|  |  |  |  |
| --- | --- | --- | --- |
| Minutes of Meeting | | Document no. | Page |
| Click here to enter text. | 1 of 1 |
| Rev.: 01 |  |
| Subject | | | Meeting no. |
| MOM workshop AML Library v0.0.11 | | | 1 |
| Date | Time | Location | |
| 21.06.23 | 9.00 – 15.00 | Teams & Aibel Asker | |
| Minutes by | | | Date for sign. |
| Coralie Denisey | | | 21.06.2023 |
| Participants | | | |
| AKER BP: Ben Landa  AIBEL: Coralie Denisey, Mette Arentz Oestmo, Vegard Blomseth Johnsen  AKER SOLUTION: Siba Misra, Petr Simunek, Sachinraj Sundarraj  MID TECHONOLOGY: Aleksandr Sokolov  EQUINOR: Idar Pe Ingebrigtsen, Anna Kristin A. Helgøy, Ashoka Konguje  ABB: Erik Berg  EATOPS: Corentin Pane  AIZE: Petter Andersen  SIEMENS: Gizem Gueler, Frank Nolting  AUCOTEC: Jérôme Anguenot, Leon Hanke  HONEYWELL: Trond Skullerud | | | |
| Absent | | | |
|  | | | |
| Copy to | | | |
|  | | | |

The following open points for AML library version 0.0.11 have been discussed during the workshop:

1. **Possible optimization of NorsokSignalClass collection.**  
   Removal of specific signal classes like “AHH”/”ALL” and addition of more generic signal classes like “BinaryOut”. Specific terminal names would still be part of object (FB, EFB, etc.) classes, e.g. MA block would have AHH terminal of BinaryOut class.

GitHub - [Optimize NorsokSignalClass collection from 149 terminal named classes to ~10 classes named after their characteristic features · Issue #3 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F3&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939792697%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=4G4LmzUM4oeDUuj0fxArCE9xo8E5sgQ6wMoMndlBZ2g%3D&reserved=0)

**Action**: Agreed to proceed with the suggested change, to be included in version AML Library v.0.0.11

1. **Overall sequence timeout**

GitHub - [Overall sequence timeout duration is missing in library · Issue #53 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F53&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=AHCDeoCyMzrJQu44YwOWY1eP3D8MmA038%2B7D2C4s93Y%3D&reserved=0)

Individual step timeout duration is currently mapped to ‘TMax’ attribute of ‘Step’ class and timeout action is mapped to ‘SequenceFlowTimeout’ interface of ‘Step’ class. ‘SequenceFlowTimeout’ has ‘Annunciation’ attribute, which was made to be consistent with IEC63131 Event/Warning/Alarm usage on simple FB’s (like BXH / WH / AHH).

A screenshot of a computer program

Description automatically generated with medium confidence

For consistency, it is possible to follow similar approach for overall sequence timeout. In this case ‘TMax’ attribute and ‘SequenceFlowTimeout’ interface would be added to ‘Start’ class.

There is no overall sequence timeout representation on SFC currently defined in IEC63131.

Previously it was discussed to add T MAX on right side of sequence start symbol:

A screenshot of a computer

Description automatically generated with medium confidence

**Action**: Agreed to proceed with the suggested change, to be included in version AML Library v.0.0.11. IEC63131 committee to look at including the change in the next revision of the SCD standard. Agreed to close GitHub issue #46 without changes to AML library.

1. **Terminal information in sequence flags**

GitHub - [Use of Sequence Flags and mapping to AML · Issue #69 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F69&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=hvQgYqMBq5GxdxeDts3sTgL9RUFXmvQ8cqJyKDFnSbg%3D&reserved=0)

Also [New Input and Output pins for Actions and Conditions to connect references · Issue #46 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F46&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=IQv6yUj8Lk4hX87OdxIx4z%2BHAD7z6JdjENIyNXXGBOE%3D&reserved=0)

During export to AML existing ‘SignalToSequence’/’SignalFromSequence’ classes are to be used (no change is needed to library itself). 3 separate ‘SignalToSequence’ instances would be created in examples above.

Each ‘SignalToSequence’ instance would have Reference attribute set to ‘02’ or ‘31’.

Terminal info from SCD will be used for appropriate linking to FB terminals in AML.

Linking to specific FB terminal in AML introduces issue when same terminal is used in more than one sequence and/or logic on SCD.

‘Or’/’Split’ should be generated in AML to handle this issue. Similar approach was used to handle Shutdown Hierarchy export.

Disadvantage of this approach is that ‘Or’/’Split’ is not present on SCD and its Tag is introduced during AML generation. Due to different tagging requirements from different projects/SAS vendors, it seems to be not possible to set generic tag generation rules. Therefore, generated Tags should be stored (as service info) in SCD drawing/AML export software to ensure Tag persistency.

A picture containing text, diagram, plan, line

Description automatically generated

Combined flag options of presentation on SCD:

* 1. Flags from/to different sequences are separate:

A picture containing text, diagram, number, font

Description automatically generated

* 1. Flags from/to different sequences are combined:

A screenshot of a graph

Description automatically generated with low confidence

**Action**: To include “Sequence In” and “Sequence Out” terminals to all function blocks that can be used in a sequence. To keep the simplified view on SCDs, SAS supplier to handle introduction of additional “OR” / “Split” as they see necessary.

1. **CommunicationType attribute – naming of possible values**

GitHub - [Update LegalValues for terminal attribute detail “CommunicationType” as per IEC PAS 63131? · Issue #68 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F68&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=wJpiKyK%2B6UykKrPHKbSaHg2GYS9%2F7uTC9CbNGS1%2BSZo%3D&reserved=0)

                Proposal to completely follow IEC and change possible values as per IEC:

                ‘GeneralSignal’

                ‘DataCommunicationLink’

**Action**: Agreed to proceed with the suggested change, to be included in version AML Library v.0.0.11

1. **Custom EFB (#) – possibility to define arithmetic formula in AML**

GitHub - [Define a mechanism/attribute to hold the function defintion for a custom arithmetic function ('#'-notation EFB) · Issue #66 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F66&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=%2BUfsWCKOzpT4YGwN7Bm77okk2IaycrQGNQV%2FpkEomts%3D&reserved=0)

Currently custom EFB could be defined as ‘VendorElementaryFunctionClass’ (as a blackbox, without info about internal implementation).

If arithmetic formulas will be allowed to be defined by engineers - SCD creators, rules for formulas should be defined and precise following of those rules should be ensured.

E.g. ‘=’ symbol is comparison operator in IEC63131, then assignment operator should be for example (as in GitHub issue proposal) ‘:=’. And this should be followed when creating SCD’s.

A picture containing text, screenshot, number, font

Description automatically generated

**Action**: To add the possibility to write the Formula as attribute. IEC63131 committee to look at limitation of arithmetic operators allowed, as more complex calculations can be defined better as Vendor specific #EFBs.

IEC63131 committee to also recommend “structured text” according to IEC61131 as the allowed language or to assess if other language type can be used with the concerned that open language can be a way in for bugs.

1. **Common hysteresis parameter on CA block**

GitHub - [Remove common "Hysteresis" parameter from NorsokFunctionBlockClass CA? · Issue #59 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F59&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=5QKRaKz5ugRPPPn5MKj6NdP%2Fd0pQpDxcu5Ylsj8N4Bg%3D&reserved=0)

Hysteresis of WV should not represent PID deviation dead band, because those parameters are different by definition.

WV.Hysteresis represents warning limit hysteresis.

And PID controller deviation dead band represents input value and setpoint max deviation, when controller is not reacting.

IEC 63131 states “Controller deviation dead band shall be available” but doesn’t list appropriate parameter for CA block.

Should it be added to AML CA FB?

Should it be added to IEC63131?

**Action**: IEC63131 committee to look into the PID controller deviation dead band definition and consider adding it to parameters list of CA block (IEC63131 table A.4.3.2.3). Agreed to keep common hysteresis parameter in AML library.

1. **Graphical info of signal lines routing on SCD’s**

GitHub - [Is there a way to add attributes to InternalElements or should we add a SystemUnitClass for GeneralSignal? · Issue #57 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F57&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=1XmBkuQ8NEwT%2FgBK15lunQwc%2BGGGdwo9tACiXNIVSa0%3D&reserved=0)

In previous discussions in 2022 it was concluded that graphical line routing information is not relevant for AML export. Can we finally conclude it?

**Action**: Graphical information added to AML is also being look at by the DEXPI initiative. Equinor is inviting to open a work group to look at this topic together with the AML organization.

1. **Signal source info in shutdown reference triangles**

[Add unambiguous signal source definition behind shutdown reference triangles (when split and used in logic) · Issue #34 · equinor/iec63131 (github.com)](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fequinor%2Fiec63131%2Fissues%2F34&data=05%7C01%7C%7Cadd0a359ae3c4b53691708db6fb5d249%7C306bb27fa230403ba4362e5cd45b8ec0%7C0%7C0%7C638226598939948910%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=tGVn9IWog0PvS3EQUfdXoJWb%2F2df%2BvaIexoy%2B39zpoU%3D&reserved=0)

**Action**: To add possibility to register a tag into the shutdown reference triangles in version AML Library v.0.0.11. Projects to agree if this shall be used or not.

1. **Updating of device library.**

For example, CheckValve class currently inherits from ManualValve, and manual valve is inheriting from Valve class. Valve class has “hasOpenLimitSwitch”/”hasCloseLimitSwitch” attributes and due to inheritance, those parameters are also present on CheckValve. Inheritance structure and attribute allocation should be changes in this case.

Proposals:

1. Remove “hasOpenLimitSwitch”/”hasCloseLimitSwitch” from parent Valve class.  
   Add explicit “hasOpenLimitSwitch”/”hasCloseLimitSwitch” to “BlockValve”, “ControlValve”, “ManualValve”. Also to “SolenoidValve”?  
   Make “CheckValve” to be child of “Valve” (Currently child of “ManualValve”)  
   Those changes will remove “hasOpenLimitSwitch”/”hasCloseLimitSwitch” from “SafetyReliefValve”, “CheckValve”, “SelfregulatingControlValve”.
2. Add “In” interface to “SelfregulatingControlValve”. There are self-regulating (mechanical) control valves with possibility to remotely set setpoint.
3. Add “Strainer”? For info - currently “Filter” is part of AML library and is child of “StaticProcessingEquipment”.  
   Also, should “Filter” and (if added) “Strainer” be “InlineDevice” children?

If other changes to Device library would be needed in future, can approach, described in 10.b be used?

**Action**: 9.a. to be implemented in version AML Library v.0.0.11

9.b. to also add “In” interface to the Self regulating control valve, but perhaps a new more global point to be opened to find another naming for the inputs of Signals to devices. To consult with DEXPI initiative for a possible alignment of terminology.

9.c. It is explained that a few devices were added in the initial AML Library but the list is not meant to be exhaustive. If the devices added do not have a meaning on a SCD because they don’t have a direct connection with the logic, should they be added? To suggest adding mapping to shape at a higher level such as “Inlinedevice” for a strainer for example.

1. **Workflow for AML library changes. It could be proposed:**
   1. If change is conceptual/large – discussion and agreement with Norsok committee is required to implement change.
   2. If change is relatively small or straightforward – it can be included in GitHub pull request for new library versions without prior discussions. Adequate time to review pull request and make comments should be available for all involved parties before merging of pull request and issuing official version of library.

**Action**: It was suggested to continue working with collecting a number of issues and discussing those before releasing a new version of AML Library, so that changes to be made for projects are not too frequent nor disturbing.

1. **Sequence On / Off page connectors**

Github [Missing attribute (eg, "ElementReference") to make unambiguous matches in case of multiple SequenceOnPage/OffPage connectors between two (or more) pages · Issue #73 · equinor/iec63131 (github.com)](https://github.com/equinor/iec63131/issues/73)

**Action**: To add Unique ID to the sequence On / Off page connectors, they should be the same as Signal On / Off page connectors with possibility to also show the ID on the SFC.

1. **“Substitute Value” vs “Fall back Value” Github #53**

Github [Change LegalValue "Substitute Value" of NorsokFunctionBlockClass attribute "InputTerminals.FallbackFunction" to "Fallback Value" · Issue #58 · equinor/iec63131 (github.com)](https://github.com/equinor/iec63131/issues/58)

**Action**: Substitute Value and Fall back values are found across the IEC63131 standard, but it should be standardize on “Substitute”.