# FMU with ModelConnect Simulation

## PROJECT SUMMARY

| REPORT DATE | PROJECT NAME | PREPARED BY |
|---|---|---|
| 1/2/2021 | FMU | CHEN SHIYU |

## PROJECT OVERVIEW

| TASK | STATUS | CONTENTS | REMARK OR LINK |
|---|---|---|---|
| Hands on ModelConnect | Finished | Alex's instruction video | |
| Implement Rosbridge to construct connection between ROS and ModelConnect (FMU) | Finished | Instead of Rosbridge, the master & slave PC has been implemented where master is Linux terminal and slave is windows. Hence, the ROS functions in Linux terminal can be retrieved by windows. | http://wiki.ros.org/ROS/Tutorials/MultipleRemoteMachines |
| Find input & output of FMU | Finished | Workflow and excel summary | |
| Fix DLL file error | Finished | Resolve python conflict & Run from Anaconda | |
| Deep analyze FMU | Finished | FMpy python library to simulate and test FMU. | https://github.com/CATIA-Systems/FMPy |
| Study Autoware and FMU CPP Code | ISSUE to be solved | 1. Publish/Subscribe message.<br>2. Server&Client to call ROS service<br>Create node handler to subscribe topics or services | See more details in ISSUE 4 |

## RISK AND ISSUE HISTORY

| ISSUE | STATUS | TIME |
|---|---|---|
| 1. Load DLL file error | [Solved] Resolve python conflict & Run from Anaconda | Dec-Jan |
| 2. FMU has unrecoverable error | [Need to be solved] [May due to ISSUE 3] | Jan |
| 3. Not able to load sample project | [Need change software version] | Jan |
| 4. Difficulty in inserting Autoware module into FMU | [Need training] Each packages/node in Autoware are connected or overlapped. Some of packages needs inputs to launch, such as maps. To launch Autoware packages, we need real-time inputs contains bus or environments information. | Jan-Feb |

## CONCLUSIONS/RECOMMENDATIONS

The VSM and VTD in ModelConnect are not able to provide real-time interface. However, the service in FMU CPP files is predefined and need to catkin_make to generate FMU. Based on Zhigang's advice, the only way to integrates Autoware into FMU is put everything in Autoware to FMU CPP folder. However, it is not only difficult but also involves with many algorithms in bottom layer.

The help from Australia AVL team is expected. Firstly, we need older version to import their project. Secondly, we need them to provide a sample codes to specifically interface nodes/ topics of ROS.