CELLOCATOR

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Pointer Telocation Ltd.

Cello-CANiQ Evaluation and Integration

Cello-CANiQ – Driver Behavior with CAN connectivity.

November, 2013.

Objectives

By the end of this lesson you will be able to:

- Understand the new Cello-CANiQ Features

- Understand new Modular fleet protocol type 11.

- Setup your Cello-CANiQ evaluation environment and run short Demo

- Understand the CAN Editor tool

- Build your own CAN triggering example

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Topics

- What new

  - New GNSS Supporting GPS and Glonass

  - CAN Connectivity

  - Automatic External Antenna control

  - oneWire Temperature sensors support

  - Extended Configuration memory – 8K

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GNSS

- The Cello-CANiQ Supports new GNSS Chip-Set based on STM 8088

- Both GPS and Glonass Systems Are Supported.

- Enhanced GNSS performance

- Embedded External Antenna Logic

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CAN Connectivity

- The Cello-CANiQ has CAN Bus interface supporting OBD2 and J1939

- Simple OBD2 Harness used as Unit's Power Source

- User configurable Triggers and actions

- Pre configured FMS variables

- Pre configured OBD2 Standard PIDs

- Graphical user tool for CAN triggering.

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Automatic External Antenna Control Logic

- The GNSS External Antenna Hw Support.

- External Antenna fault detection (Short / Disconnect)

- Automatic Internal or External Antenna selection to achieve optimal GNSS reception.

- The Selected Antenna is reflected by Fleet type 0 Message

2.2.3.19   Service and Location Status Byte (byte 41)

Functions as the upper bit selecting the role of bytes 33 to 38 (CR200)	IMEI Bit 49	IMEI Bit 48	CFE Type (see CFE type table below)			Trailer status indication: 0-Trailer Disconnected 1-Trailer Connected	Actual GNSS antenna selected (Int.=0, Ext.=1). Relevant only for Glonass variants.
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

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8 Kbytes configuration

- The Configuration Memory was expended to 8 Kbytes

- New Type 11 messages supports 8Kbytes programming and uploading

- Cello-IQ configuration was remapped
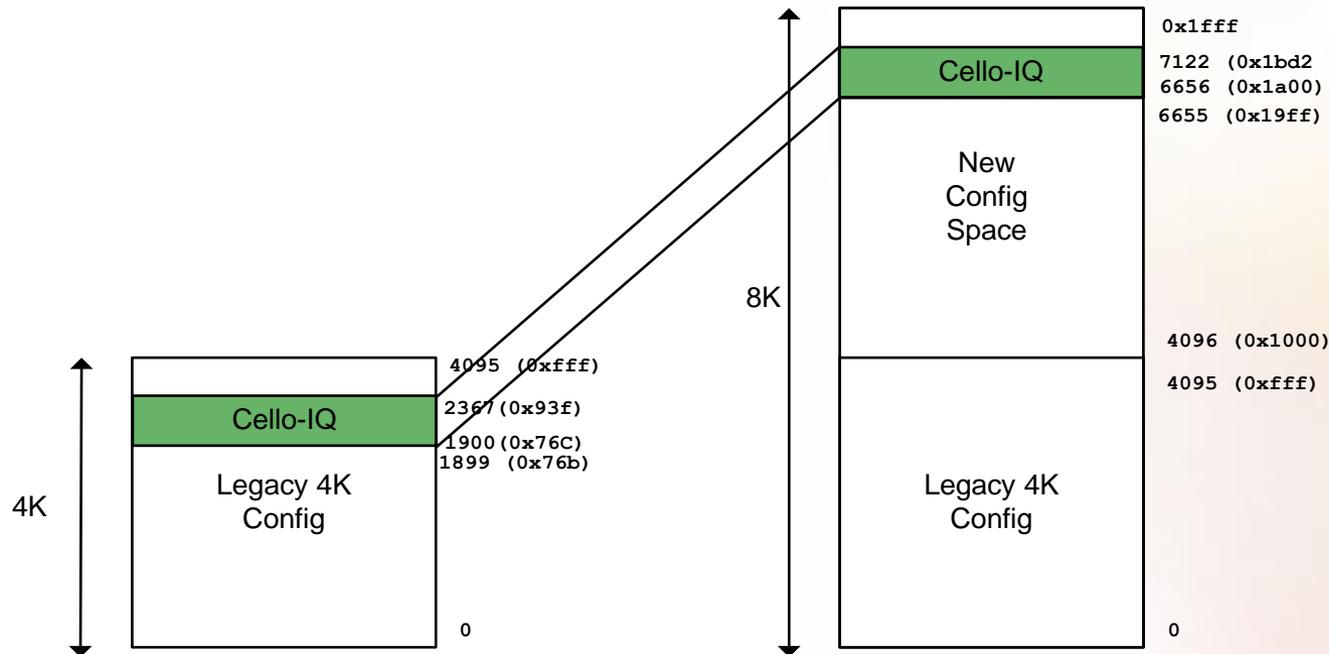
Fleet Type 11 Protocol

❖ Cello-CANiQ Fleet application protocol now supports new modular protocol type called Type 11.

❖ Type 11 fleet protocol extends the functionality of type 9 by supporting larger data and configurable application message structure.

```
┌─────────────────────────────────────────────┐
│  ┌──────────┐                                │
│  │  Type 0  │                                │
│  ├──────────┤                                │
│  │  Type 9  │                                │
│  ├──────────┤                                │
│  │ Type 11  │                                │
│  ├──────────┤                                │
│  │   ...    │                                │
│  └──────────┘        Fleet Application Protocol │
└─────────────────────────────────────────────┘
                        ⇕
┌─────────────────────────────────────────────┐
│              TCP/UDP over IP                 │
└─────────────────────────────────────────────┘
                        ⇕
┌─────────────────────────────────────────────┐
│               GSM / GPRS                     │
└─────────────────────────────────────────────┘
```

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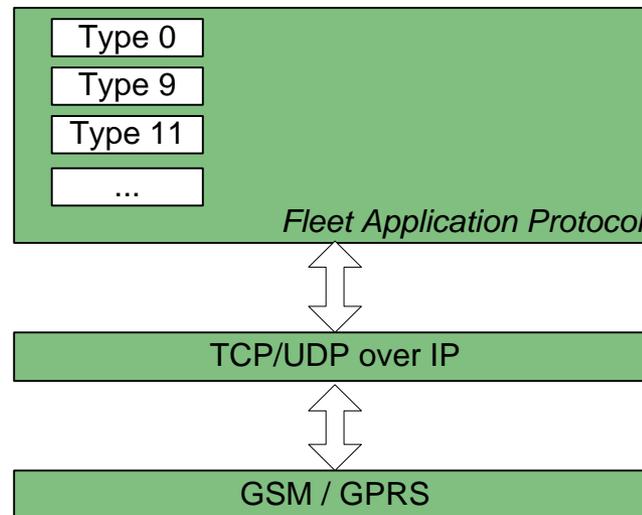
Type 11 Structure

❖ Type 11 has new header format with 16 bits allocated for message length

Type 11 Attached modules
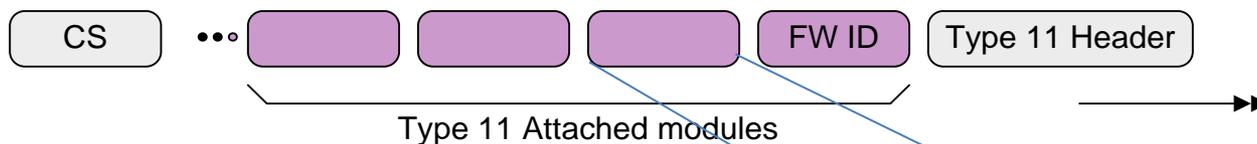
❖ Each module includes: module id, Length and payload bytes.

Module ID
Length. LSByte
Length MSByte
Data
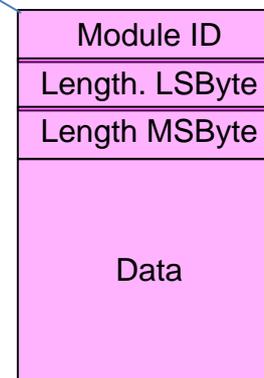
Typical CAN Type 11 Trigger event message

4D4347500B53B60100480146007E0000000000   - Header
08060000121011400   - FW ID
0613000404020D5545A30310145703EC2C0000290000   - GPS Location Stamp
070700012C080B150A0D   - GPS Time Stamp
1905001E04010000 - Trigger Event ID
0246001E0456C1F71909804004462C00008240047C0000008540040000000008
34004000000008140045EBD3201844004642700008640040000000087400400
0000008840040000000BA -Variables Dump List

Typical CAN Type 11 Variable Dump List parsing

02 - Module ID
4600 – Module Length
1E04 – Operator ID
56C1F719 – PL Signature
09 – Number of variables
8040 – First Variable ID
04   - Variable length (4 Bytes)
462C0000 – Variable data : 0x00002c46
8240   - Second variable Id etc

Cello-CANiQ CAN Bus

- Cello-CANiQ Supports new CAN connectivity designed to widen the visibility of the unit to the vehicle's information sources.

- CAN connectivity supports both J1936 or OBD2 vehicle busses.

```
CAN         CAN         CAN         CAN
Interface   Handler   Triggering   Actions
```
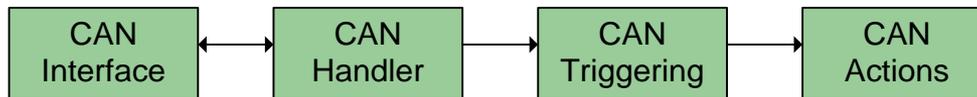
- CAN Interface: Physical and Data Link Layers: wire level and framer level message handling.

- CAN Handler: OBD2 Query/Response Manager, J1939 Message interceptor, maps CAN application messages into Cello-CANiQ "Variables".

- CAN Triggering: Configurable CAN triggers. User configurable relations between CAN variables values and resulted CAN Actions.

- CAN Actions: configurable type 11 message and GPIO sequence are generated as a result of true trigger criteria.

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Cello-CANiQ Programmer/ CAN Editor

- The CAN Editor is an extended Programmer feature.

- The CAN Editor enables the user to select CAN variables, Define Triggers schemes and define CAN Actions.

CAN Configuration
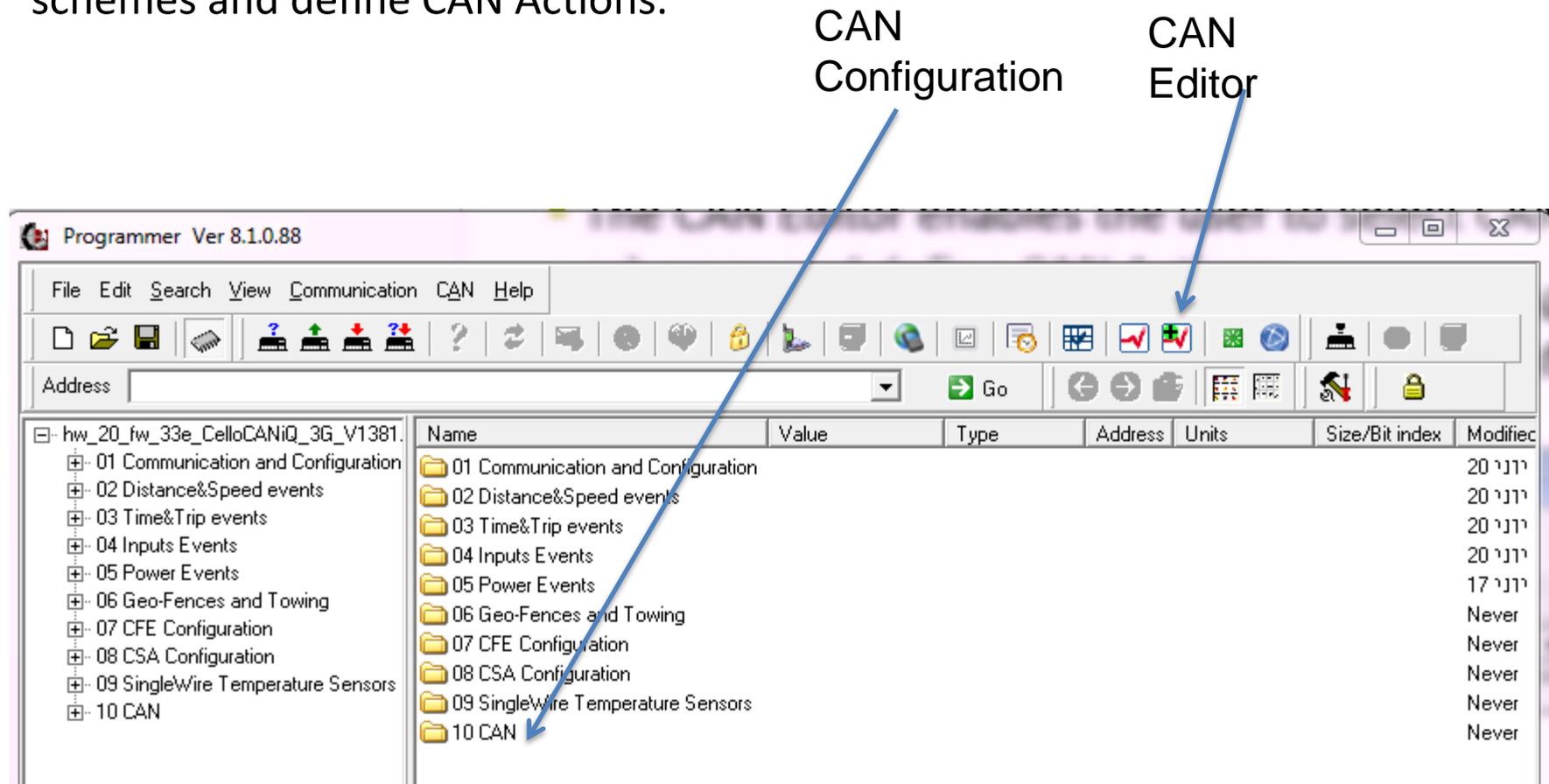
CAN Editor

Cello-CANiQ Programmer/ CAN Editor

- The CAN Editor is a graphical tool designed to configure CAN related information sources with user defined behavior.

- CAN Editor enable the user to select CAN variable and associate them with Operators. Operations will manipulate the CAN data and generate events.

- Operators are Logical data manipulation functions.

- Variables and Operators are associated by simple graphical "Click and Drag" action design to connect the variable to the Operator

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Cello-CANiQ Editor: OBD2 View

- Selecting OBD2 variable

Table View

Standard OBD2 Variables

Drag and drop the variable from Left to right. This will activate the OBD2 Variable
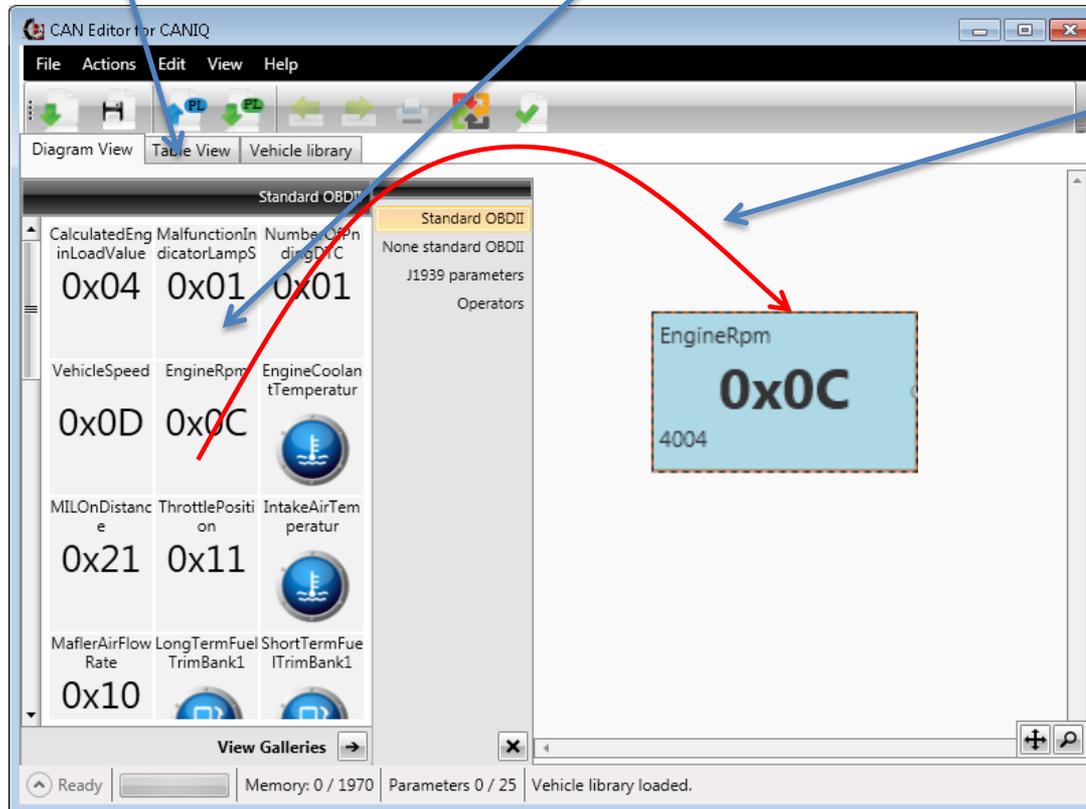
Cello-CANiQ Editor:OBD2 Table view/Standard PID

- The editor allocates a "Parameter ID" for each selected variable.

- The user can control the PID's query polling time

Parameter ID

Parameter Name

PID's Configurable Polling time
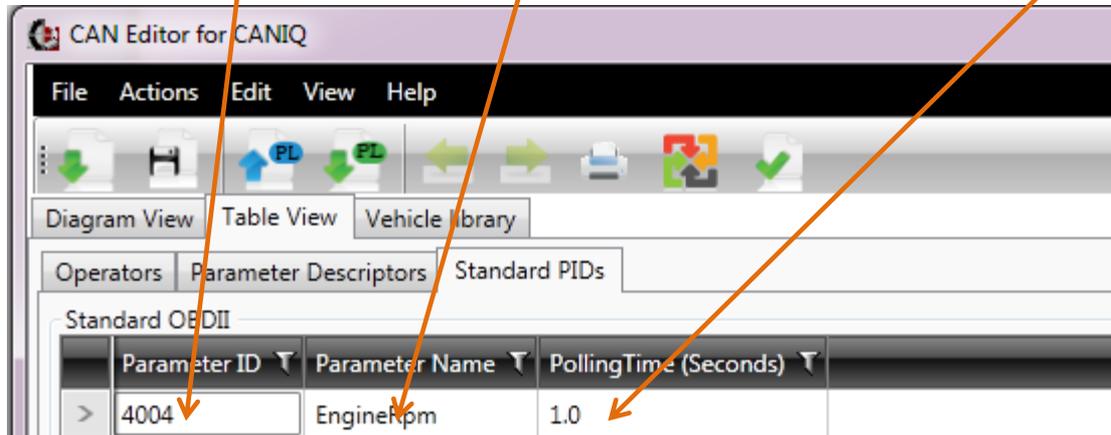
Cello-CANiQ Editor: Adding Single Threshold Operator

Drag and drop an operator
from the operators section

Connect the
Variable
to the operator

Open the Operator's
control windows to set
the operator's
properties
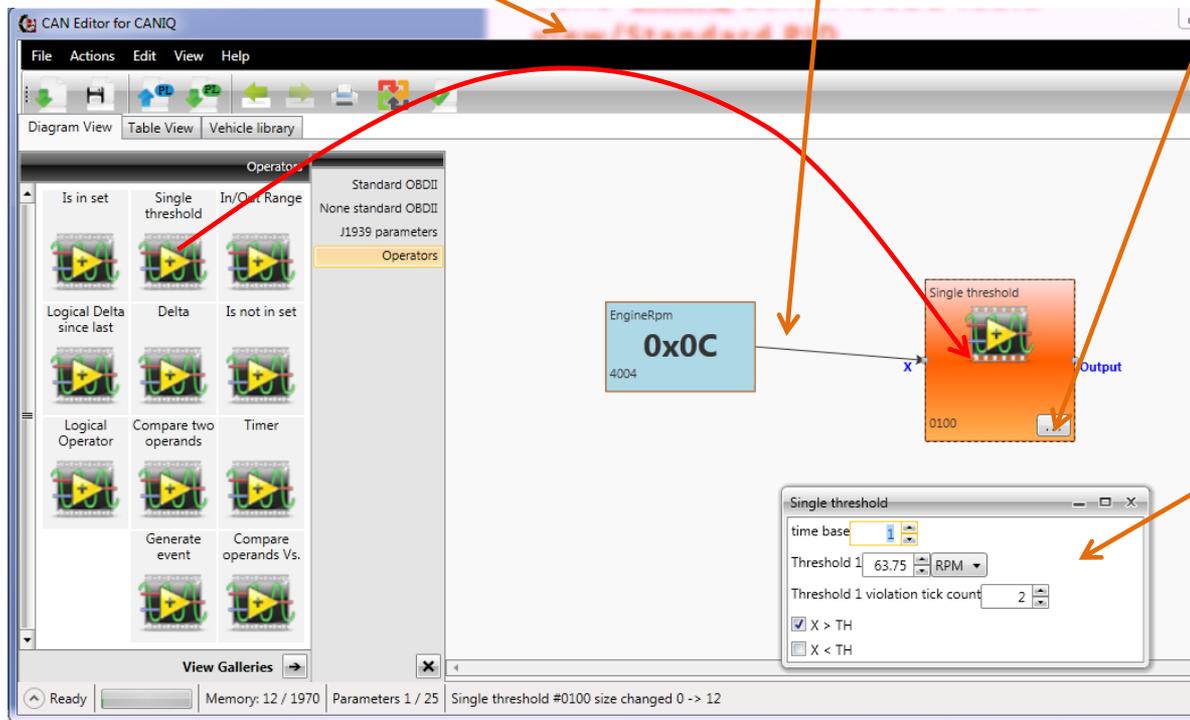
Operator's Properties
In this example
defines
The filter's properties

Cello-CANiQ Editor: Adding Event Operator

What shall the event do?

Type 11 Modules attached

2-Connect the "Threshold operator" to the "Generate Event"

Variables Value dump list

1-Drag and drop a "Generate Event operator"

Cello-CANiQ Editor: Adding Event Operator

- The Generate Event Operator defines the following:

  - Type Of Action : Message, Output, DFD (Infrastructure)

  - Message Structure if message was selected as Action

  - Outputs Patterns if Output was selected as Action

Cello-CANiQ Editor: Saving PL

First: Write CAN Config to PL

Second: Use: File/Save Configuration to save the Diagram.XML File
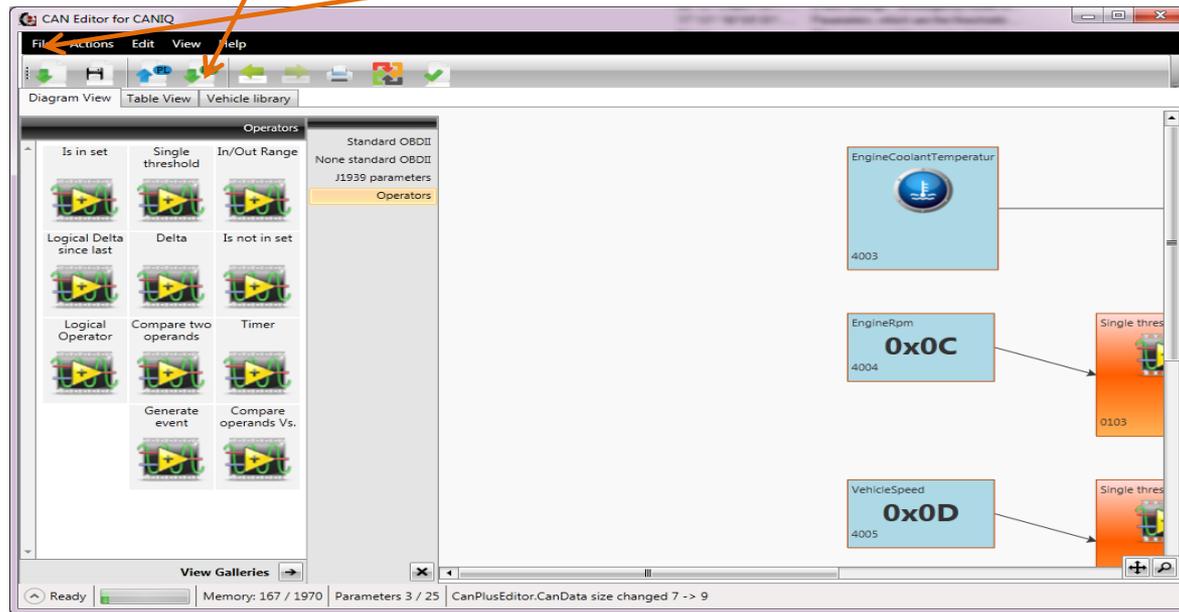
- The **diagram.xml** file will be used by the Communication Center to parse the CAN type 11 messages. It must be saved in the following file location: C:\Program Files (x86)\Cellocator\Resources\XML\PL XML.
  Press: Actions/Reload Telemetry Files in the comm. Center to activate the file

Cello-CANiQ Evaluation Kit: CAN emulator

RS232
115200 Kbps

CAN Bus
Emulator

CAN Bus

Cello-CANiQ
UUT

Internet

Server running
Communication
Center

CAN Bus
Injector
PC Application

RS232
115200 Kbps

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Cello-CANiQ Evaluation Kit: CAN emulator

DB9

4 Pin
Connector

711-00134

Internet

Server running
Communication
Center

CAN Bus
Emulator

Cello-CANiQ
UUT

Security

2 X RS232 115200 Kbps

CAN Bus
Injector
PC Application

Hw Simulator

12 V

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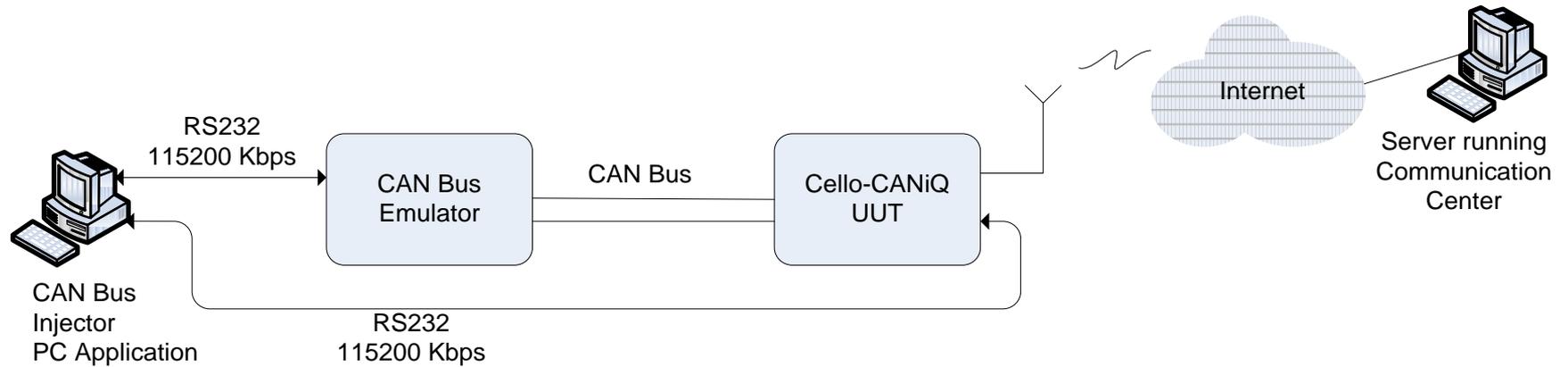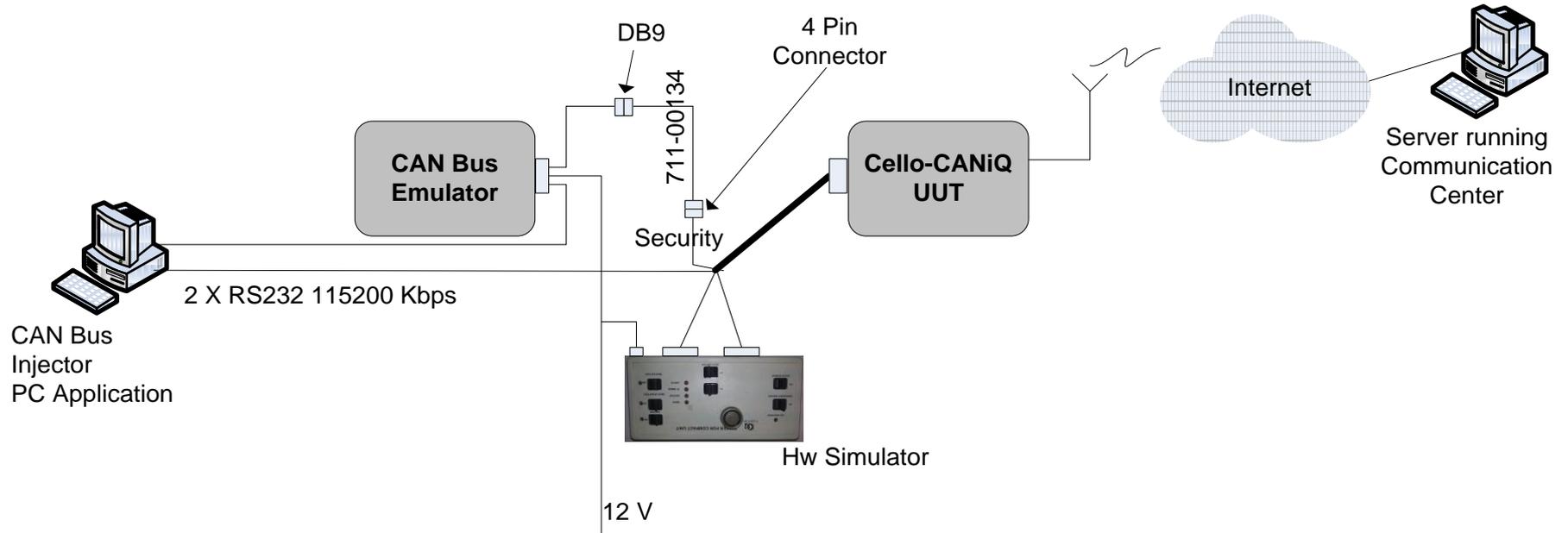
Cello-CANiQ Evaluation Kit: CAN Bus Injector

- Run pre-recorded CAN bus scenarios.

- The "CAN Bus Injector Application" downloads pre recorded CAN events towards the "CAN Emulator " unit via Serial protocol.

- The "CAN Emulator" emulates the Vehicle computer towards the UUT using its CAN Bus interface.

- "CAN Emulator" supports both OBD2 and J1939.

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Cello-CANiQ Evaluation Kit: CAN Bus Injector

- Install the Evaluation tools. In Windows 7, press the Start button and click the Cellocator sub folder. Click "CAN Injector" under the "CAN Tools" sub folder.

Cellocator sub folder created in the start menu after Evaluation tools are installed.

CAN Injector Application
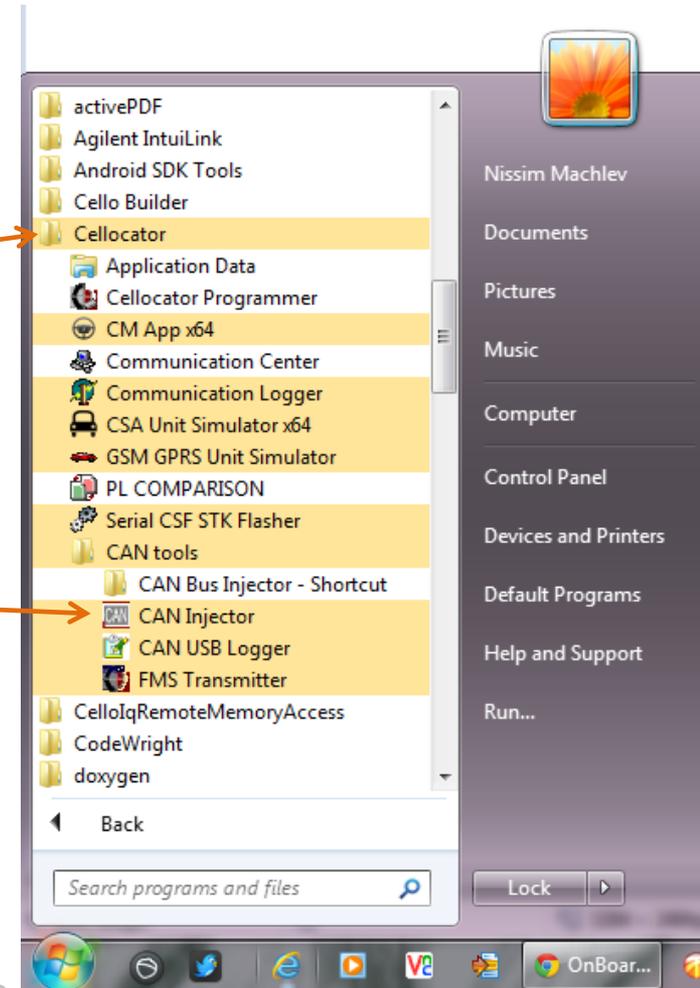
Cello-CANiQ Evaluation Kit: CAN Bus Injection Application

Press "Load Scenario"

Select Com. Port
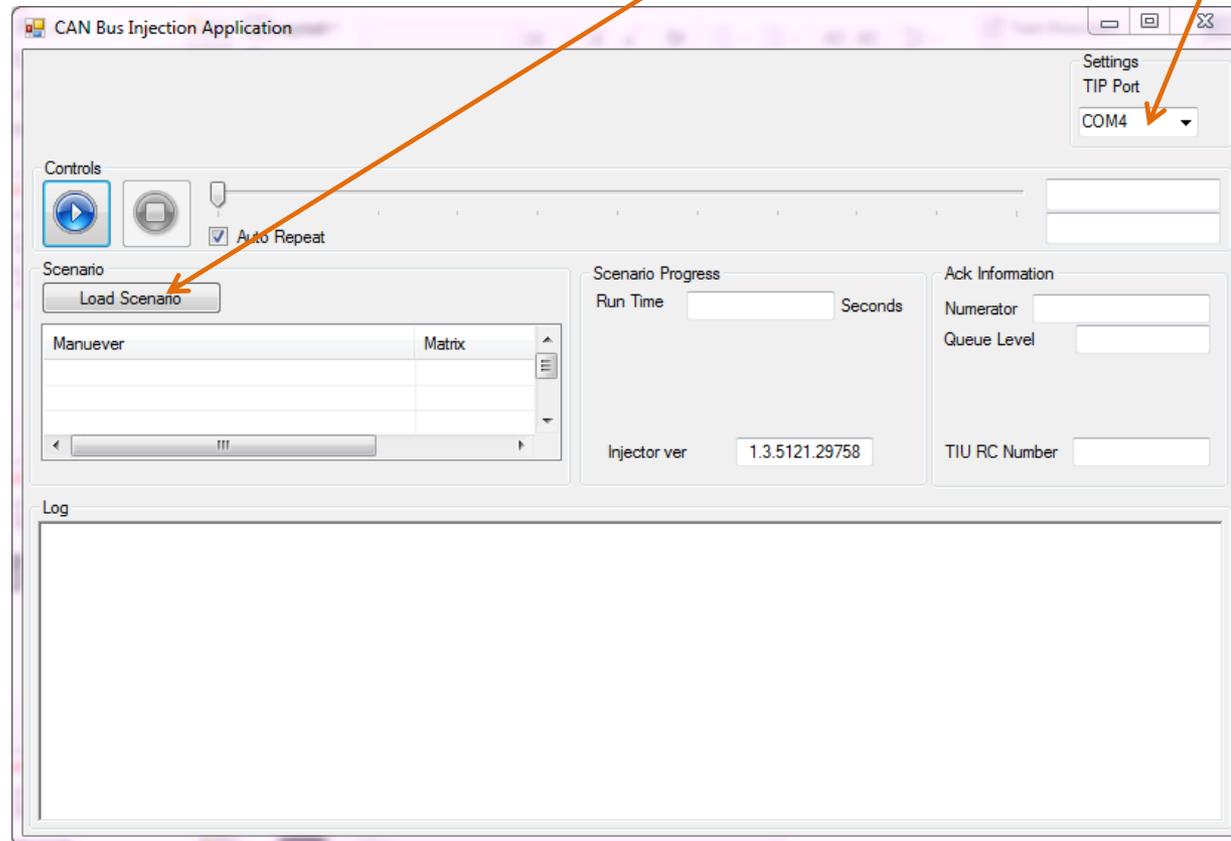
Cello-CANiQ Evaluation Kit: CAN Bus Injection Application

1 - Select the type of CAN bus emulation needed by opening one of the the sub folder: OBD2, J1939.
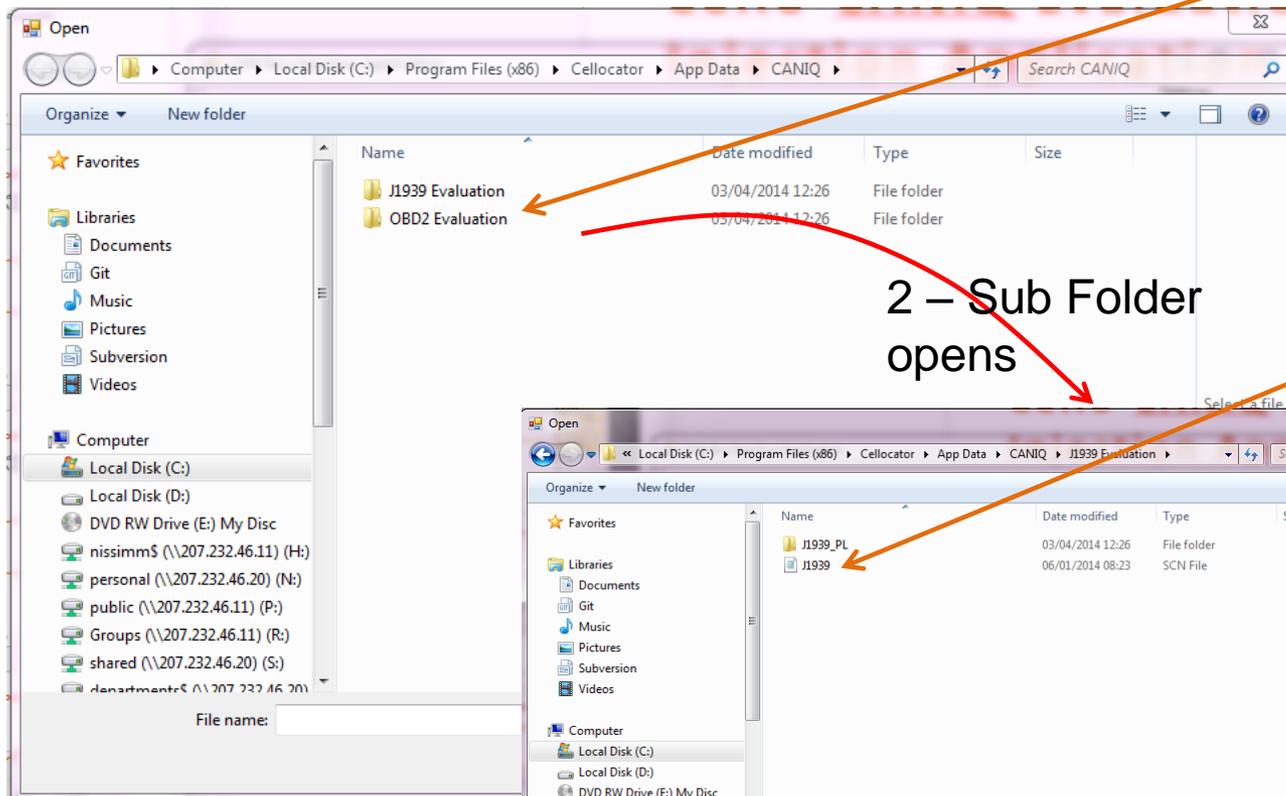
2 – Sub Folder opens

3 – Select .scn file containing the data to be injected
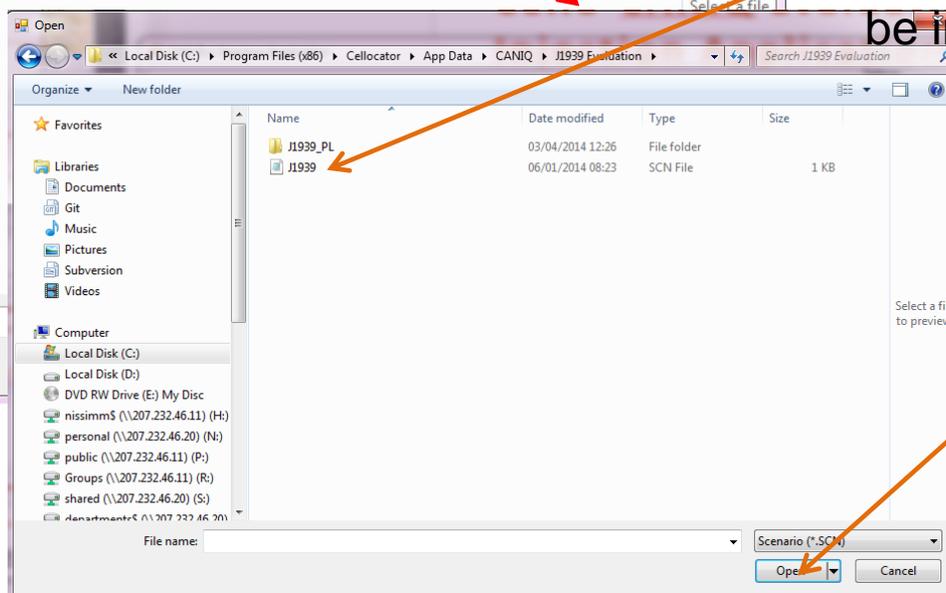
4 – Open the File.

Cello-CANiQ Evaluation Kit: CAN Bus Injection Application

Play the recorded file

Stop

Time Shift

Auto Repeat enables endless scenario injection
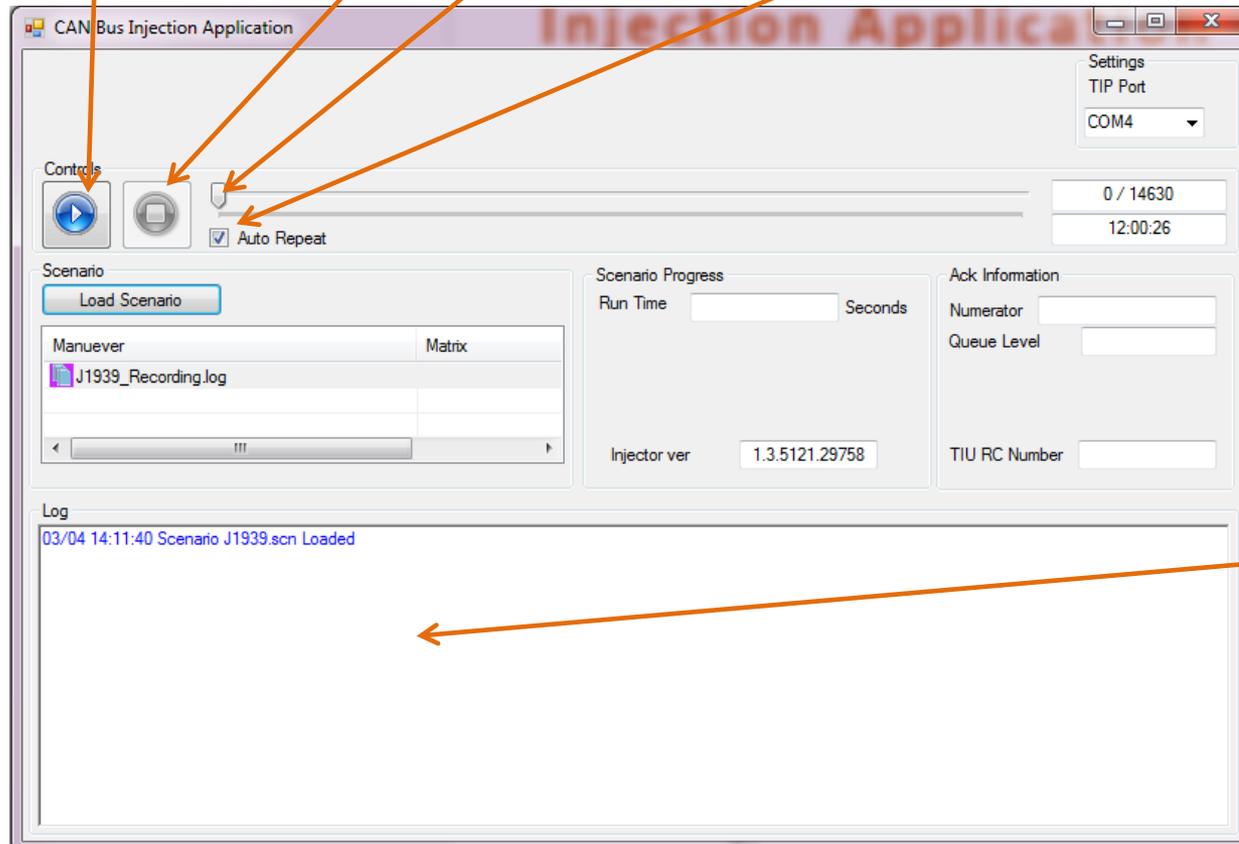
Events Log

Cello-CANiQ Evaluation Kit: CAN Bus Injection Application

- After powering the emulator for the first time please run scenario file for at least 10 seconds to fill the Emulator unit with data.

- Move the play cursor to the file beginning by dragging the cursor to the right most place.

- Ignition off the UUT (using Vehicle Simulator), wait for event on the Comm. Center

- Ignition on (using Vehicle Simulator) UUT, Wait for event on the Comm. Center.

- Play the scenario file, The Communication Center should start showing type 11 messages with CAN trigger events.

Cellocator Cello-CANiQ – Let's take a ride