

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 acustic signal.

• Augmented Cognition (Solution Exploration)

The ILSS sends a notification message to the HA suggesting to reposition the

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.

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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 occured) 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 avilable 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.

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 acustic 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.

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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.

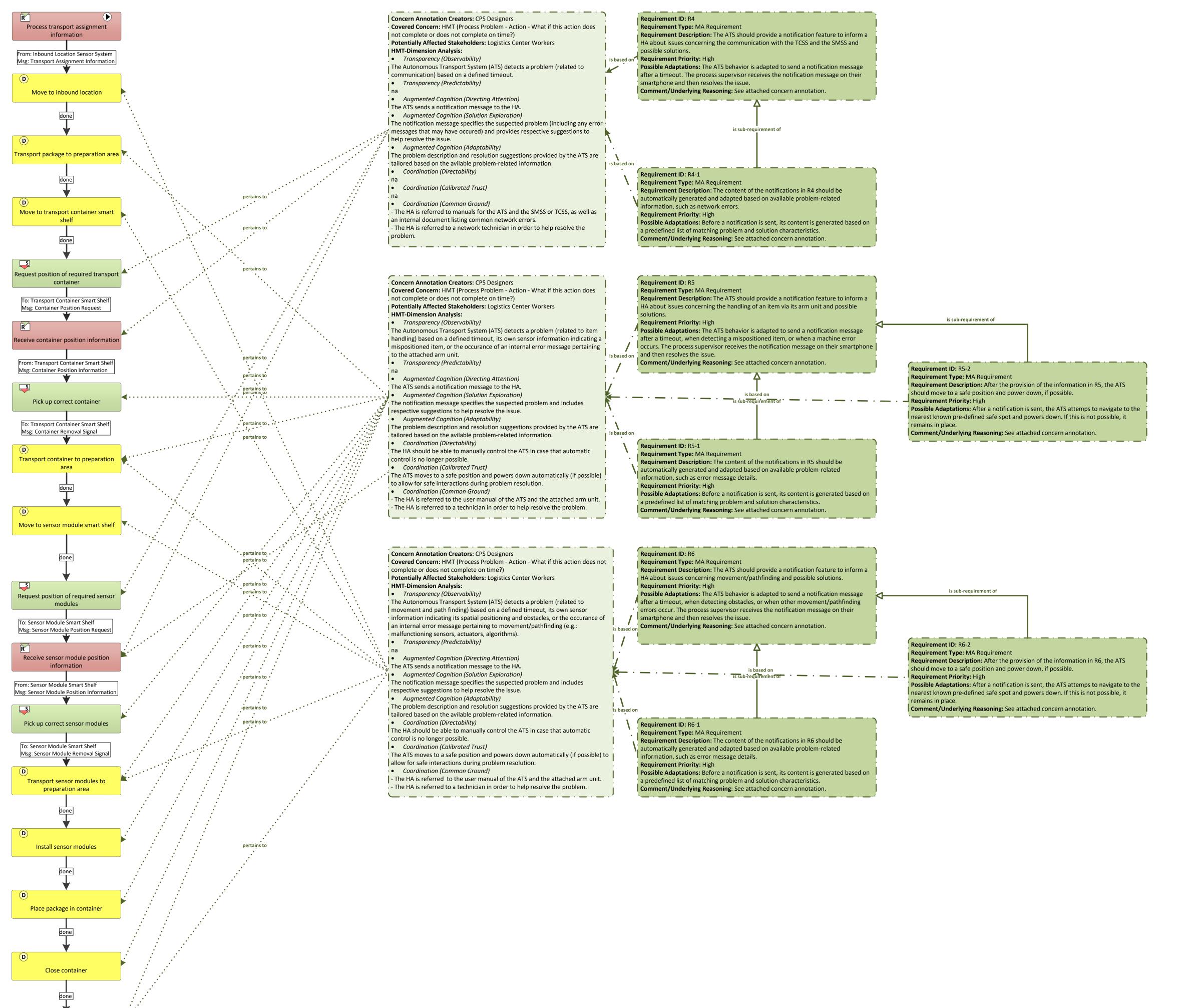
Requirement Priority: High

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.

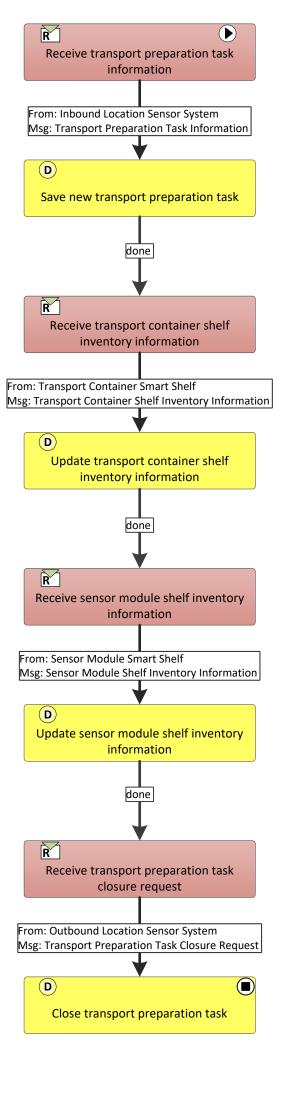
pertains to

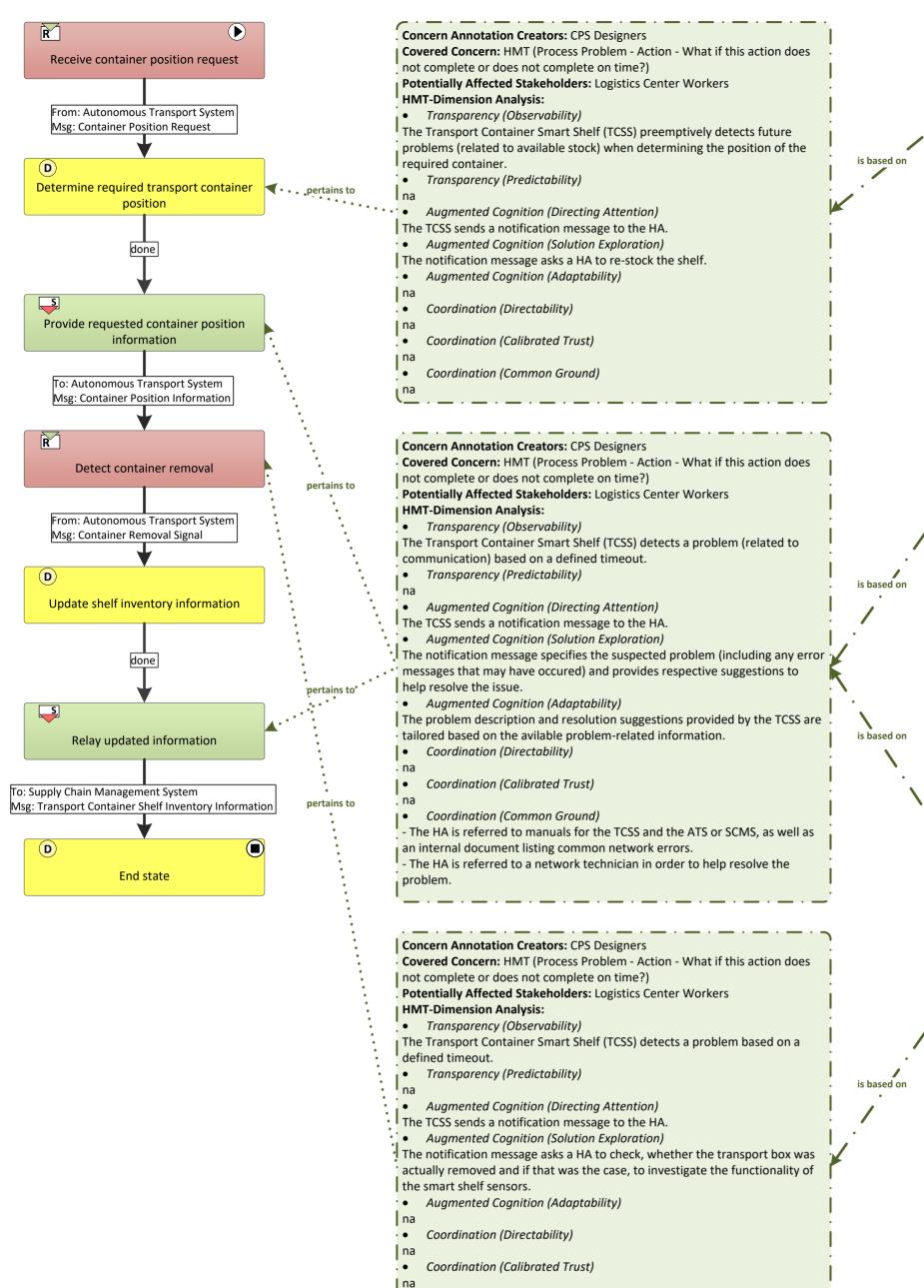


Transport container to outbound location

To: Outbound Location Sensor System Msg: Container Drop-Off Signal

End state





Coordination (Common Ground)

- The HA is referred to manuals for the ATS and the TCSS.

- The HA is referred to a technician in order to help resolve the problem.

smartphone and then re-stocks the shelf. **Comment/Underlying Reasoning:** See attached concern annotation. Requirement ID: R8 Requirement Type: MA Requirement Requirement Description: The TCSS 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 TCSS 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. is sub-requirement of Requirement ID: R8-1 Requirement Type: MA Requirement Requirement Description: The content of the notifications in R8 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. Requirement ID: R9 Requirement Type: MA Requirement Requirement Description: The TCSS should provide a notification feature to inform a HA about potential issues concerning transport container removal (detection) and possible solutions. Requirement Priority: High Possible Adaptations: The TCSS 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 Description: The TCSS should provide a notification feature to inform a

position determination and send a notification message in case of reaching a defined

Possible Adaptations: The TCSS behavior is adapted check available stock during

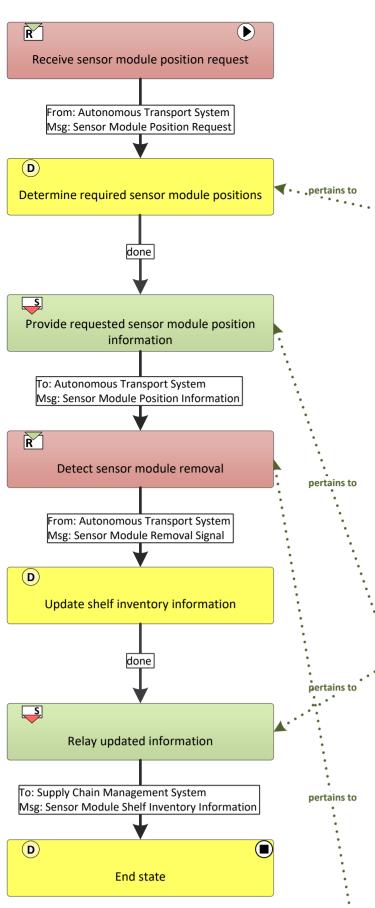
threshhold. The process supervisor receives the notification message on their

Requirement ID: R7

Requirement Priority: High

Requirement Type: MA Requirement

HA about issues concerning the available stock.



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 Sensor Module Smart Shelf (SMSS) preemptively detects future problems (related to available stock) when determining the position of the required container. • Transparency (Predictability) na Augmented Cognition (Directing Attention) The SMSS sends a notification message to the HA. • Augmented Cognition (Solution Exploration) The notification message asks a HA to re-stock the shelf. Augmented Cognition (Adaptability) l na Coordination (Directability) l na Coordination (Calibrated Trust) na Coordination (Common Ground) **Concern Annotation Creators:** CPS Designers **Covered Concern:** HMT (Process Problem - Action - What if this action does

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Requirement Type: MA Requirement Requirement Description: The SMSS should provide a notification feature to inform a HA about issues concerning the available stock. Requirement Priority: High

Possible Adaptations: The SMSS behavior is adapted check available stock during position determination and send a notification message in case of reaching a defined threshhold. The process supervisor receives the notification message on their smartphone and then re-stocks the shelf.

Comment/Underlying Reasoning: See attached concern annotation.

not complete or does not complete on time?)

Potentially Affected Stakeholders: Logistics Center Workers **HMT-Dimension Analysis:**

Transparency (Observability)

The Sensor Module Smart Shelf (SMSS) detects a problem (related to communication) based on a defined timeout.

Transparency (Predictability)

Augmented Cognition (Directing Attention)

The SMSS 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 occured) and provides respective suggestions to help resolve the issue.

Augmented Cognition (Adaptability)

The problem description and resolution suggestions provided by the SMSS are tailored based on the avilable problem-related information.

Coordination (Directability)

na

Coordination (Calibrated Trust) na

Coordination (Common Ground)

- The HA is referred to manuals for the SMSS 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

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 Sensor Module Smart Shelf (SMSS) detects a problem based on a defined timeout.

Transparency (Predictability)

Augmented Cognition (Directing Attention)

The SMSS sends a notification message to the HA. Augmented Cognition (Solution Exploration)

The notification message asks a HA to check, whether the sensor modules were actually removed and if that was the case, to investigate the functionality of the smart shelf sensors.

Augmented Cognition (Adaptability)

Coordination (Directability)

Coordination (Calibrated Trust)

na Coordination (Common Ground)

- The HA is referred to manuals for the ATS and the SMSS.

- The HA is referred to a technician in order to help resolve the problem.

Requirement ID: R11 Requirement Type: MA Requirement

Requirement ID: R10

Requirement Description: The SMSS 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 SMSS 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.

is sub-requirement of

Requirement ID: R11-1

Requirement Type: MA Requirement

Requirement Description: The content of the notifications in R11 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.

Requirement ID: R12

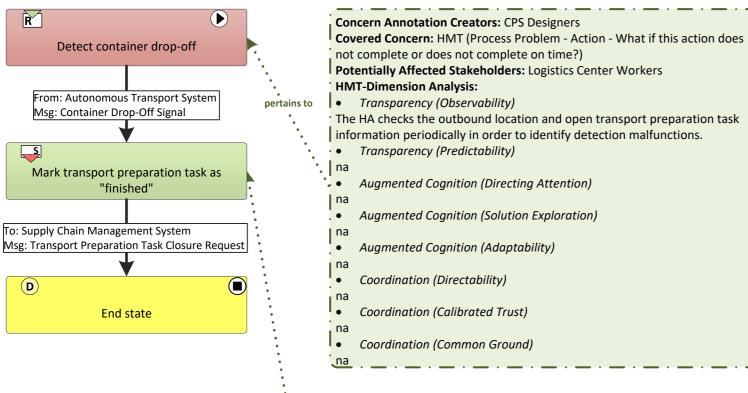
Requirement Type: MA Requirement

Requirement Description: The SMSS should provide a notification feature to inform a HA about potential issues concerning sensor module removal (detection) and possible solutions.

Requirement Priority: High

Possible Adaptations: The SMSS 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: R14

Requirement Type: MA Requirement

Requirement ID: R13

malfunctions.

Requirement Type: HA Requirement

Requirement Priority: Medium

the scope of the current models.

Requirement Description: The OLSS should provide a notification feature to inform a

Requirement Description: A HA needs to periodically check the outbound location

Possible Adaptations: A separate process needs to be established, which lies outside

and open transport preparation task information in order to identify and resolve

Comment/Underlying Reasoning: See attached concern annotation.

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.

is sub-requirement of

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.

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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)

pertains to

• 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 occured) 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 avilable problem-related information.

Coordination (Directability)

Coordination (Calibrated Trust)

• Coordination (Common Ground)

- The HA is referred to manuals for the OLSS and SCMS, as well as an internal document listing common network errors.

problem.

is based on

- The HA is referred to a network technician in order to help resolve the

is based on