**Data Model for OpenETCS project**

This document contents the list of items to take into account during the modelling activities, how to describe them and how there are linked.

**List of items:**

* Type
* Requirement
* Function
* Functional Block
* Variable
* Constant
* Packet

All the items are identified by:

* an ident: this ident shall be unique and allow to identify exactly the item. How to be defined the ident depend of the tools to manage the repository of items
* a name: the name is defined according naming convention (see first proposal <https://github.com/openETCS/validation/wiki/Verification-Artifacts-Styleguide>) and shall allow to identify the class of items (requirement, variable, function,...)

In the case that uniqueness is ensured on the names, and depending on the tools selected, we can avoid to use “ident”.

**Type:**

* Boolean
* Integer
* Floating point
* T\_text: textual description
* T\_ident: based on a textual description
* T\_Version = {3.0.0, 3.3.0}
* T\_VariableNature = {Acceleration, Distance, Gradient, Length, Miscellaneous, Number, ClassNumber, IdentityNumber, Qualifier, TimeDate, Speed, Text}
* T\_SourceDocument = {subset-26, subset-34}
* T\_Definition : a textual and graphical description (all kind of picture, table and diagram are allowed)

**Requirement: T\_Requirement**

It is identified by the following attributes:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the requirement |
| Nature | 1 | * Structural * Functional * Definition |  |
| Source | 1 | T\_SourceDocument | the document where the requirement is defined the first time (SRS, FIS, SSRS,...) |
| Discussion | 1 (Optional) | T\_Text | Discussion or comment to clarify or justify the requirement |
|  |  |  |  |

Requirements are links together by mother-child relations:

* a requirement can be refined (description can be clarified) in a child requirement
* a requirement can be split in several child requirements
* a requirement can be derived from several mother requirements

**Variable: T\_Variable**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the variable |
| Source | 1 | T\_SourceDocument | the document where the variable is defined the first time (SRS, FIS, SSRS,...) |
| Nature | 1 | T\_VariableNature | Nature of the Variable (Acceleration, Speed, Ident,...) |
| MinimalValue | 0..1 | T\_Text |  |
| MaximalValue | 0..1 | T\_Text |  |
| SpecialValue | 0..n | T\_Text |  |
| Allocation | 1 | * Interface * Packet * Internal |  |
| *Requirement* | *1..n* | *T\_Requirement* | *The set of requirement which defined the variable (at least one)* |
|  |  |  |  |

**Constant: T\_Constant**

*Do we need to separate Variables and constants ?*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the variable |
| Source | 1 | T\_SourceDocument | the document where the variable is defined the first time (SRS, FIS, SSRS,...) |
| Nature | 1 | T\_VariableNature | Nature of the Variable (Acceleration, Speed, Ident,...) |
| Value | 1 | T\_Text |  |
| Allocation | 1 | * Interface * Packet * Internal |  |
| *Requirement* | *1..n* | *T\_Requirement* | *The set of requirement which defined the constant (at least one)* |
|  |  |  |  |

**Function: T\_Function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the function |
| *Input* | *0..n* | *T\_Variable* | *Input variables of the function* |
| *Output* | *0..n* | *T\_Variable* | *Output variables of the function* |
| *Local* | *0..n* | *T\_Variable* | *Main internal variables of the function used to describe it* |
| *Parameter* | *0..n* | *T\_Constant* | *Main constants and parameters used to describe the function* |
| *Requirement* | *0..n* | *T\_Requirement* | *Requirements allocated to the function* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
|  |  |  |  |

Functions are linked together by several kind of relation:

* mother-child relation: a function is split in several sub-functions
* sequential relation: a function shall occur before an another

**Functional Block: T\_FunctionalBlock**

*Are functional blocks really necessary ?*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the function |
| *Function* | *1..n* | *T\_Function* | *Set of function of this block* |
|  |  |  |  |

**Packet: T\_Packet**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Textual and graphical description of the packets |
| *Data* | *0..n* | *T\_Variable* | *Set of external variable transmitted* |
| Sender | 1 |  |  |
| Receiver | 1 |  |  |
| *Requirement* | *1..n* | *T\_Requirement* | *The set of requirement which defined the packet (at least one)* |
|  |  |  |  |

**Links :**

