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Concern Annotation Creators: CPS Designers
Covered Concern: HMT (Process Problem - Action - What if this action does not complete or does not complete on time?)
Potentially Affected Stakeholders: Logistics Center Workers
HMT-Dimension Analysis:

- *Transparency (Observability)*
The Inbound Location Sensor System (ILSS) detects the problem based on a defined timeout.
- *Transparency (Predictability)*
na
- *Augmented Cognition (Directing Attention)*
The ILSS informs the HA via an acoustic signal.
- *Augmented Cognition (Solution Exploration)*
The ILSS sends a notification message to the HA suggesting to reposition the item.
- *Augmented Cognition (Adaptability)*
na
- *Coordination (Directability)*
na
- *Coordination (Calibrated Trust)*
na
- *Coordination (Common Ground)*
- The HA uses color markers as a guideline to reposition the item.
- The HA is referred to the user manual of the ILSS.

Concern Annotation Creators: CPS Designers
Covered Concern: HMT (Process Problem - Action - What if this action does not complete or does not complete on time?)
Potentially Affected Stakeholders: Logistics Center Workers
HMT-Dimension Analysis:

- *Transparency (Observability)*
The Inbound Location Sensor System (ILSS) detects a problem (related to communication) based on a defined timeout.
- *Transparency (Predictability)*
na
- *Augmented Cognition (Directing Attention)*
The ILSS sends a notification message to the HA.
- *Augmented Cognition (Solution Exploration)*
The notification message specifies the suspected problem (including any error messages that may have occurred) and provides respective suggestions to help resolve the issue.
- *Augmented Cognition (Adaptability)*
The problem description and resolution suggestions provided by the ILSS are tailored based on the available problem-related information.
- *Coordination (Directability)*
na
- *Coordination (Calibrated Trust)*
na
- *Coordination (Common Ground)*
- The HA is referred to manuals for the ILSS and the ATS or SCMS, as well as an internal document listing common network errors.
- The HA is referred to a network technician in order to help resolve the problem.

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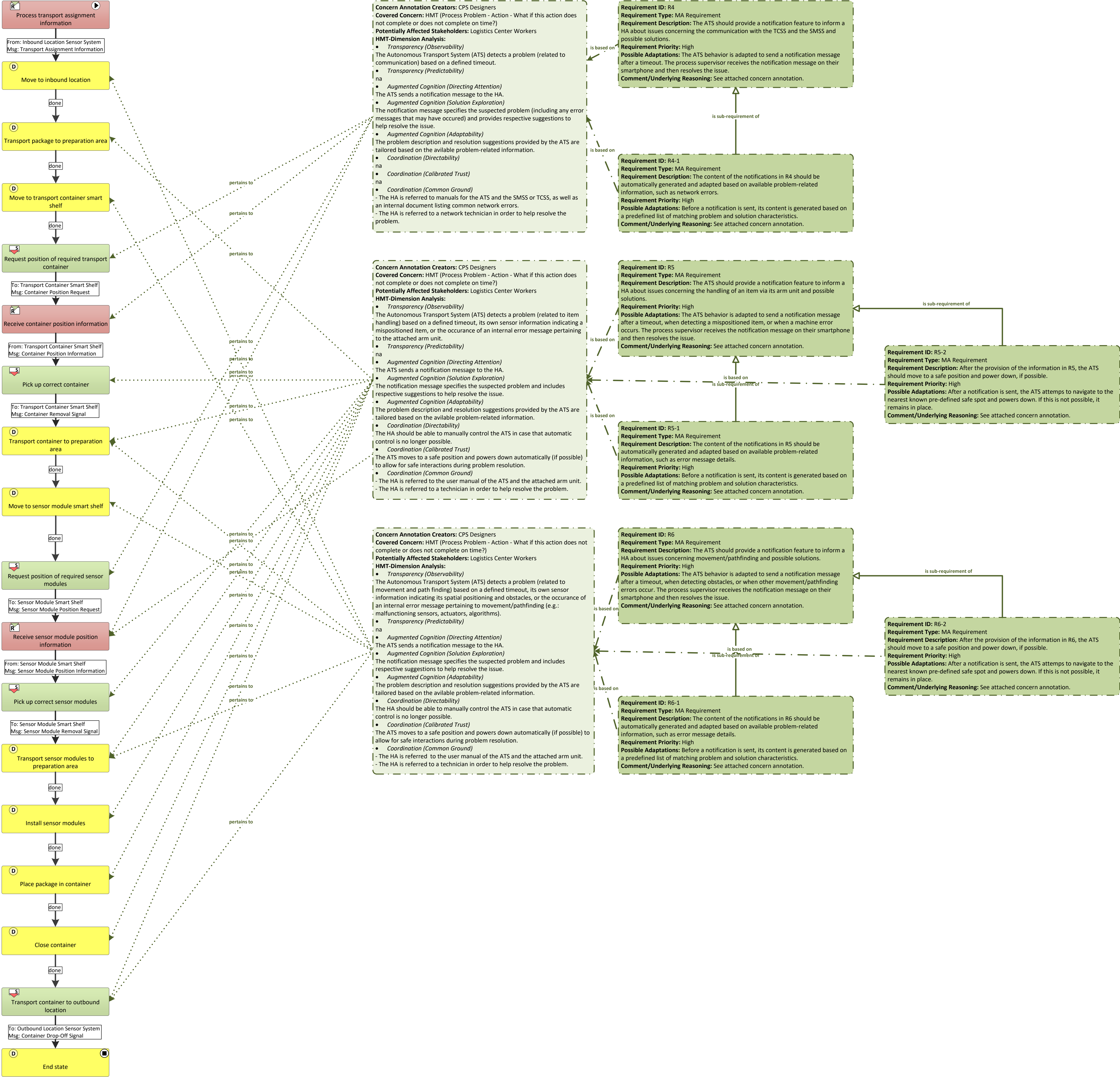
Requirement ID: R1
Requirement Type: MA Requirement
Requirement Description: The ILSS should provide a notification feature to inform a HA about issues concerning the automated reading of good and transport assignment information and possible solutions.
Requirement Priority: High
Possible Adaptations: Adaptation 1: The ILSS behavior is adapted to trigger an acoustic signal after a timeout. The process supervisor receives this signal and then resolves the issue. Adaptation 2: The ILSS behavior is adapted to send a notification message after a timeout. The process supervisor receives the notification message on their smartphone and then resolves the issue.
Comment/Underlying Reasoning: See attached concern annotation.

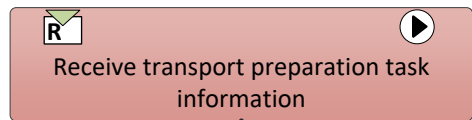
Requirement ID: R2
Requirement Type: Environment Requirement
Requirement Description: The inbound location should use color markers to show the correct positioning of a good.
Requirement Priority: Medium
Possible Adaptations: These color markers are used during the adaptations of R1 to help a process supervisor resolve possible positioning problems.
Comment/Underlying Reasoning: See attached concern annotation.

Requirement ID: R3
Requirement Type: MA Requirement
Requirement Description: The ILSS should provide a notification feature to inform a HA about issues concerning the communication with the ATS and the SCMS and possible solutions.
Requirement Priority: High
Possible Adaptations: The ILSS behavior is adapted to send a notification message after a timeout. The process supervisor receives the notification message on their smartphone and then resolves the issue.
Comment/Underlying Reasoning: See attached concern annotation.

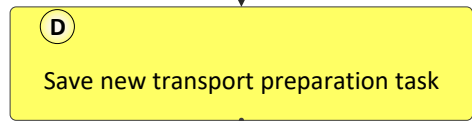
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Requirement ID: R3-1
Requirement Type: MA Requirement
Requirement Description: The content of the notifications in R3 should be automatically generated and adapted based on available problem-related information, such as network errors.
Requirement Priority: High
Possible Adaptations: Before a notification is sent, its content is generated based on a predefined list of matching problem and solution characteristics.
Comment/Underlying Reasoning: See attached concern annotation.

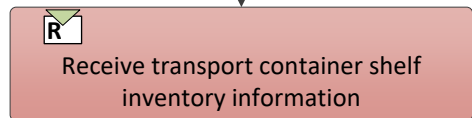




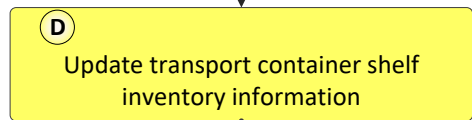
From: Inbound Location Sensor System
Msg: Transport Preparation Task Information



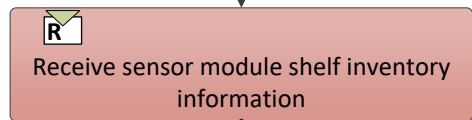
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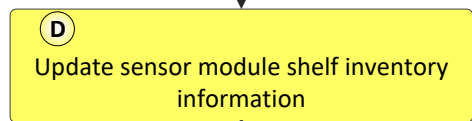
From: Transport Container Smart Shelf
Msg: Transport Container Shelf Inventory Information



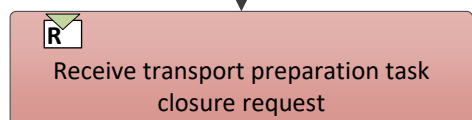
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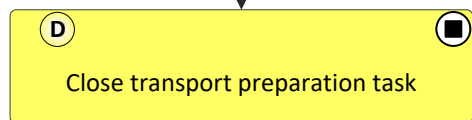
From: Sensor Module Smart Shelf
Msg: Sensor Module Shelf Inventory Information

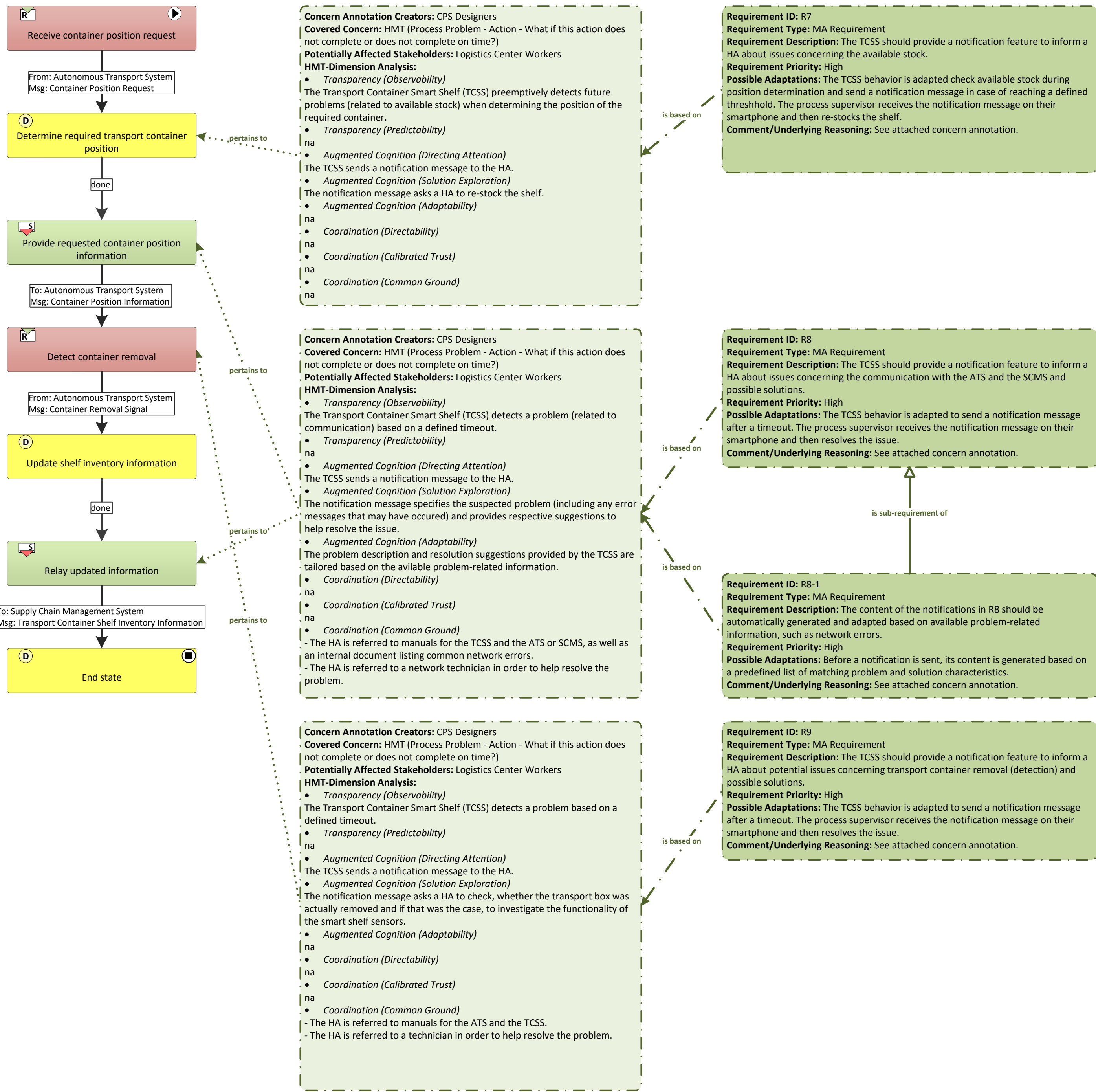


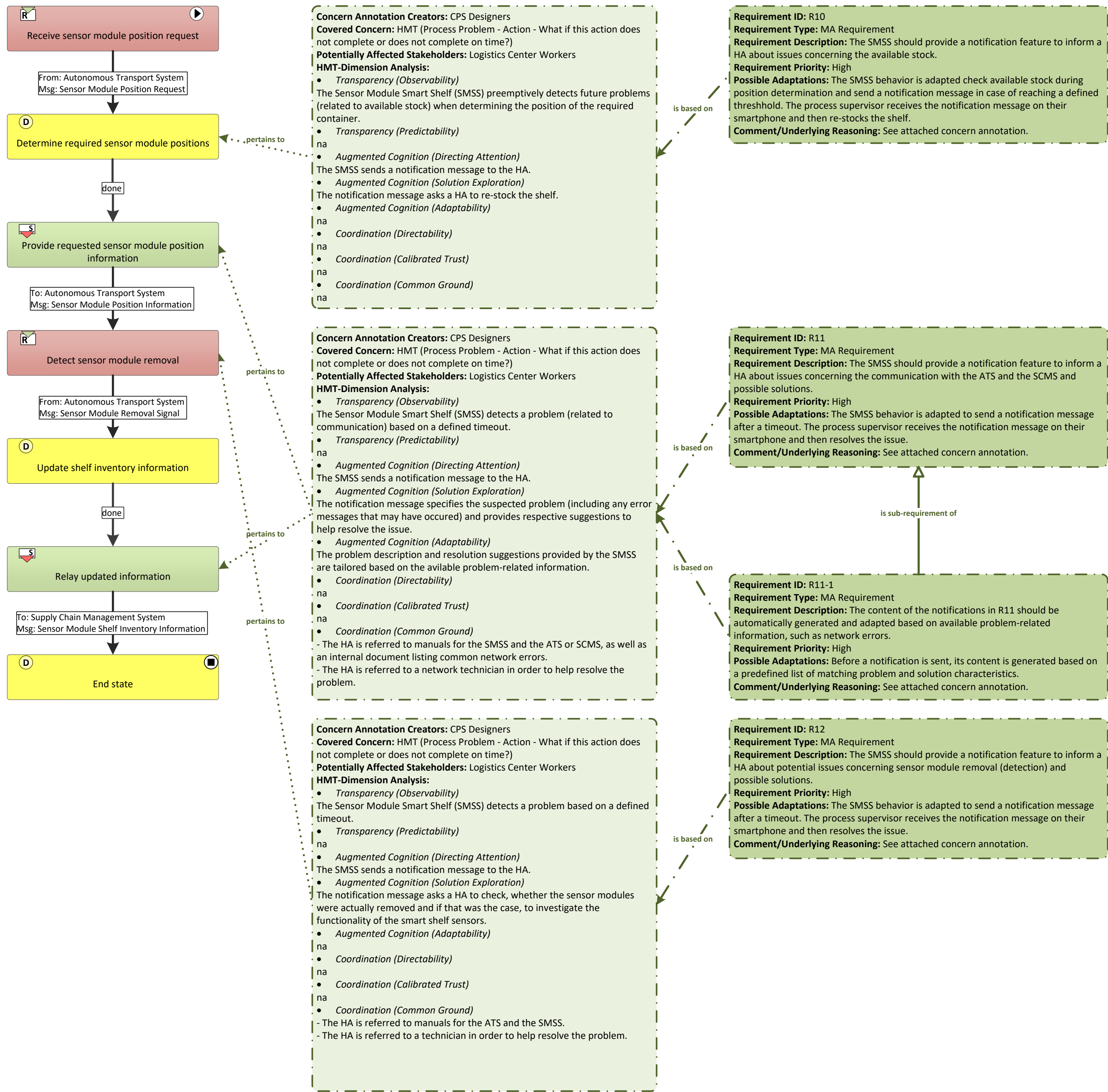
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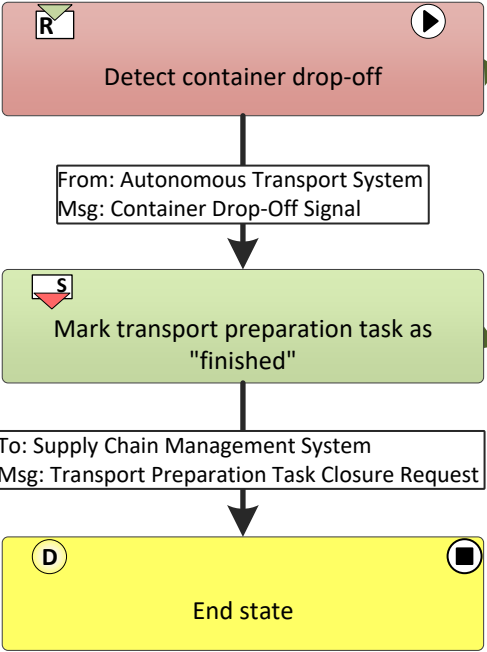


From: Outbound Location Sensor System
Msg: Transport Preparation Task Closure Request









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Covered Concern: HMT (Process Problem - Action - What if this action does not complete or does not complete on time?)
Potentially Affected Stakeholders: Logistics Center Workers
HMT-Dimension Analysis:

- *Transparency (Observability)*
The HA checks the outbound location and open transport preparation task information periodically in order to identify detection malfunctions.
- *Transparency (Predictability)*
na
- *Augmented Cognition (Directing Attention)*
na
- *Augmented Cognition (Solution Exploration)*
na
- *Augmented Cognition (Adaptability)*
na
- *Coordination (Directability)*
na
- *Coordination (Calibrated Trust)*
na
- *Coordination (Common Ground)*
na

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Requirement ID: R13
Requirement Type: HA Requirement
Requirement Description: A HA needs to periodically check the outbound location and open transport preparation task information in order to identify and resolve malfunctions.
Requirement Priority: Medium
Possible Adaptations: A separate process needs to be established, which lies outside the scope of the current models.
Comment/Underlying Reasoning: See attached concern annotation.

Concern Annotation Creators: CPS Designers
Covered Concern: HMT (Process Problem - Action - What if this action does not complete or does not complete on time?)
Potentially Affected Stakeholders: Logistics Center Workers
HMT-Dimension Analysis:

- *Transparency (Observability)*
The Outbound Location Sensor System (OLSS) detects a problem (related to communication) based on a defined timeout.
- *Transparency (Predictability)*
na
- *Augmented Cognition (Directing Attention)*
The OLSS sends a notification message to the HA.
- *Augmented Cognition (Solution Exploration)*
The notification message specifies the suspected problem (including any error messages that may have occurred) and provides respective suggestions to help resolve the issue.
- *Augmented Cognition (Adaptability)*
The problem description and resolution suggestions provided by the OLSS are tailored based on the available problem-related information.
- *Coordination (Directability)*
na
- *Coordination (Calibrated Trust)*
na
- *Coordination (Common Ground)*
- The HA is referred to manuals for the OLSS and SCMS, as well as an internal document listing common network errors.
- The HA is referred to a network technician in order to help resolve the problem.

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Requirement ID: R14
Requirement Type: MA Requirement
Requirement Description: The OLSS should provide a notification feature to inform a HA about issues concerning the communication with the SCMS and possible solutions.
Requirement Priority: High
Possible Adaptations: The OLSS behavior is adapted to send a notification message after a timeout. The process supervisor receives the notification message on their smartphone and then resolves the issue.
Comment/Underlying Reasoning: See attached concern annotation.

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Requirement ID: R14-1
Requirement Type: MA Requirement
Requirement Description: The content of the notifications in R13 should be automatically generated and adapted based on available problem-related information, such as network errors.
Requirement Priority: High
Possible Adaptations: Before a notification is sent, its content is generated based on a predefined list of matching problem and solution characteristics.
Comment/Underlying Reasoning: See attached concern annotation.

