4.7.22 Delay Ruleset

4.7.22.1 Delay Overview

The Delay ruleset is used for platforms whose full functions in the command chain are not modeled. Generally, the Delay ruleset allows for the receipt of a message/assignment from a commander and the forwarding of that message to a subordinate. All of the rulesets that delay messages must be used carefully when large numbers of messages are to be delayed. The message-delay mechanism causes fragmentation of memory, resulting in long runtimes and a potential for the run not to be complete.

4.7.22.2 Delay Battle Management Phases

The Delay ruleset utilizes no battle management phases.

4.7.22.3 Delay Received-Message Processing

The message-processing routine for the Delay ruleset processes all messages. The routine delays the message if a delay has been specified and then forwards the message after the delay.

4.7.22.4 Delay System Configuration

The Delay ruleset can be used on ground platforms. A communications device is required; sensors and weapons are not used. Platforms using the Delay ruleset cannot be commanders, flight leaders, or wingmen, and they cannot be commanded. Targets and assets are not used.

4.7.22.5 Delay Network Recommendations

Platforms using the Delay ruleset should be linked to the platforms sending the information and the platforms receiving the message after the delay.

4.7.23 Generic Ruleset

The Generic ruleset is a structure used specifically for targets. This ruleset was created because every platform must have a ruleset. The Generic ruleset has no phases, no track file, and no message processing.

The Generic ruleset can be used on aircraft or ground systems. Weapons, sensors, and communications devices are not used. Generic platforms cannot be commanders, flight leaders, or wingmen. They cannot have commanders. Targets and assets are not used.

The Generic ruleset has no message-processing capability; therefore, there are no network recommendations for this ruleset.

4.7.24 No Command (NOCMD) Ruleset

4.7.24.1 NOCMD Overview

The NOCMD ruleset, which is set up for stand-alone platforms, has no phases and no track file. Its processing occurs in its message-processing routine, which does not process command messages but only surveillance messages. Since there is no track file, no processing is performed. The ruleset's functionality is basically the same as the Generic ruleset. The NOCMD ruleset should not be used.

4.7.24.2 NOCMD Battle Management Phases

The NOCMD ruleset utilizes no battle management phases.

4.7.24.3 NOCMD Received-Message Processing

The NOCMD message-processing routine processes only track messages; it does not process command messages.

4.7.24.4 NOCMD System Configuration

The NOCMD ruleset can be used only on ground platforms. A communications device is required; sensors and weapons are not used. Platforms using the NOCMD ruleset cannot be commanders, flight leaders, wingmen, and they cannot be commanded. Targets and assets are not used.

4.7.24.5 NOCMD Network Restrictions

The functionality of this ruleset requires no networks.

4.7.25 SAM Launcher

4.7.25.1 SAM Launcher Overview

The SAM Launcher ruleset models remoted launcher sites for the Flexible SAM ruleset. The Flexible SAM ruleset can be used in combination with the SAM Launcher ruleset to model launches from remoted sites, while maintaining the capability to have co-located launchers.

The Flexible SAM performs target selection. During the weapon selection process, the Flexible SAM ruleset determines which of its launchers has the shortest intercept time to the target and assigns that launcher to the target. The Flexible SAM sends the assignment command to the launcher during the Flexible SAM launch phase, and the SAM launcher receives the assignment and launches the weapon. The Flexible SAM then evaluates the intercept outcome.

4.7.25.2 SAM Launcher Battle Management Phases

The SAM Launcher has three battle management phases: launch phase, reload phase, and User Rules phase. The launch phase is activated upon receipt of an assignment command from the Flexible SAM. The reload phase is identical to Flexible SAM reload phase. The User Rules phase is executed in response to a user-defined set of triggers.

4.7.25.2.1 SAM Launcher Launch Phase

The scheduling of the launch phase takes into account both the start time of the launch phase, representing the minimum time from receipt of the launch command from the Flexible SAM, and the minimum interval between launches. If the launch phase is not currently scheduled when a launch command is received, the launch phase is scheduled at the maximum of the start time of the phase and the minimum interval since the last launch. Once the phase executes, the next launch record is evaluated. If another launch record is waiting, the phase is scheduled for this launch at the maximum of the start time from the time the command was received and the minimum interval to the latest launch.

The SAM Launcher launch phase is scheduled for its start time upon receipt of an assignment command from the Flexible SAM. When the Flexible SAM sends the command to the SAM launcher, the Flexible SAM remains in lock on the target. Upon receipt of the assignment command, the SAM launcher performs the engage action on the target.

During the SAM launcher launch phase, the intercept time is recomputed. The SAM Launcher performs the launch action against the target, and the Flexible SAM intercept phase is scheduled to execute at the intercept time. If the SAM launcher's weapons are depleted to a level that requires reloading and weapons are available for reload, the SAM launcher reloads.

When the Flexible SAM intercept phase executes, the engagement outcome is evaluated. The result of the engagement is logged to the SAM launcher, and the Flexible SAM performs the normal action. The Flexible SAM continues in target selection or other engagements.

4.7.25.2.2 SAM Launcher Reload Phase

The SAM Launcher Reload phase is identical to the Flexible SAM reload phase.

4.7.25.2.3 SAM Launcher User Rules Phase

The SAM Launcher can execute the User Rules phase in response to the events including death of its commander, or the loss or regaining of its commander through communications checks. The User Rules phase provides several responses, including the selection of an alternate commander. The use of User Rules is described in Section 4.12.

4.7.25.3 SAM Launcher Received Message Processing

The SAM Launcher receives two types of command messages from the Flexible SAM: assignment commands and stop commands. The SAM Launcher also can receive communications checks from either a SAM LCS or Flexible SAM.

4.7.25.3.1 SAM Launcher Assignment Command

When an assignment message is received, the SAM launcher performs the Engage action; and the SAM Launcher's launch phase is examined for possible scheduling as described in Section 4.7.25.2.1.

4.7.25.3.2 SAM Launcher Stop Command

The launcher can also receive a stop command from the Flexible SAM. If the launcher has already launched, the launch is evaluated as a failure. If the launcher has not yet launched, a Stop Dead Target action is performed. This is the only condition under which a stop command would be sent.

4.7.25.3.3 SAM Launcher Communications Check

The SAM Launcher can receive communications checks from its commander, who can operate with either the SAM LCS or Flexible SAM ruleset. If a SAM Launcher loses communications with its commander, it can execute its User Rules phase to select an alternate commander.

4.7.25.4 SAM Launcher System Configuration

The SAM Launcher must have surface-to-air weapons and a communications device if the propagation model is used. The SAM Launcher does not use sensors.

The SAM Launcher must be commanded by a Flexible SAM or a SAM LCS ruleset; it cannot function independently. The SAM Launcher cannot have subordinates.

4.7.25.5 SAM Launcher Network Recommendations

The SAM Launcher must be linked to its commanding Flexible SAM. The code requires this link to function properly and, if the link does not exist, the Flexible SAM may have some unfinished engagements. The net should be of command type only.

4.7.26 SSM Commander

4.7.26.1 SSM Commander Overview

The Surface-to-Surface Missile (SSM) Commander ruleset is used to model various C2 nodes associated with the counterforce command chain. The ruleset receives intelligence information from intelligence centers; border crossing authority from CTOC rulesets; and track, command, and acknowledgment messages from other SSM Commander rulesets within the command chain. Track and assignment messages are generated and sent to subordinate units. The Ground Attacker Commander is recommended instead of the SSM Commander.

4.7.26.2 SSM Commander Battle Management Phases

The SSM Commander uses a target-select phase, which prioritizes commanded assignments and track information. The prioritization is commanded-assigned targets sorted by priority, and then track information sorted by perishability time. The SSM Commander limits the number of targets and/or tracks it will process in one target-select phase to the user-defined maximum tracks/targets assessed.

The SSM Commander assigns targets to the available subordinate that can launch soonest against the target. If multiple subordinates are available to launch now, the closest subordinate is selected. The SSM Commander checks track messages to determine whether the system type being tracked is on its systems-to-target list. The systems to target list can be specified as target systems or target classes. A target is determined to be on the systems to target list by the following two-step process. The lookup consists of checking the target system type or NCTR determination of target, and default or true class of the target. If using perceived information, the classification (which can be a weapon, system, or class) resulting from the NCTR process will be checked to determine if it matches an entry on the system of interest list. If the NCTR ID does not match, a second check of the list is performed using the default category of the target (default TM, default CM, default ABT, and default GND). If using truth information, the true system of the target will be checked to determine if it is on the list; and if it is not, the true class is next checked. If it is, the commander will assign it as a target. If the track system type is not in the systems-to-target list, the track is passed to all the commander's subordinate commanders that have the track in their AORs.

4.7.26.3 SSM Commander Message Processing

The SSM Commander performs battle management and interacts with other rulesets through messages. This subsection discusses the messages processed by the SSM Commander.

4.7.26.3.1 SSM Commander Message Delays

There are two types of message delays in the SSM Commander ruleset. The track message delay is used to account for the time spent determining whether a particular track is a target plus the time spent determining which subordinate should receive the commanded assignment or track.

The command message delay is used to account for the time spent determining which subordinate should receive a commanded assignment that was originated by a platform's superior.

4.7.26.3.2 Messages Sent by SSM Commander Ruleset

4.7.26.3.2.1 SSM Commander Track Data

This message is sent when a SSM Commander either does not have target assignment authority or has a track in his trackfile that is not on his systems-of interest list.

4.7.26.3.2.2 SSM Commander Border-Crossing Authority

This message is only sent to subordinate SSM Commanders. It is sent down the command chain to allow each level to change the weapon state.

4.7.26.3.2.3 SSM Commander Commanded Assignment

This message is sent when an SSM Commander has processed a track and sends it to his subordinate as a target. This message is sent to a subordinate with the target in its AOR if the subordinate is an SSM Commander, or to a subordinate that has the target within weapons range if the subordinate is an SS FU. The message is sent to the subordinate closest to the target.

4.7.26.3.2.4 SSM Commander Acknowledgment

This message is sent to commanders to indicate that an assignment command was received. A CANTCO is sent to the SSM Commander when it is determined that a target assignment could not be completed. This message is sent up the command chain to the SSM Commander that identified the target.

A WILCO acknowledgment is sent when a launch can be completed. This message is sent up the command chain to the SSM Commander that identified the target.

4.7.26.3.3 SSM Commander Received Message Processing

4.7.26.3.3.1 SSM Commander Track Data

This message is received from an intelligence center or another SSM Commander. When a commander with target assignment authority receives this type of message, it checks its systems-of-interest list to determine whether the track is a target. If the track is a target, the commander sends an assignment.

When a commander does not have target assignment authority or the track was not identified as a target, the commander sends the track data to subordinate commanders if the track is in their AOR.

4.7.26.3.3.2 SSM Commander Border-Crossing Authority

This message is received from either a CTOC or SSM Commander ruleset and causes the weapon status for this commander to transition from "On Hold" to "Ready."

4.7.26.3.3.3 SSM Commander Assignment

This message is received for tracks that have already been designated as a target. When a commander receives this type of message, it assigns one of his subordinates this track as an assignment or a launch command if the subordinate is a SSM Commander or an SS FU, respectively.

4.7.26.3.3.4 SSM Commander Acknowledgment

This message is received in response to a previously sent assignment message. Three types of acknowledgment messages can be received: 1) A received command message is received from a subordinate acknowledging receipt of a commanded assignment, 2) A CANTCO is received from a subordinate that has determined it cannot execute a commanded assignment, and 3) A WILCO is received from a subordinate that will complete a commanded assignment.

4.7.26.3.3.5 SSM Commander Update Request Message

When the SSM Commander sends a command message, it contains the number of the track entry on the target. The receiving platform then attempts to find the commanded track number in its track file. If the track number is not found, the receiving platform sends an update request message back to the SSM Commander for that track number. Upon receipt of the request message, the SSM Commander generates a commanded track update message that contains the track data for the target. The commanded track update also contains all the information of the previous command message, which will then be processed by the receiving platform after the track information has been processed.

4.7.26.4 SSM Commander System Configuration

The SSM Commander ruleset requires a communications device. Sensors are optional, and weapons are not used. The SSM Commander can be the commander of a platform using the SSM Commander or SS FU ruleset and can be commanded only by another SSM Commander ruleset.

4.7.26.5 SSM Commander Network Recommendations

A simplex link from the CTOC with message class command should be used. Simplex links from Intel CAC with message classes intelligence and track, provide the track information. Duplex links are recommended between the SSM Commander(s) and the SS FUs in the command chain, with message classes, track and command, between commanders and command between commanders and FUs.