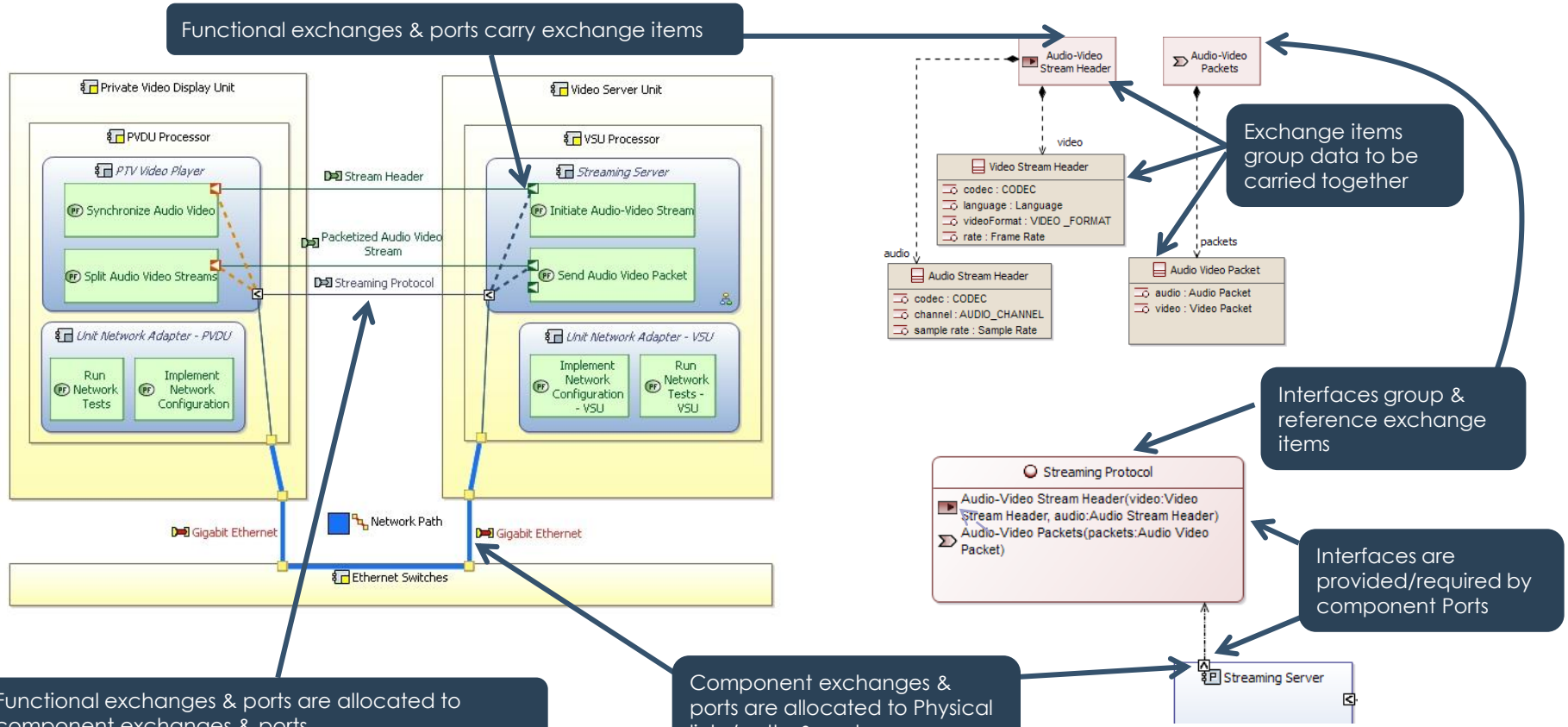
Capella and Arcadia
Functions-Structure-Interfaces

INPUTS FOR SYSML V2 WG – JUNE 20TH, 2017

Stéphane Bonnet
In charge of Thales Corporate MBSE Coaching & Community
Capella Design Authority

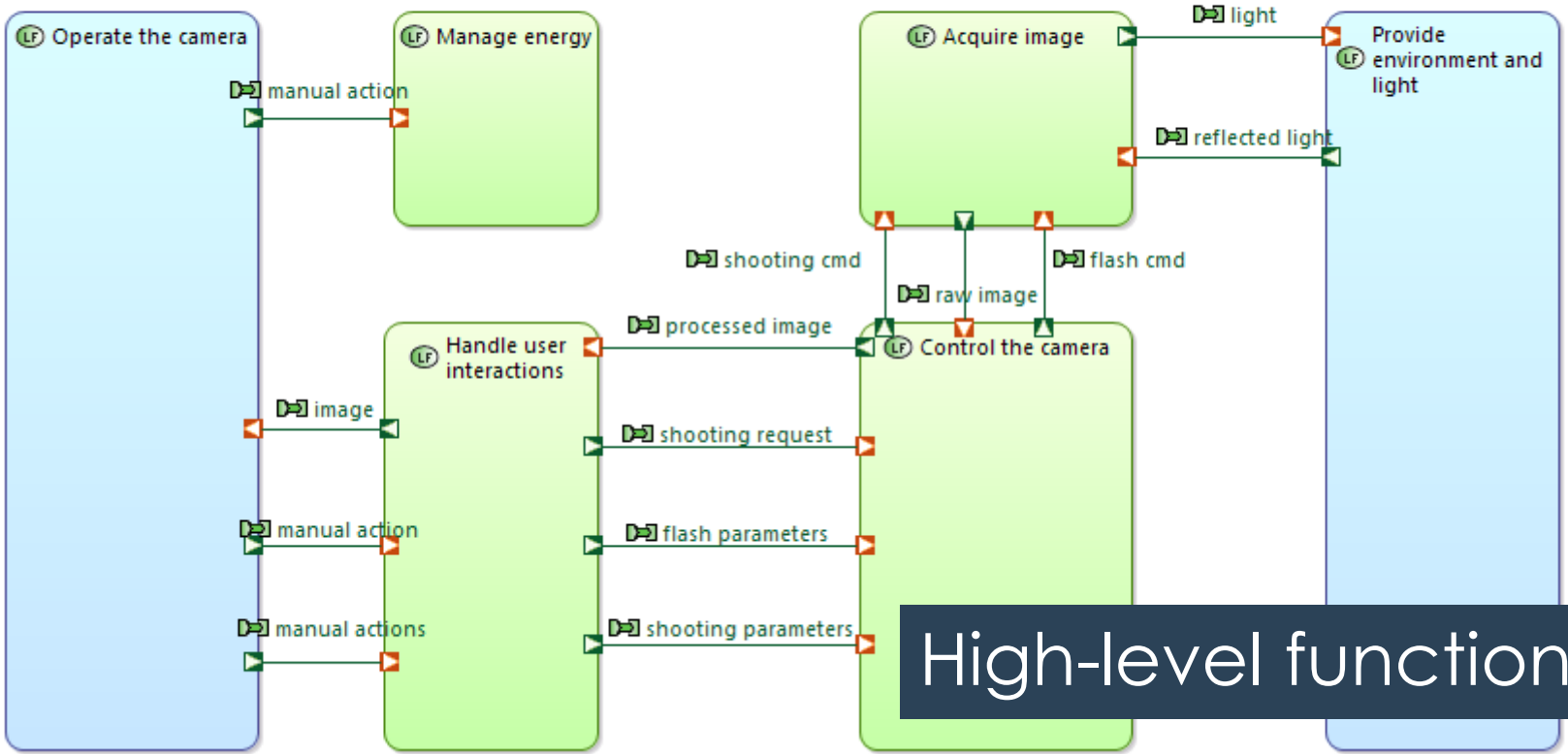
stephane.bonnet@thalesgroup.com

The big picture

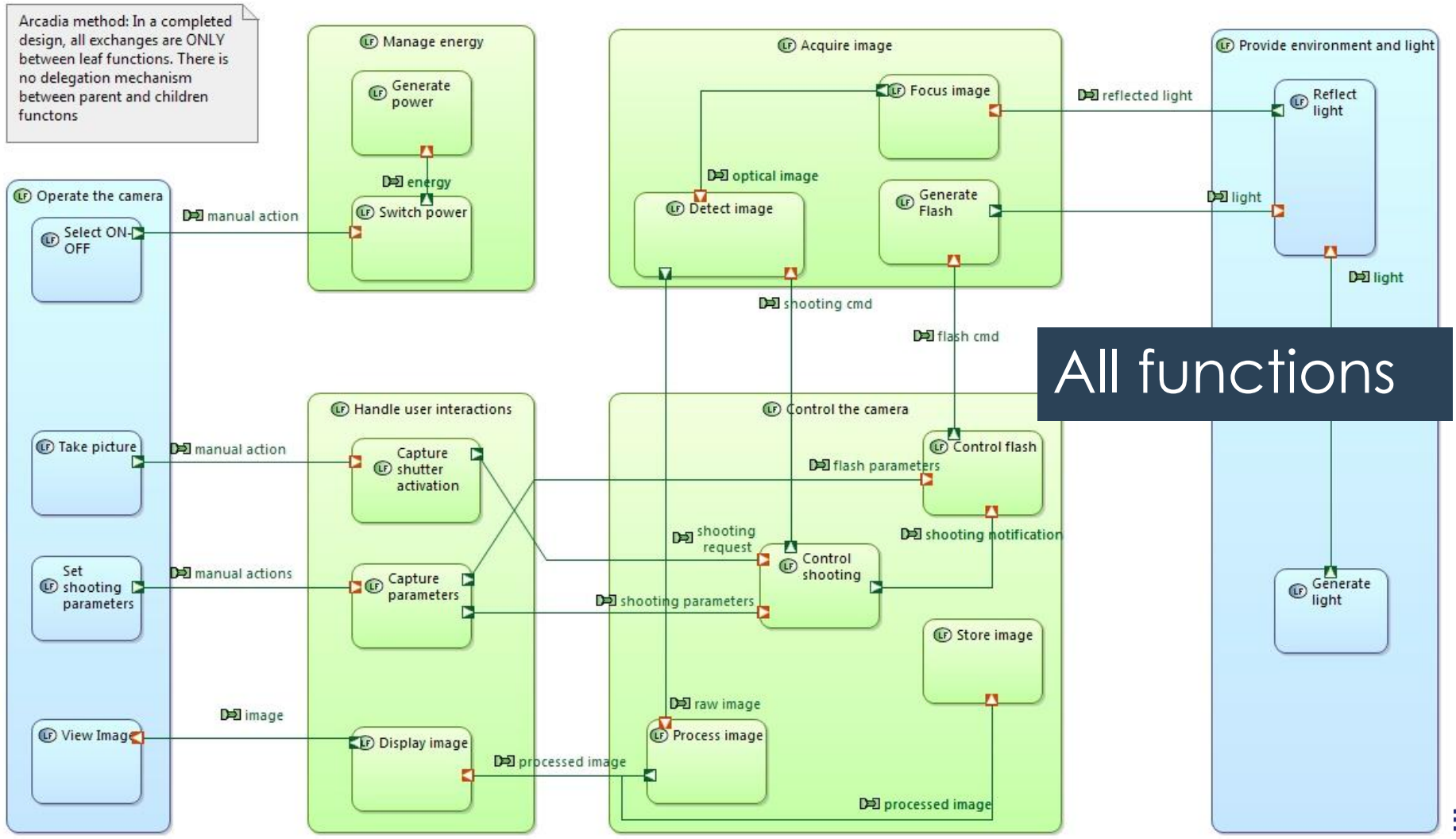


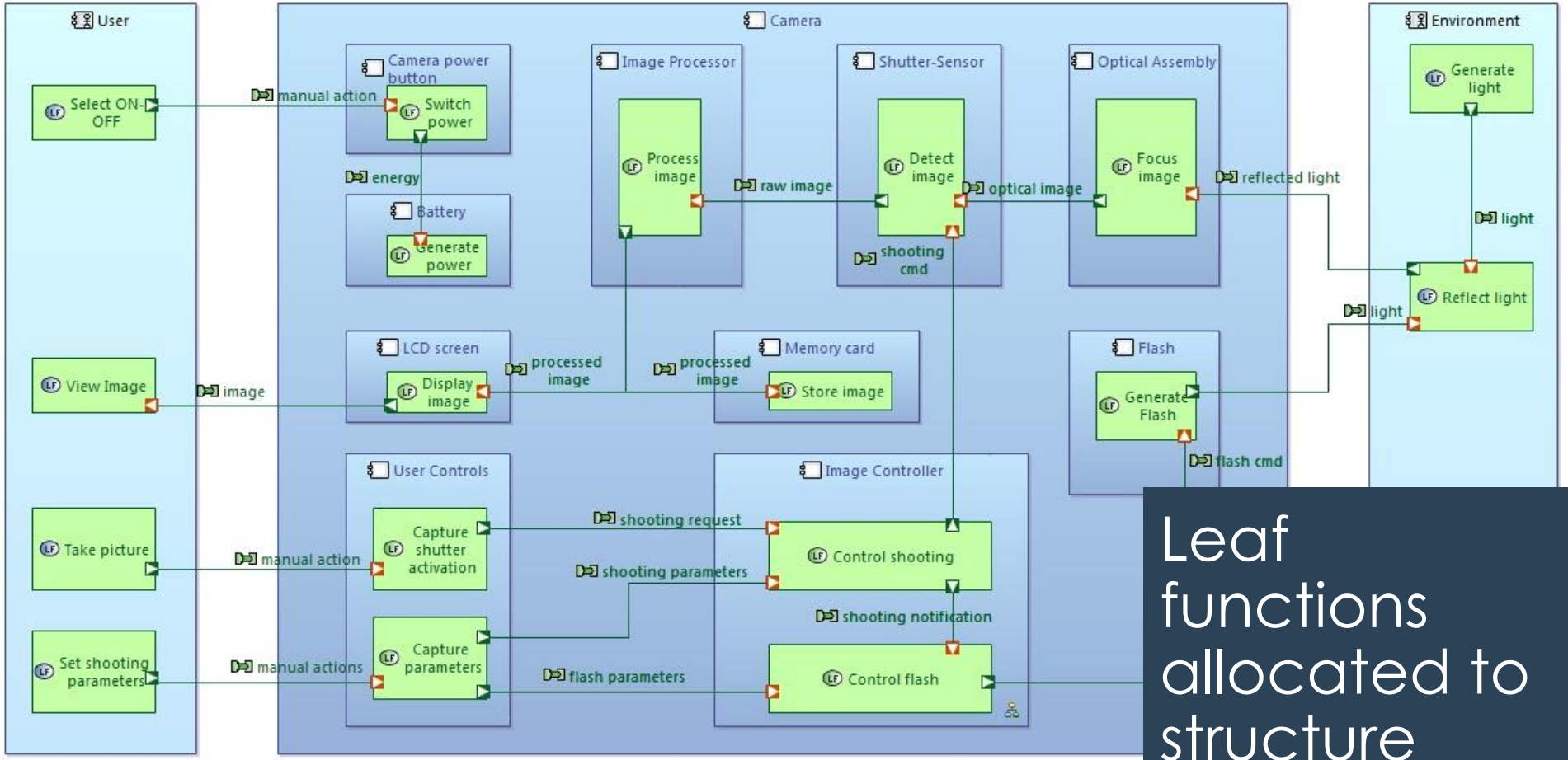
The example illustrated in the following slide is an adaptation of the example used by the SysML v2 Working Group. It is not the most accurate description of a real Camera design.

Exchanges between functions are actually computed based on the exchanges existing between child leaf functions (which are not displayed on this diagram)



High-level functions

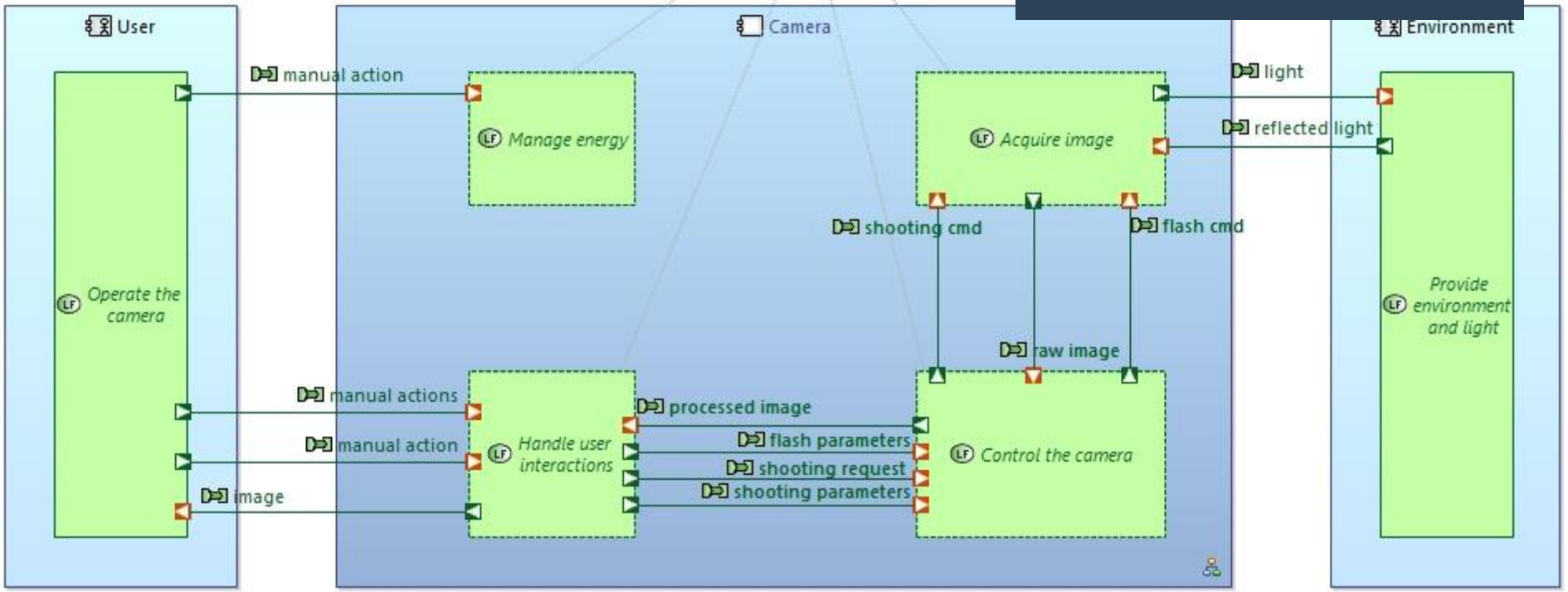


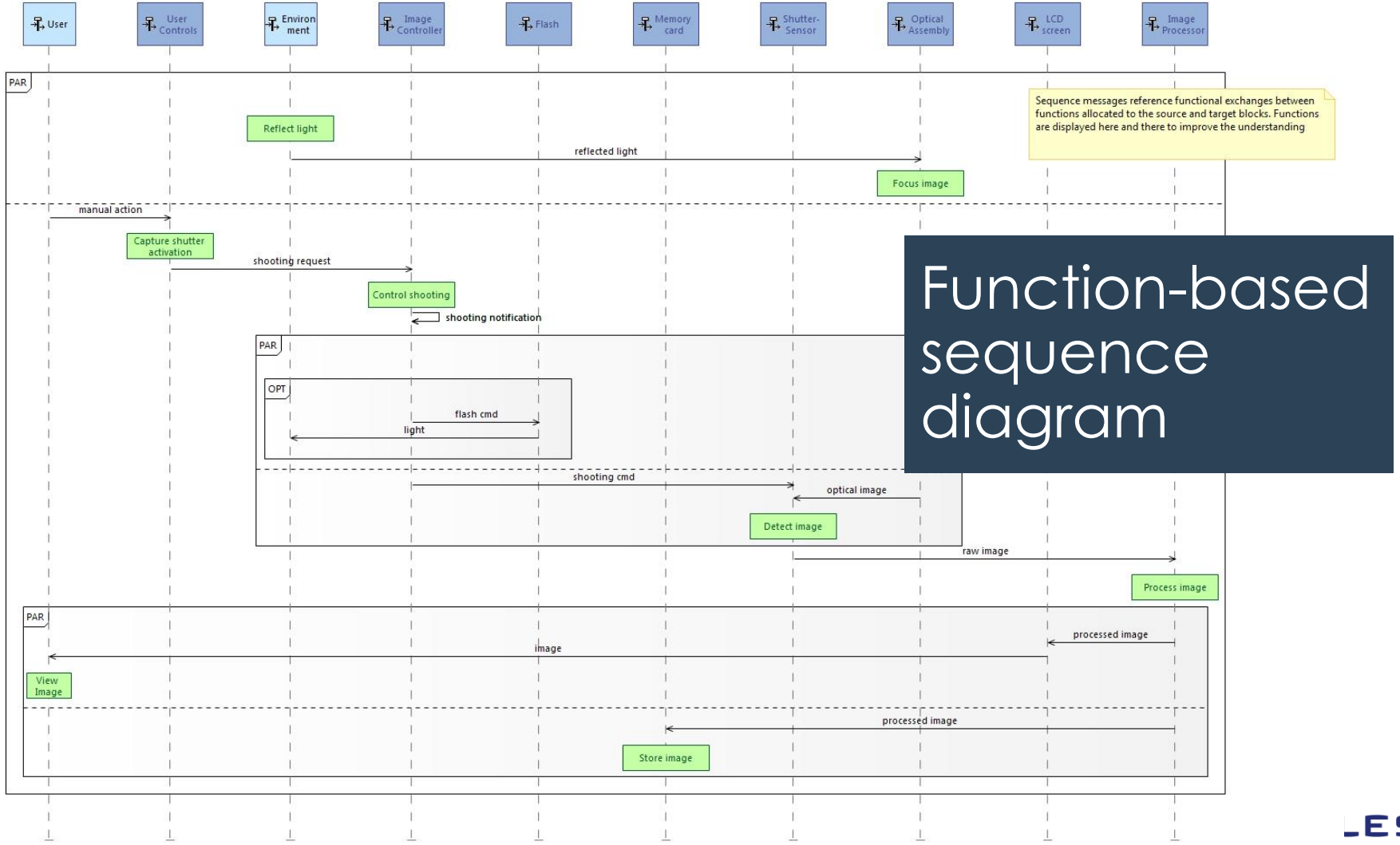


Leaf functions allocated to structure elements

The level 1 functions can be visualized on the Camera component even though there is no real allocation relationship in the model between the parent functions and the Camera component (this is the meaning of the Italic labels of functions). These functions can be visualized because all their children functions are actually allocated to sub components of Camera ((this is the meaning of the dashed borders of functions)

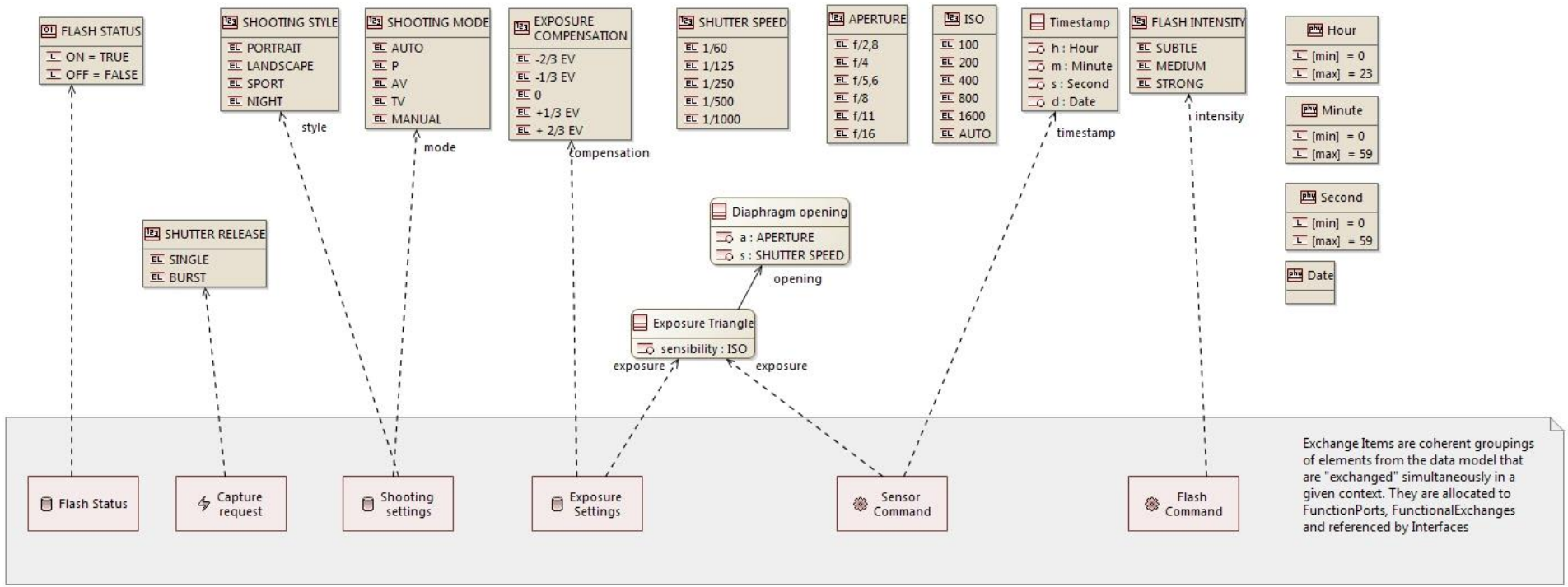
Graphical, computed simplified view





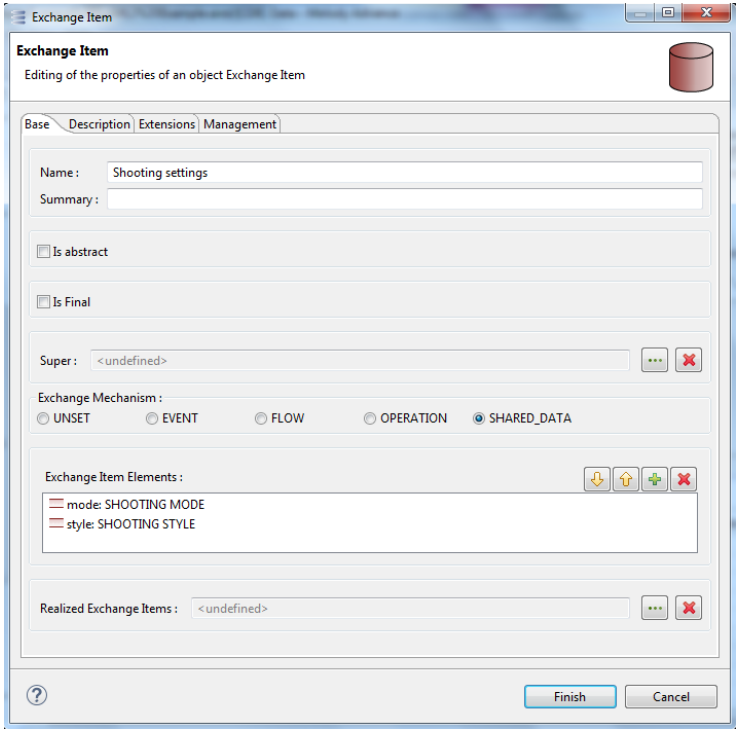
Function-based sequence diagram

Data model

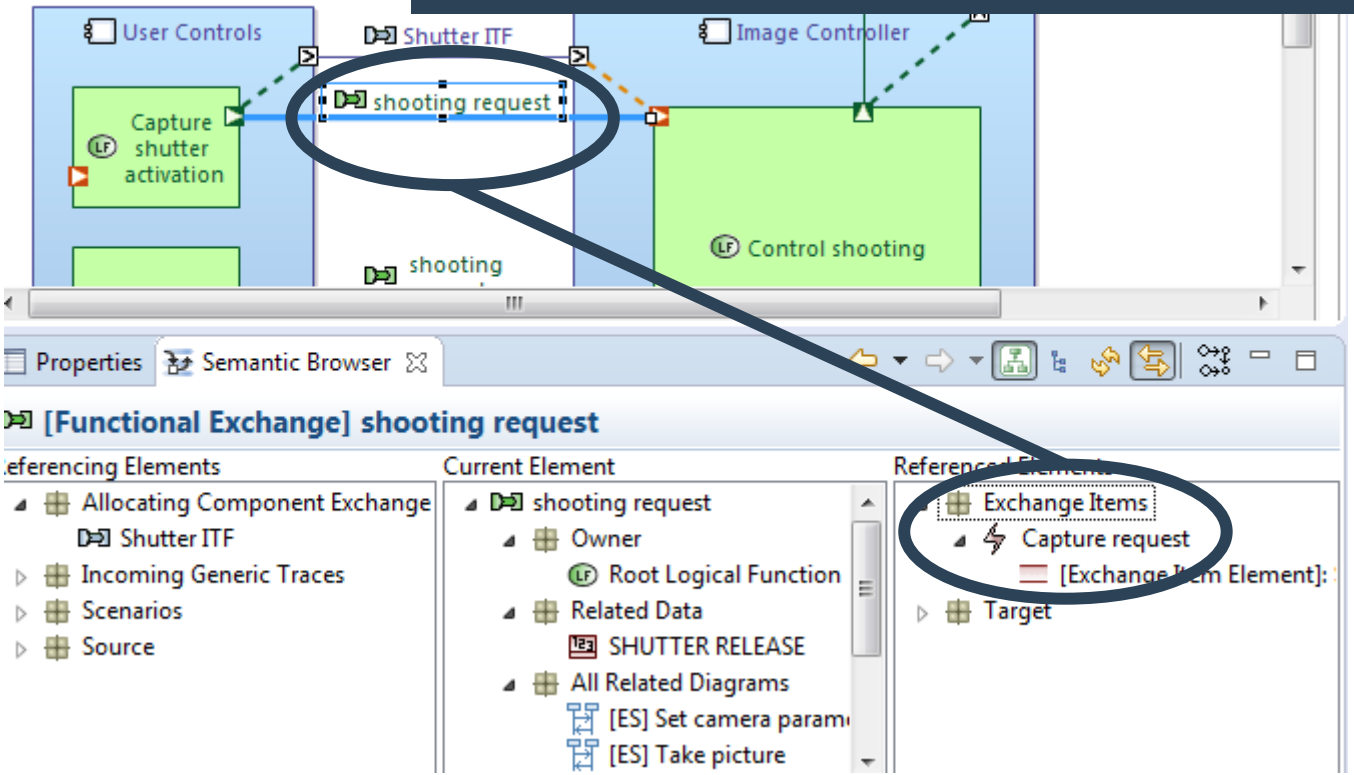


Data model

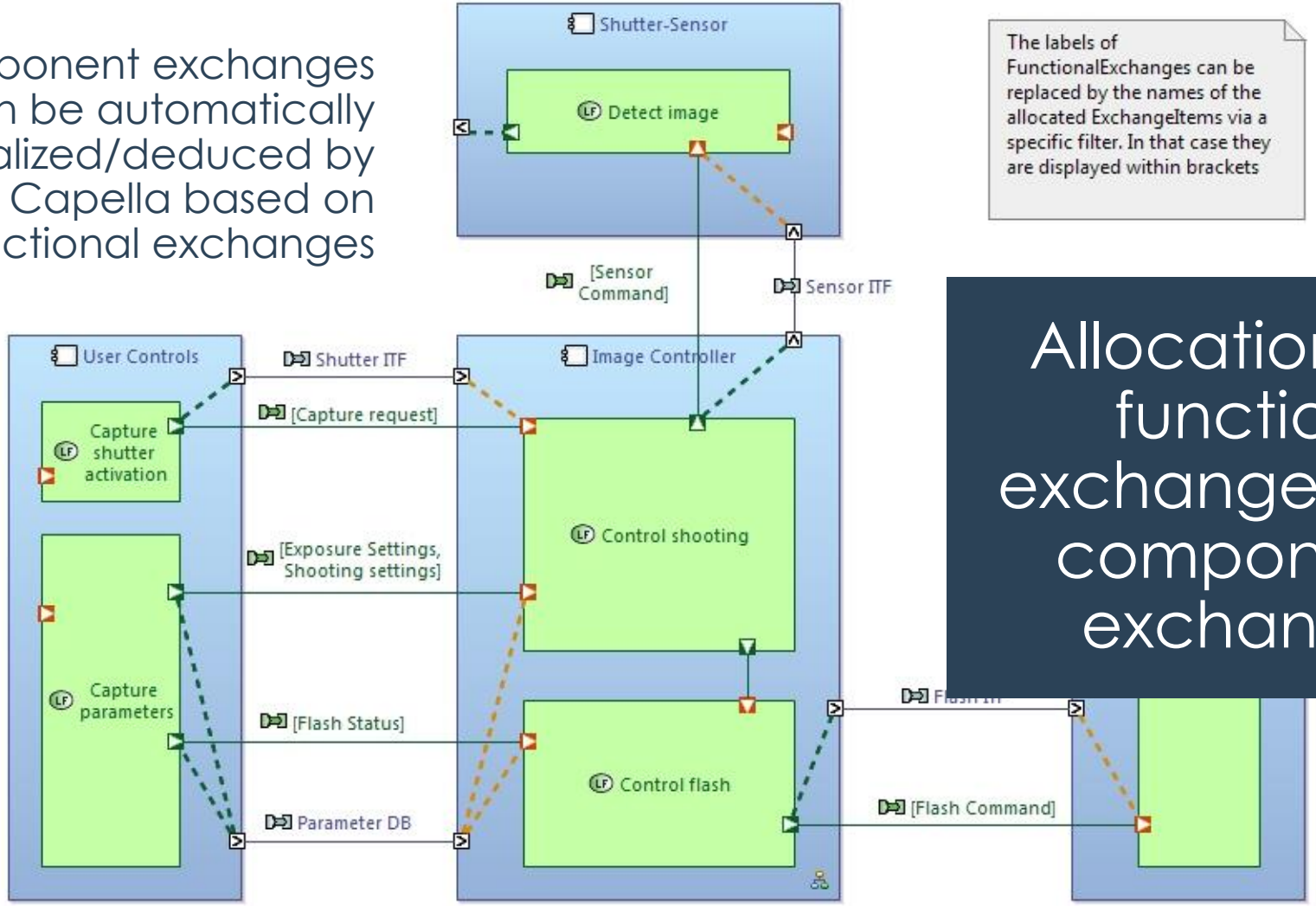
A « communication mechanism » can optionally be set on every Exchange Item



Allocation of Exchange Items to Functional Exchanges



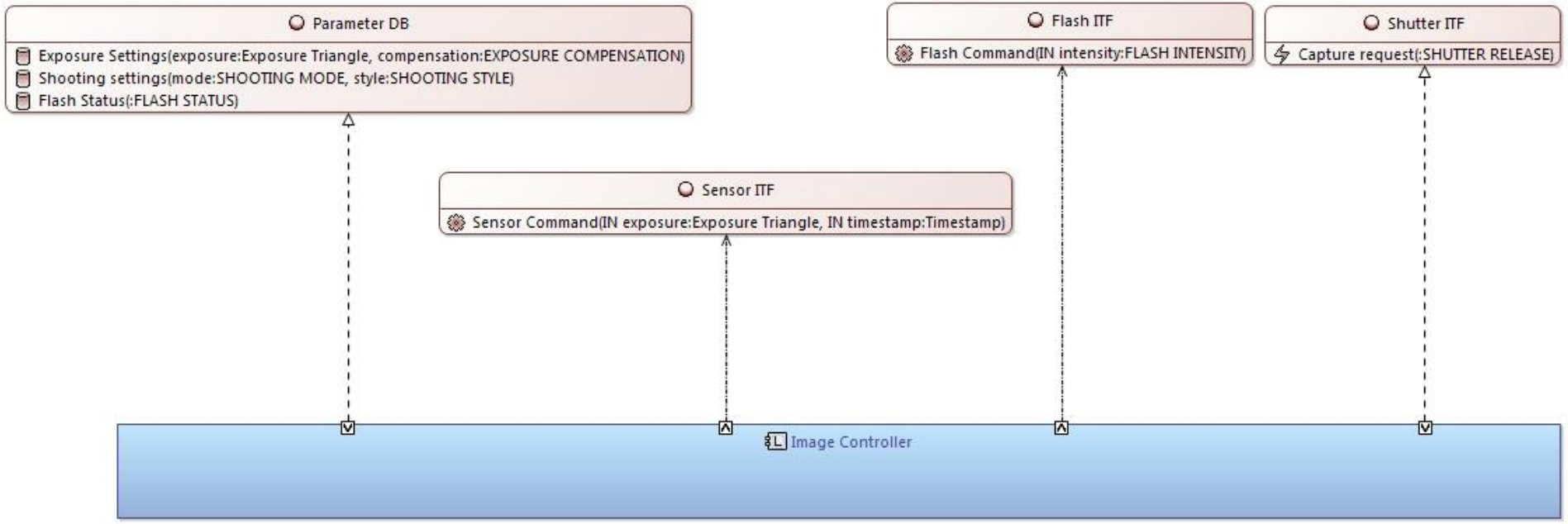
Component exchanges can be automatically initialized/deduced by Capella based on functional exchanges



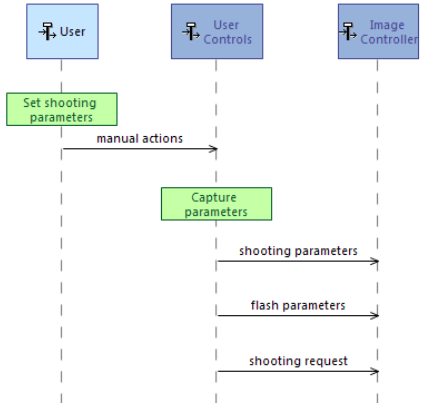
Allocation of functional exchanges to component exchanges

Interfaces between components

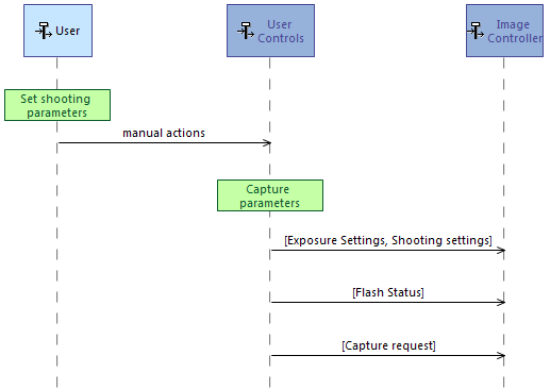
Interfaces can be automatically initialized by Capella, based on previous allocations.
Dedicated model validation rules detect gaps in interfaces between structural elements and functions



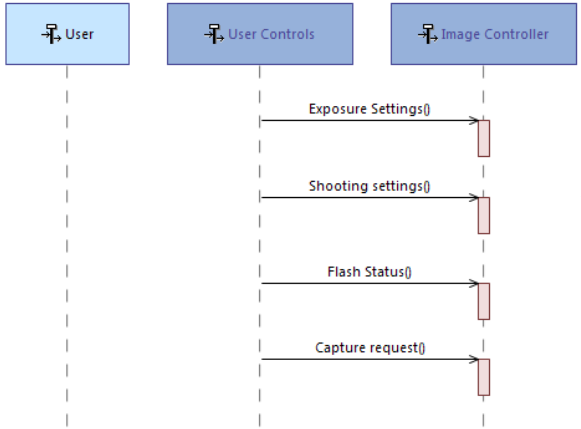
Different kinds of sequence diagrams



Function-based scenario, label of sequence messages if the name of functional exchanges

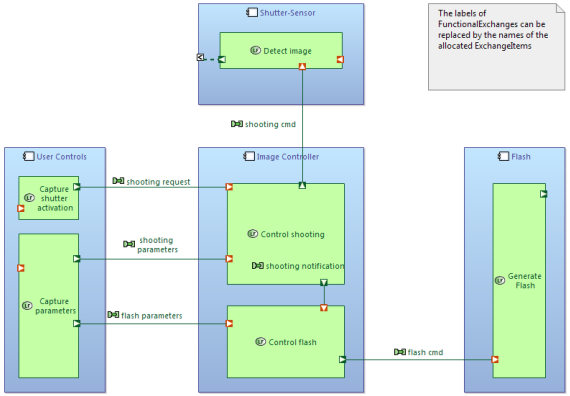


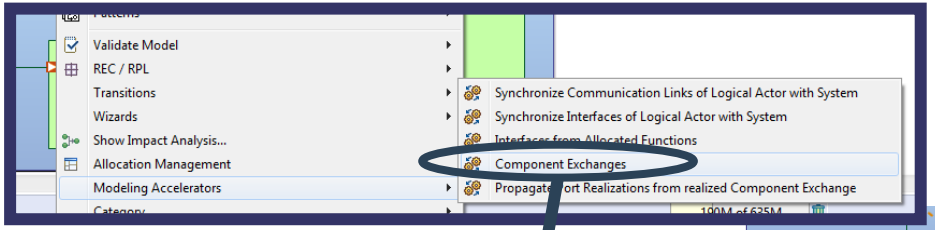
Function-based scenario, label of sequence messages if the name of allocated Exchange Item (can be a subset)

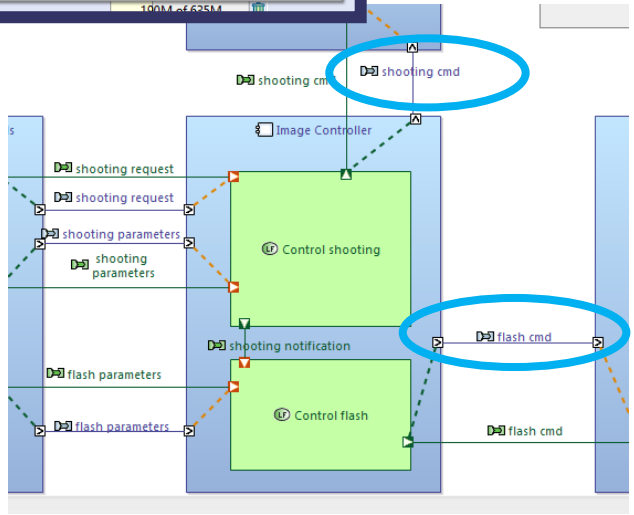


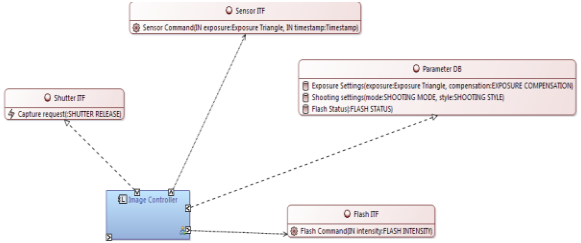
Interface scenario, no reference to functions anymore

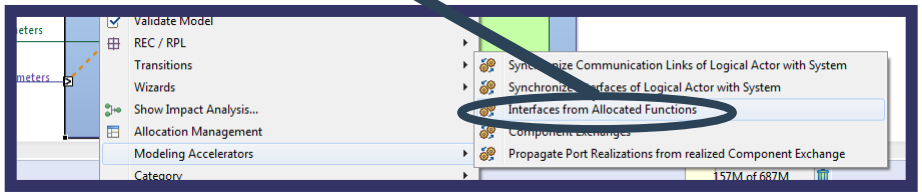
Step by step model building











Limitations – Way forward

… or why we are interested in the current SysML v2 work on interfaces

- The interface provide/require concept is not natural for most system engineers. It is too SW-oriented. We like the idea of having components participating in interfaces and playing roles instead.
- We need to describe interfaces with protocols (using mechanisms like sequence diagrams, state machines, etc.).

Capella

Open Source Solution for Model-Based Systems Engineering

Download:
http://polarsys.org/capella/download.html