VR-FORCES C2SIM INTERFACE

Current interface runs as a separate command-line application in Windows. It makes a VRForces Remote Control DIS or HLA Interface connection to VRForces. It then subscribes to a C2SIM server (default 10.2.10.70, REST port 8080, STOMP port 61613) and listens for IBML09 and C2SIM standard orders. It does not validate the order against an XML schema; simply parses out the necessary information elements. It defaults to C2SIM schema, initialization from the server, and address 127.0.0.1 for VR-Forces.

The prototype distinguishes five types of objects for ManeuverWarfareTask PerformingEntity, as established in the C2SIMInitialization:

- An aggregate mobile infantry squad, recognized by the 12th character in the 15- character SIDCString having value "B" and not having initialized HostilityCode "HO"
- An aggregate irregular squad-size mobile team, recognized by the 12th character in the 15-character SIDCString having value "B" and having initialized HostilityCode "HO"
- An aircraft is recognized by character 3 in that string having value "A"; all aircraft are AH-64 Apache helicopters, except those that have DIS Entity string 1.2.225.23.1.1.0 which are Chinook and those that have DIS Entity string 1.2.225.50.6.1.0 which are GlobalHawk UAS.
- A boat is recognized by character 3 in that string having value "S"
- Everything else is represented as a VR-Forces Abrams Tank (clearly there is a lot more to do in defining objects)

Units to be simulated are initialized per C2SIM standard. If server is not yet running, the interface waits on a startup initialization message; if already running. it requests late joiner initialization for which the server sends the same message but with object positions from latest reports. Hostility and name come from the initialization process, with Entity UUID as key.

The order can have multiple tasks. Data pulled from the order are UUID, TaskersIntent (IBML09 only), DateTime, and vector of GDC coordinate points identified as latitude, longitude, and optional elevationAGL, provided as either a single-point destination or a route.

Order and Task UUIDs must be unique. In addition to their UUIDs, Tasks must have a unique name that does not contain blanks.

The order can be sent to the server by a command-line client or by the BMLC2GUI (both available open source on c4i.gmu.edu/OpenBML under C2SIM Client and Servers).

The implemented order directs VR-Forces to MOVE an object with a specific UUID through the sequence of locations given by the route, or ATTACK at the same coordinates.

A Chinook can be given a mission EVACTN to evacuate noncombatants. The Chinook will embark them up at the last Location in Route, debark them at the task's directed Location, and return to its original position. The object to be evacuated is selected by proximity to the pickup point; it must be within 100 meters of the pickup point.

Under C2SIM LOX schema 1.0.2 and later a Task can include a MapGraphicID which is the UUID of a PhysicalEntity that can be specified either in C2SIMInitialization or before Tasks in a C2SIMOrder. Currently the only use for this is to describe a Route in the XML for the MapGraphicID. C2simVRF will pass that Route to VRForces and use it for the Task.

Also under C2SIM LOX schema 1.0.2 and later it is possible to SetSimulationRealtimeMultiple in a C2SIM SystemCommand. Speedup values of 1, 2, 5, 10 and 15 in such a message are passed to VRForces.

After an object is created and the server goes into running state, VR-Forces sends a C2SIM/BML position report for every friendly initialized object, every 30 seconds. The report uses the syntax of the last order received (IBML09 or C2SIM). Simulation execution starts when the first order is received. Hostile objects can have automatic sending of position reports configured (see main.cxx) but the default is for them not sending. Aircraft and aggregated objects send C2SIM observation reports or IBML09 general status reports if they detect other than friendly objects.

There are command-line parameters (see below) to configure the interface to pass only those reports that would be generated by blue (blue positions and observations of red) or by red (red positions and observations of blue), both, or neither.

The variety of objects and actions they can take are based on needs of the MSG-145 C2SIM validation. We do not plan to expand c2simVRF to the full capabilities of VR- Forces; only to enable those use cases tried by MSG-145 and MSG-201.

Effective with c2simVRFv2.15, it is possible to use the C2SIM interface with either DIS or HLA. To run with HLA start the interface using runc2simVRFHLA1516e.bat.

c2simVRFv16 uses these command line parameters;
any can be omitted to use default unless providing one of the later ones:
1. server IP address
2. REST port number
3. STOMP port number
4. clientID name
5. 1 to skip initialize, 0 otherwise (default 0)
6. 1 to use IBML instad of C2SIM, 0 otherwise (default 0)
7. 0 to send blue tracking (default)
   1 to send red and blue tracking,
   2 to send only red tracking
   3 to send no tracking
8. VRForces Local IP Address (defaults to loopback)
9. report generation interval in seconds
10. blue force name for initialization
11. 1 to print debug data, 0 otherwise (default 0)
12. VRForces Session ID (default 1)
13. remote control interface application number (default 3201)
14. VRForces Site ID (default 1)

15. 0 to send blue observations (default)
    1 to send red and blue observations,
    2 to send only red observations
    3 to send no observations
16. 1 to respond to C2SIM SetSimulationRelatimeMultiple;
    0 not to respond (default 0)

See also README.txt file in the open source project folder.