AN2508 – ARMOR CIGI Integration

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Battlespace Simulations

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Overview

The purpose of this document is to explain the configuration and CIGI packets expected by ARMOR for basic CIGI operation.

Configuration

This document assumes the following ARMOR configuration:

- CIGI / Sender / IP Address, Port are compatible with those used by the CIGI host.
- CIGI / Receiver / IP Address, Port are compatible with those used by the CIGI host.
- CIGI Group ID, View ID match those requested by the CIGI host when sending the View Definition and View Control CIGI packets.
- System Settings / Camera / Camera Driver = CIGI. This contrasts with the default ARMOR setting, whereby ARMOR controls all camera movement, attachment, and transitions internally.
- A Valid License must be applied for ARMOR to proceed past the splash screen.

ARMOR allows configuration of two View IDs, which can be selected at runtime (if operational) using the 1 and 9 keys. These two views are commonly used to provide a first-person view (1) and a sensor view (9) to the same ARMOR instance. This configuration reflects the MACE display-locked (ownship) and camera-locked behavior, but only one view (typically the first) is required for ARMOR to operate.

Synchronization

ARMOR operates asynchronously, and the frame rate is entirely independent of IG Control packets. The frame number and timestamp information contained in the IG Control packet are used to provide context and filtering of other CIGI packets, to ensure that ARMOR processes all incoming data but filters out stale data in cases where multiple conflicting packets are received. No interpolation or extrapolation is currently applied to incoming packets. CIGI synchronous mode is not currently supported.

Operation

The expected sequence of operations for ARMOR is as follows:

- ARMOR Launch will check license data and load critical data before listening for CIGI messages.

- ARMOR Sends IG Up Notification to indicate that it is now operational and ready to receive entity and camera data from the host. This is an Event Notification message with Event ID = 1. Typically, MACE then responds by sending/re-sending all entity data.

- Receive Data: All data can be received in the same frame from this point onward

- Receive Entity Data. This may be spread over multiple frames, if necessary, but should be completed as quickly as possible to ensure that ARMOR has all the data.

- Receive Camera Data. Must receive CIGI definition and control for this ARMOR instance, with matching View ID and Entity ID (see below).

Entities

Entities are created using Entity Control and updated using Entity Position packets. An entity can be safely created and updated in the same frame. ARMOR requires that the Extended Entity Type option be set, and that a SISO 7-part entity type be specified for each entity. This entity type data is checked against data from the ARMOR model map XML, which specifies which IG model will be loaded for each type.

Camera

The CIGI camera must be initialized by the host using a View Definition packet. The View ID parameter must match one of the two specified in the ARMOR CIGI configuration.

- If ARMOR is to control only a single view, it is best to use the first View ID, which defaults to 1.

- The Mirror Mode, Pixel Replication Mode, Projection Type, and Reorder options are not supported.

- The Near Clip and Far Clip are controlled by ARMOR by default but can be controlled by CIGI if desired using the advanced CIGI settings in the main menu.
- The Field of View parameters will be used by ARMOR in conjunction with the current window aspect ratio, so the final field of view may differ from the CIGI values. Asymmetric fields of view are not supported and will be disregarded in favor of the total horizontal and vertical values. The camera must also be attached to an entity using a View Control packet. Again, the View ID must match that specified in the CIGI settings and by the View Definition packet. In addition, the Entity ID must correspond to that of an existing entity.

Miscellaneous

The Celestial Sphere Control packet is required to specify a date and time for the simulation. Until this is received, ARMOR will use the current system time.

Standard Packets

This section outlines the standard CIGI 4.0 packets required and received by ARMOR.

Essential Packets

The following are received by ARMOR as per the CIGI 4.0 specification and are critical to basic operation.

- IG Control
- Entity Control
- Entity Position
- Celestial Sphere Control
- View Definition
- View Control

Additional Packets

The following standard CIGI 4.0 messages are also supported:

- Short Articulated Part Control
- Line of Sight Vector Request
- Line of Sight Segment Request
- Weather Control
- Atmosphere Control

Symbology

For rendering HUD symbology via CIGI, the following standard CIGI 4.0 packets are supported:

- Surface Definition
- Symbol Control
- Short Symbol Control
- Text Definition
- Polygon Definition
- Circle Definition
- Textured Circle Definition
- Textured Polygon Definition

Custom Packets

This section outlines the custom packets sent and received by ARMOR to provide full functionality. The full details for the specifications for these packets are beyond the scope of this document. **AN2507 – ARMOR CIGI ICD** documents the custom component controls BSI uses for MACE/ARMOR integration.

Component Controls

The following packets are implemented via custom Component Control and Short Component Control CIGI packets and are used to provide data and functionality not described in the CIGI 4.0 specification.

- Entity Appearance
- Fire Weapon

- Detonation
- Entity Attachment
- Designation
- Entity Thermal Signature
- Selected Weapon
- Character Stance
- Entity Identification
- Reset Symbols

Event Notifications

ARMOR provides the following custom outgoing Event Notification packets:

- IG Up
- Symbols Up
- View Info