1 Network

section *NetworkChannels* **parents** *scj_prelude*, *MissionId*, *MissionIds*, *SchedulableId*, *SchedulableIds*, *MissionChan*, *SchedulableChan*, *TopLevelMissionSequencerFWChan*, *FrameworkChan*, *SafeletChan*

channelset *TerminateSync* ==
{| *schedulables_terminated*, *schedulables_stopped*, *get_activeSchedulables* |}

channelset *SafeletTierSync* ==
{| *start_toplevel_sequencer*, *done_toplevel_sequencer*, *done_safeletFW* |}

channelset *TierSync* ==
{| *start_mission.MainMission*, *done_mission.MainMission*, *done_safeletFW*, *done_toplevel_sequencer* |}

channelset *MissionSync* ==
{| *done_safeletFW*, *done_toplevel_sequencer*, *register*, *signalTerminationCall*, *signalTerminationRet*, *activate_schedulables*, *done_schedulable*, *cleanupSchedulableCall*, *cleanupSchedulableRet* |}

channelset *SchedulablesSync* ==
{| *activate_schedulables*, *done_safeletFW*, *done_toplevel_sequencer* |}

channelset *ClusterSync* ==
{| *done_toplevel_sequencer*, *done_safeletFW* |}

channelset *Tier*0*Sync* ==
TierCommonSync
∪
{| *start_mission.MainMission*, *done_mission.MainMission*, *initializeRet.MainMission*, *requestTermination.MainMission.MainMissionSequencer* |}

section *Program* **parents** *scj_prelude*, *MissionId*, *MissionIds*,
SchedulableId, *SchedulableIds*, *MissionChan*, *SchedulableMethChan*, *MissionFW*,
SafeletFW, *TopLevelMissionSequencerFW*, *NetworkChannels*, *ManagedThreadFW*,
SchedulableMissionSequencerFW, *PeriodicEventHandlerFW*, *OneShotEventHandlerFW*,
AperiodicEventHandlerFW, *TestSafeletApp*, *MainMissionSequencerApp*,
MainMissionApp, *NestedMissionSequencerAppNestedMissionApp*, *NestedOneShotEventHandlerApp*

process $ControlTier \mathrel{\widehat=}$
$$\left(\begin{array}{l} SafeletFW \\ \quad [\![TierSync]\!] \\ TopLevelMissionSequencerFW(MainMissionSequencer) \end{array}\right)$$

process $Tier0 \mathrel{\widehat=}$
$$\left(\begin{array}{l} MissionFW(MainMission) \\ \quad [\![MissionSync]\!] \\ (SchedulableMissionSequencerFW(NestedMissionSequencer)) \end{array}\right)$$

process $Tier1 \mathrel{\widehat=}$
$$\left(\begin{array}{l} MissionFW(NestedMission) \\ \quad [\![MissionSync]\!] \\ (OneShotEventHandlerFW(NestedOneShotEventHandler)) \end{array}\right)$$

process $Framework \mathrel{\widehat=}$
$$\left(\begin{array}{l} ControlTier \\ \quad [\![TierSync]\!] \\ \left(\begin{array}{l} Tier0 \\ \quad [\![Tier0Sync]\!] \\ Tier1 \end{array}\right) \end{array}\right)$$

process $Application \mathrel{\widehat=}$
$$\left(\begin{array}{l} TestSafeletApp \\ ||| \\ MainMissionSequencerApp \\ ||| \\ MainMissionApp \\ ||| \\ NestedMissionSequencerApp \\ ||| \\ NestedMissionApp \\ ||| \\ NestedOneShotEventHandlerApp \end{array}\right)$$

process $Program \mathrel{\widehat=} Framework \; [\![\; AppSync \;]\!] \; Application$

2 Safelet

section *TestSafeletApp* **parents** *scj_prelude*, *SchedulableId*, *SchedulableIds*, *SafeletChan*

process $TestSafeletApp \mathrel{\widehat=} \textbf{begin}$

$$InitializeApplication \mathrel{\widehat=} \begin{pmatrix} initializeApplicationCall \longrightarrow \\ initializeApplicationRet \longrightarrow \\ \textbf{Skip} \end{pmatrix}$$

$$GetSequencer \mathrel{\widehat=} \begin{pmatrix} getSequencerCall \longrightarrow \\ getSequencerRet\,!\,MainMissionSequencer \longrightarrow \\ \textbf{Skip} \end{pmatrix}$$

$$Methods \mathrel{\widehat=} \begin{pmatrix} GetSequencer \\ \Box \\ InitializeApplication \end{pmatrix} ;\ Methods$$

$\bullet\ (Methods) \triangle (end\_safelet\_app \longrightarrow \textbf{Skip})$

end

3 Top Level Mission Sequencer

section *MainMissionSequencerApp* **parents** *TopLevelMissionSequencerChan*, *MissionId*, *MissionIds*, *SchedulableId*

process $MainMissionSequencerApp \mathrel{\widehat=} \textbf{begin}$

$$GetNextMission \mathrel{\widehat=} \left(\begin{array}{l} getNextMissionCall\,.\,MainMissionSequencer \longrightarrow \\ getNextMissionRet\,.\,MainMissionSequencer\,!\,MainMission \longrightarrow \\ \textbf{Skip} \end{array}\right)$$

$$Methods \mathrel{\widehat=} \big(GetNextMission\big)\ ;\ Methods$$

$$\bullet\ (Methods) \triangle (end\_sequencer\_app\,.\,MainMissionSequencer \longrightarrow \textbf{Skip})$$

end

4 Missions

4.1 MainMission

section *MainMissionApp* **parents** *scj_prelude*, *MissionId*, *MissionIds*, *SchedulableId*, *SchedulableIds*, *MissionChan*, *SchedulableMethChan*

process $MainMissionApp \mathrel{\widehat=} \textbf{begin}$

$$InitializePhase \mathrel{\widehat=} \left(\begin{array}{l} initializeCall\,.\,MainMission \longrightarrow \\ register\,!\,NestedMissionSequencer\,!\,MainMission \longrightarrow \\ initializeRet\,.\,MainMission \longrightarrow \\ \textbf{Skip} \end{array}\right)$$

$$CleanupPhase \mathrel{\widehat=} \left(\begin{array}{l} cleanupMissionCall\,.\,MainMission \longrightarrow \\ cleanupMissionRet\,.\,MainMission\,?\,\textbf{False} \longrightarrow \\ \textbf{Skip} \end{array}\right)$$

$$Methods \mathrel{\widehat=} \left(\begin{array}{l} InitializePhase \\ \Box \\ CleanupPhase \end{array}\right) \;;\; Methods$$

- $(Methods) \triangle (end\_mission\_app\,.\,MainMission \longrightarrow \textbf{Skip})$

end

4.2 Schedulables of MainMission

section *NestedMissionSequencerApp* **parents** *TopLevelMissionSequencerChan*, *MissionId*, *MissionIds*, *SchedulableId*

process $NestedMissionSequencerApp \mathrel{\widehat=} \textbf{begin}$

$$GetNextMission \mathrel{\widehat=} \begin{pmatrix} getNextMissionCall\,.\,NestedMissionSequencer \longrightarrow \\ getNextMissionRet\,.\,NestedMissionSequencer\,!\,NestedMission \longrightarrow \\ \textbf{Skip} \end{pmatrix}$$

$$Methods \mathrel{\widehat=} \big(GetNextMission\big)\ ;\ Methods$$

$$\bullet\ (Methods) \triangle (end\_sequencer\_app\,.\,NestedMissionSequencer \longrightarrow \textbf{Skip})$$

end

4.3 NestedMission

section *NestedMissionApp* **parents** *scj_prelude*, *MissionId*, *MissionIds*, *SchedulableId*, *SchedulableIds*, *MissionChan*, *SchedulableMethChan*

process $NestedMissionApp \mathrel{\widehat=} \textbf{begin}$

$$InitializePhase \mathrel{\widehat=} \begin{pmatrix} initializeCall\,.\,NestedMission \longrightarrow \\ register\,!\,NestedOneShotEventHandler\,!\,NestedMission \longrightarrow \\ initializeRet\,.\,NestedMission \longrightarrow \\ \textbf{Skip} \end{pmatrix}$$

$$CleanupPhase \mathrel{\widehat=} \begin{pmatrix} cleanupMissionCall\,.\,NestedMission \longrightarrow \\ cleanupMissionRet\,.\,NestedMission\,?\,\textbf{False} \longrightarrow \\ \textbf{Skip} \end{pmatrix}$$

$$Methods \mathrel{\widehat=} \begin{pmatrix} InitializePhase \\ \Box \\ CleanupPhase \end{pmatrix}\ ;\ Methods$$

$$\bullet\ (Methods) \triangle (end\_mission\_app\,.\,NestedMission \longrightarrow \textbf{Skip})$$

end

4.4 Schedulables of NestedMission

section *NestedOneShotEventHandlerApp* **parents** *OneShotEventHandlerChan*, *SchedulableId*, *SchedulableIds*

process *NestedOneShotEventHandlerApp* $\widehat{=}$ **begin**

$$
\begin{array}{l}
Methods \mathrel{\widehat{=}} \\
handlerAsyncEvent \mathbin{;} Methods
\end{array}
$$

$$
\begin{array}{l}
handlerAsyncEvent \mathrel{\widehat{=}} \\
\left(\begin{array}{l}
handleAsyncEventCall \mathbin{.} NestedOneShotEventHandler \longrightarrow \\
handleAsyncEventRet \mathbin{.} NestedOneShotEventHandler \longrightarrow \\
\mathbf{Skip}
\end{array}\right)
\end{array}
$$

$\bullet$ $(Methods) \mathbin{\triangle} (end\_oneShot\_app \mathbin{.} NestedOneShotEventHandler \longrightarrow \mathbf{Skip})$

end