



# Functional Safety with Ansys SCADE Software:

## Creating Projects from Masterproject Instructions

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This is the list of all of the Ansys SCADE Software models for the workshop:

- SCADEmodel\_Session\_I\_A\_1
- SCADEmodel\_Session\_I\_A\_2
- SCADEmodel\_Session\_I\_B\_1
- SCADEmodel\_Session\_I\_B\_2
- SCADEmodel\_Session\_II\_A\_1
- SCADEmodel\_Session\_II\_A\_2
- SCADEmodel\_Session\_II\_B\_1
- SCADEmodel\_Session\_II\_B\_2 (Master)

The “master model”, which includes practically all discussed features, is the model II\_B\_2. This contains the latest states of the “logics” as well as all specified test cases. If larger changes or extensions of the concept should become necessary, it is recommended:

- carry out the changes to this model II\_B\_2 and afterwards
- Derive the other projects from it again.

### Clear.bat

This is a small batch file to “clean up” all model directories. In the course of the work, additional subfolders such as KCG, Simulation and Test\_TEE are created using the Ansys SCADE tool in almost all subfolders. This batch file deletes all these intermediate results. Only the “clean” models and test projects remain.

### Create all Models/Projects

The following list shows which modifications are required for the other models. The model ‘ACC\_Scademodel\_Library’ is the same in all projects and is not modified. Also in the workshop it is “looked at” at most times, but not modified or the like. Theoretically, it could be outsourced and the eight session models could refer to it, but then the projects are no longer completely independent of each other.

### Session I

*I\_A\_1 out of Master:*

1. Deletion of the test project (whole folder).
2. Deletion of the packages including operators:
  - a. Integration\_Package
  - b. SiL\_Package
3. In the diagram of the control operator, set the note (top left) to the current session no., *i.e.* change here from “Session II B 2” to “Session I A 1
4. Changes in the diagram:
  - a. Calculation of ‘speed\_Relative’: change the time constant from 0.2\_f32 to 0.3\_f32 (intentionally different value than in the requirements)
  - b. Parameters for PI controller (below), include a syntactical error: 0.8\_l32 instead of 0.8\_f32
  - c. Calculation of ‘distance\_guide\_speed’ for the case “distance\_IN < 100.0\_f32”: instead of the calculation from ‘distance\_IN’, simply assign the constant 5.0\_f32 (the implementation of the formula will then be implemented in Session I A 1)
  - d. In the calculation of ‘break\_OUT’ remove the unary-minus block (connect directly to the output of the PI controller)

### *I\_A\_2 out of Master:*

1. Deletion of the test project (whole folder).
2. Deletion of the packages including operators:
  - a. Integration\_Package
  - b. SiL\_Package
3. In the diagram of the control operator, set the note to the current session no.
4. Changes in the diagram:
  - a. In the calculation of 'break\_OUT' remove the unary-minus block (connect directly to the output of the PI controller)

### *I\_B\_1 out of Master:*

1. Deletion of the packages including operators:
  - a. Integration\_Package
  - b. SiL\_Package
2. Changes in the diagram:
  - a. In the calculation of 'break\_OUT' remove the unary-minus block (connect directly to the output of the PI controller)
3. In the diagram of the control operator, set the note to the current session no.
4. In the testproject
  - a. Delete the following procedures:
    - i. Procedure\_IntegrationTest
    - ii. Procedure\_SiL\_Tests
  - b. Delete in the FileView (tab left) under Results:
    - i. Procedure\_IntegrationTest.trf
    - ii. Procedure\_SiL\_Tests.trf
  - c. Delete the following testrecords:
    - i. Record\_Control\_Brake\_70percent
    - ii. Record\_Control\_Profile
    - iii. Record\_Control\_Throttle\_Max100

### *I\_B\_2 out of Master:*

1. Deletion of the packages including operators:
  - a. Integration\_Package
  - b. SiL\_Package
2. In the diagram of the control operator, set the note to the current session no.
3. In the testproject
  - a. Delete the following procedures:
    - i. Procedure\_IntegrationTest
    - ii. Procedure\_SiL\_Tests
  - b. Delete in the FileView (tab left) under Results:
    - i. Procedure\_IntegrationTest.trf
    - ii. Procedure\_SiL\_Tests.trf

## Session II

### *II\_A\_1 out of Master:*

1. Delete the test project (whole folder)
2. Deletion of the packages including operators:
  - a. SiL\_Package
3. In the operator diagrams set the note to the current session no.
4. Changes in the diagram:
  - a. Fully delete content of state ,Control\_ON' in Op 'Software\_Integration'
  - b. Delete transition from ,Control\_ON' to ,Control\_OFF' (right hand side)
  - c. Change the condition of the remaining transition to ,bool\_Condition\_ON' (is undercut green, is deliberately not to work)
  - d. In the operator's interface delete input ,ControlSwitch\_IN'

### *II\_A\_2 out of Master:*

1. Deletion of the packages including operators:
  - a. SiL\_Package
2. In the operator diagrams set the note to the current session no.
3. In the testproject
  - a. Delete the following procedures:
    - i. Procedure\_SiL\_Tests
  - b. Delete in the FileView (tab left) under Results:
    - i. Procedure\_SiL\_Tests.trf

### *II\_B\_1 out of Master:*

1. Delete the test project (whole folder)
2. In the operator diagrams set the note to the current session no.

### *II\_B\_2 out of Master*

Indeed is already the master project!

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