

GROUP 09
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HighwayToSafety
MESSIR Analysis Document
- v 1.0 -

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Chapter 1

Introduction

1.1 Overview

HighwayToSafety is a simple system intended to help users organising and managing the aftermath of an highway car crash as effectively as possible. It assures a quick communication between the workforce, who are on the site of the accident and their colleagues who work at the emergency centrals.

1.2 Purpose and recipients of the document

This document is an analysis document complying with the MESSIR methodology. Its intent is to provide a first simple example of a precise specification of the functional properties of the HTS system.

The recipients of this document are:

- the HTS system's buyer company (ABC): this document is used as a contractual document jointly with any other document considered as useful (as requirement elicitation document, ...) in order to have a higher degree of precision in requirement description. It is also used as a basis document for the HTS system validation using specification based testing.
- the HTS system development company (ADC) will use this document as the basis for development (mainly design, implementation, maintenance). It is also used for verification and validation using test plans defined using the analysis models described in this document and according to the HTS methodology.

1.3 Application Domain

The HTS system belongs to the Crisis Management Systems Domain. It is a system dedicated to only crisis professional end users.

It is not an institutional system certified and guaranteed by any governmental entity and thus must be used with caution.

1.4 Definitions, acronyms and abbreviations

HTS - HighwayToSafety

1.5 Document structure

The document structure is designed to be coherent with the **Messip** methodology [1]. Section 2 provides a general description of the system purpose, its users, its environment and some general non functional requirements. A more detailed description of the non functional requirements related to dependability, if any, are provided in section 7. The **system operations** triggered by input events coming from the external **actors** belonging to the environment are described in Section 3. The **HTS** concepts used to represent the any persistent or transient information is given in Section 4. The precise specification of the system operations in term of system's state changes, events sent together with the constraints on the allowed sequences of system operations are described in Section 5.

Chapter 2

General Description

2.1 Domain Stakeholders

All stakeholders of the system are detailed in this section. After a brief description of a stakeholder, its objectives are first stated. Thereafter, the responsibilities of the stakeholder are detailed which help to achieve the stakeholder objectives to a certain degree. While the objectives characterize the general problems addressed by the *iCrashMini* system, the responsibilities describe concrete actions that are expected from a stakeholder. Some of these responsibilities can be traced looking at the use case described in Section 2.3, and hence must be supported by the *iCrashMini* system. All stakeholders listed in this section have an interest in the system or are affected by the system in some way, but only a subset of the stakeholders are directly involved in the use cases described. Let us remind that use case diagrams or descriptions are not **Messip** analysis phase mandatory outputs. They are proposed as informal means to help understanding the semantics of the system specification made of the mandatory analysis models, which provide a complete executable specification.

2.2 System's Actors

2.2.1 Emergency Central

Emergency Central Administrator Most likely a chief or someone with high autorities in the Emergency Central. His job is to assign fellow colleagues as coordinators.

Emergency Central Coordinator An Emergency Central Coordinator is an employee who has been given special rights by the administrator. His job is:

1. To check the incident's location with the notifier.
2. To create the new event in the system.
3. To send a dispatch message to the corresponding coordinators.

2.2.2 Firemen

General idea : The most important dispatched coordinators, because they are the ones sitting in the ambulances and providing first aids to the injured individuals.

Firemen Administrator Most likely a chief or someone with high autorities in the Firemen Department. His job is to assign fellow colleagues as coordinators.

Firemen Coordinator A Firemen Coordinator is a Team Leader who has been given special rights by the administrator. His job is:

1. To assemble his team as soon as possible when a dispatch request is received.
2. To provide information on his Team's whereabouts.
3. To call for backup if needed when on-site.
4. To send messages if needed.

2.2.3 Tow Service

General idea : Dispatched coordinators responsible of clearing the highway of the destroyed cars.

Tow Service Administrator Most likely a chief or someone with high autorities in the Tow Service. His job is to assign fellow colleagues as coordinators.

Tow Service Coordinator A Tow Service Coordinator is a Team Leader who has been given special rights by the administrator. His job is:

1. To assemble his team as soon as possible when a dispatch request is received.
2. To provide information on his Team's whereabouts.
3. To send messages if needed.

2.2.4 Police

General idea : General idea : Dispatched coordinators responsible of solving eventual conflicts between the victims.

Police Administrator Most likely a chief or someone with high authorities in the Police Department. His job is to assign fellow colleagues as coordinators.

Police Coordinator A Police Coordinator is a Team Leader who has been given special rights by the administrator. His job is:

1. To assemble his team as soon as possible when a dispatch request is received.
2. To provide information on his Team's whereabouts.
3. To send messages if needed.

2.2.5 Communication Company

A Communication Company is a company who provides fixed and mobile voice services like POST, TANGO, ORANGE, etc. Its job is to transfer any emergency calls to the Emergency Central and to provide the notifier's geographical position via its network to the system.

2.3 Use Cases Model

This section contains the use cases elicited during the requirements elicitation phase. The use cases are textually described as suggested by the **Messir** method and inspired by the standard Cokburn template [2].

2.3.1 Use Cases

2.3.1.1 summary-suGlobalManagementOfEvent

The goal is to manage the creation of a new crisis event including all the necessary information and to have the requested coordinators arrive on the crisis event's location.

USE-CASE DESCRIPTION	
<i>Name</i>	suGlobalManagementOfEvent
<i>Scope</i>	system
<i>Level</i>	summary
<i>Primary actor(s)</i>	
1	actCentralCoordinator [active]
<i>Secondary actor(s)</i>	
1	actCommunicationCompany [active]
2	actFiremenCoordinator [active]
3	actTowServiceCoordinator [active]
<i>Goal(s) description</i>	
The goal is to manage the creation of a new crisis event including all the necessary information and to have the requested coordinators arrive on the crisis event's location.	
<i>Reuse</i>	
1	<u>ugCreateNewCrisisEvent</u> [1..*]
2	<u>ugGlobalDispatchManagement</u> [1..*]
<i>Protocol condition(s)</i>	
1	none.
<i>Pre-condition(s)</i>	
1	none.
<i>Main post-condition(s)</i>	
1	a new crisis event has been created and modifications have been made by the coordinators to the system and its environment concerning a crisis event.
<i>Main Steps</i>	
a	the actor actCentralCoordinator executes the <u>ugCreateNewCrisisEvent</u> use case
b	the actor actFiremenCoordinator executes the <u>ugGlobalDispatchManagement</u> use case
c	the actor actTowServiceCoordinator executes the <u>ugGlobalDispatchManagement</u> use case
<i>Steps Ordering Constraints</i>	
1	step (a) must be executed before step (b) or step (c)
2	step (b) XOR step (c)
<i>Additional Information</i>	
none	

Figure 2.1 Shows the suGlobaManagementOfEvent use-case and its actors.

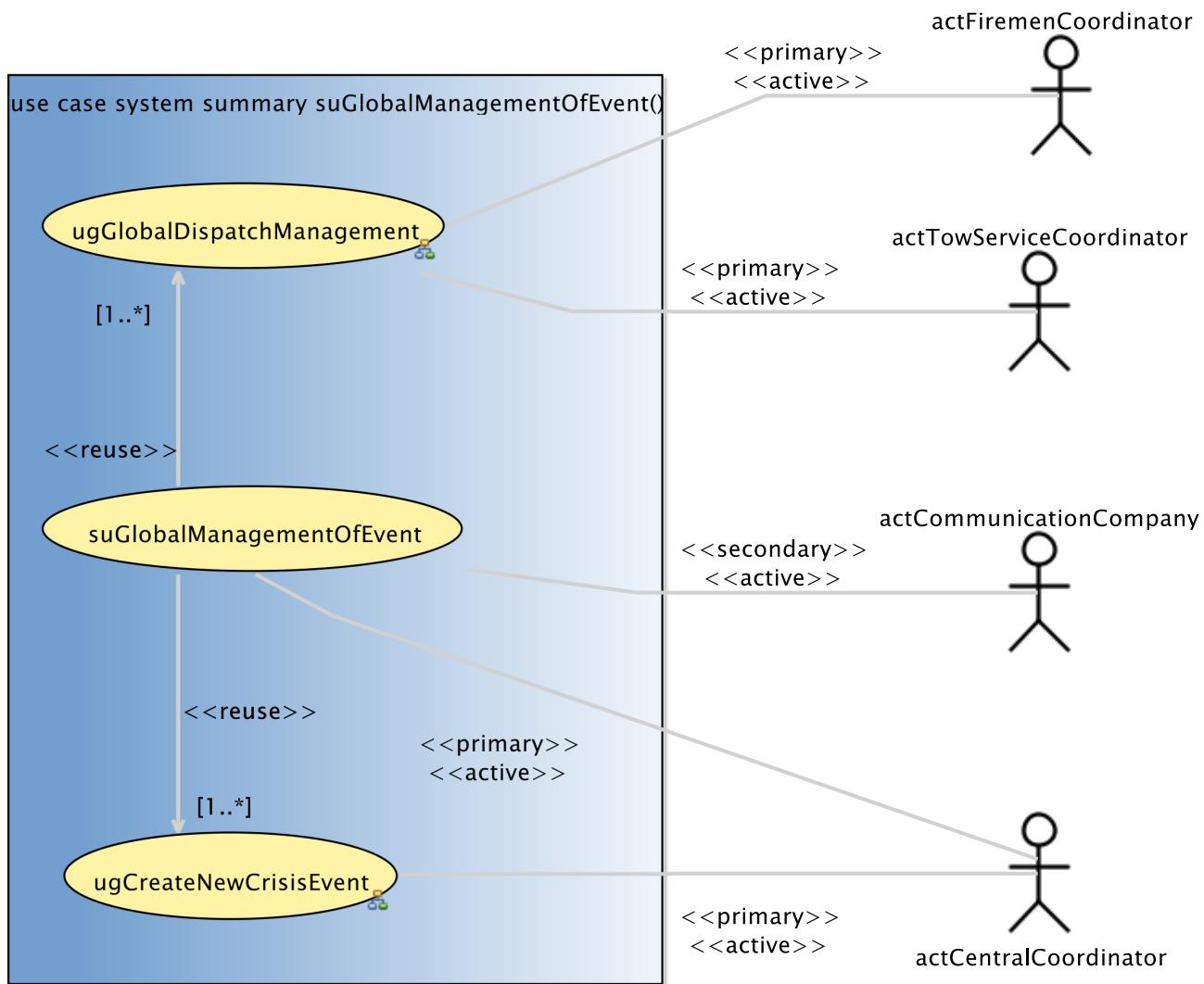


Figure 2.1:

2.3.1.2 usergoal-ugCreateNewCrisisEvent

The goal is to manage the creation of a new crisis event including all the necessary information.

USE-CASE DESCRIPTION	
Name	ugCreateNewCrisisEvent
Scope	system
Level	usergoal
Primary actor(s)	
1	actCentralCoordinator [active]
Secondary actor(s)	
1	actCommunicationCompany [active]
2	actFiremenCoordinator [passive]
3	actTowServiceCoordinator [passive]
Goal(s) description	
The goal is to manage the creation of a new crisis event including all the necessary information.	
Reuse	
1	<u>oeAddNewCrisisEvent [1..*]</u>
2	<u>oeRequestCrisisEventLocation [1..*]</u>
3	<u>oeReceiveCrisisEventLocation [1..*]</u>
4	<u>oeCreateNewCrisisEvent [1..*]</u>
5	<u>oeMovePinOnMap [0..*]</u>
Protocol condition(s)	
1	none.
Pre-condition(s)	
1	none.
Main post-condition(s)	
1	a dispatch order including the crisis event's information such as the id, map with pin, witness's phone number, etc. is sent to nearest, free Firemen Team and Tow Service Team.
Main Steps	
a	the actor actCentralCoordinator executes the <u>oeAddNewCrisisEvent</u> use case
b	the actor actCentralCoordinator executes the <u>oeRequestCrisisEventLocation</u> use case
c	the actor actCommunicationCompany executes the <u>oeReceiveCrisisEventLocation</u> use case
d	the actor actCentralCoordinator executes the <u>oeMovePinOnMap</u> use case
e	the actor actCentralCoordinator executes the <u>oeCreateNewCrisisEvent</u> use case
Steps Ordering Constraints	
1	step (a) must be executed first
2	if step (c) then previously step (b)
3	if step (d) then previously step (c)
4	step (e) executed as last
5	step (a), (b), (c), (e) must be executed at least once
Additional Information	
none	

Figure 2.2 Shows the ugCreateNewCrisisEvent use-case and its actors.

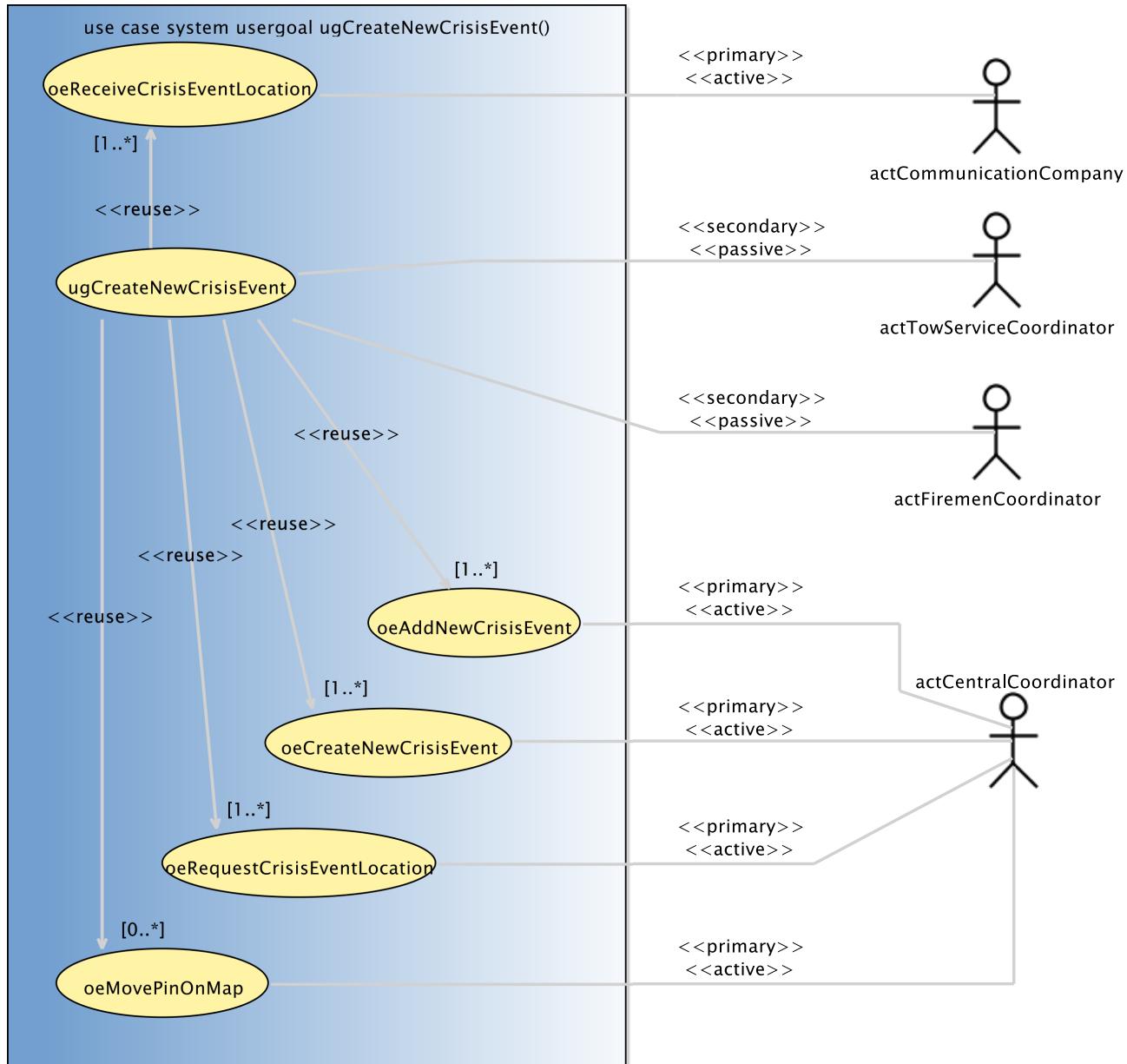


Figure 2.2: ugCreateNewCrisisEvent

2.3.1.3 usergoal-ugGlobalDispatchManagement

The goal is to have the requested coordinators arrive on the crisis event's location.

USE-CASE DESCRIPTION	
Name	ugGlobalDispatchManagement
Scope	system
Level	usergoal
Primary actor(s)	
1	actFiremenCoordinator [active]
2	actTowServiceCoordinator [active]
Secondary actor(s)	
1	actCentralCoordinator [passive]
2	actPoliceCoordinator [active]
Goal(s) description	
The goal is to have the requested coordinators arrive on the crisis event's location.	
Reuse	
1	<u>oeGetCrisisEventInformation</u> [2..*]
2	<u>oeUpdateDispatchStatus</u> [4..*]
3	<u>oeRefreshMap</u> [0..*]
4	<u>oeMessage</u> [0..*]
5	<u>oeRequestHelp</u> [0..*]
6	<u>oeCloseCrisisEvent</u> [2..*]
7	<u>oeAddRequestHelp</u> [0..*]
Protocol condition(s)	
1	none.
Pre-condition(s)	
1	the sender is associated to a crisis event.
Main post-condition(s)	
1	modifications have been made to the system and its environment concerning a crisis event.
Main Steps	
a	the actor actFiremenCoordinator executes the <u>oeGetCrisisEventInformation</u> use case
b	the actor actFiremenCoordinator executes the <u>oeUpdateDispatchStatus</u> use case
c	the actor actTowServiceCoordinator executes the <u>oeGetCrisisEventInformation</u> use case
d	the actor actTowServiceCoordinator executes the <u>oeUpdateDispatchStatus</u> use case
e	the actor actTowServiceCoordinator executes the <u>oeRefreshMap</u> use case
f	the actor actTowServiceCoordinator executes the <u>oeMessage</u> use case
g	the actor actFiremenCoordinator executes the <u>oeAddRequestHelp</u> use case
h	the actor actFiremenCoordinator executes the <u>oeRequestHelp</u> use case
i	the actor actPoliceCoordinator executes the <u>oeGetCrisisEventInformation</u> use case
j	the actor actPoliceCoordinator executes the <u>oeUpdateDispatchStatus</u> use case
k	the actor actFiremenCoordinator executes the <u>oeCloseCrisisEvent</u> use case
l	the actor actTowServiceCoordinator executes the <u>oeCloseCrisisEvent</u> use case
m	the actor actPoliceCoordinator executes the <u>oeCloseCrisisEvent</u> use case

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... Use-Case Description table continuation

Steps Ordering Constraints	
1	if step (b),(d),(j) then previously step (a),(c),(i) respectively
2	if step (k),(l),(m) then previously step (b),(d),(j) at least two times respectively
3	step (h) can only be executed if step (g) has at least been executed once previously
4	if step (i) then previously step (h)
Additional Information	
none	

Figure 2.3 Shows the ugGlobalDispatchManagement use-case and its actors.

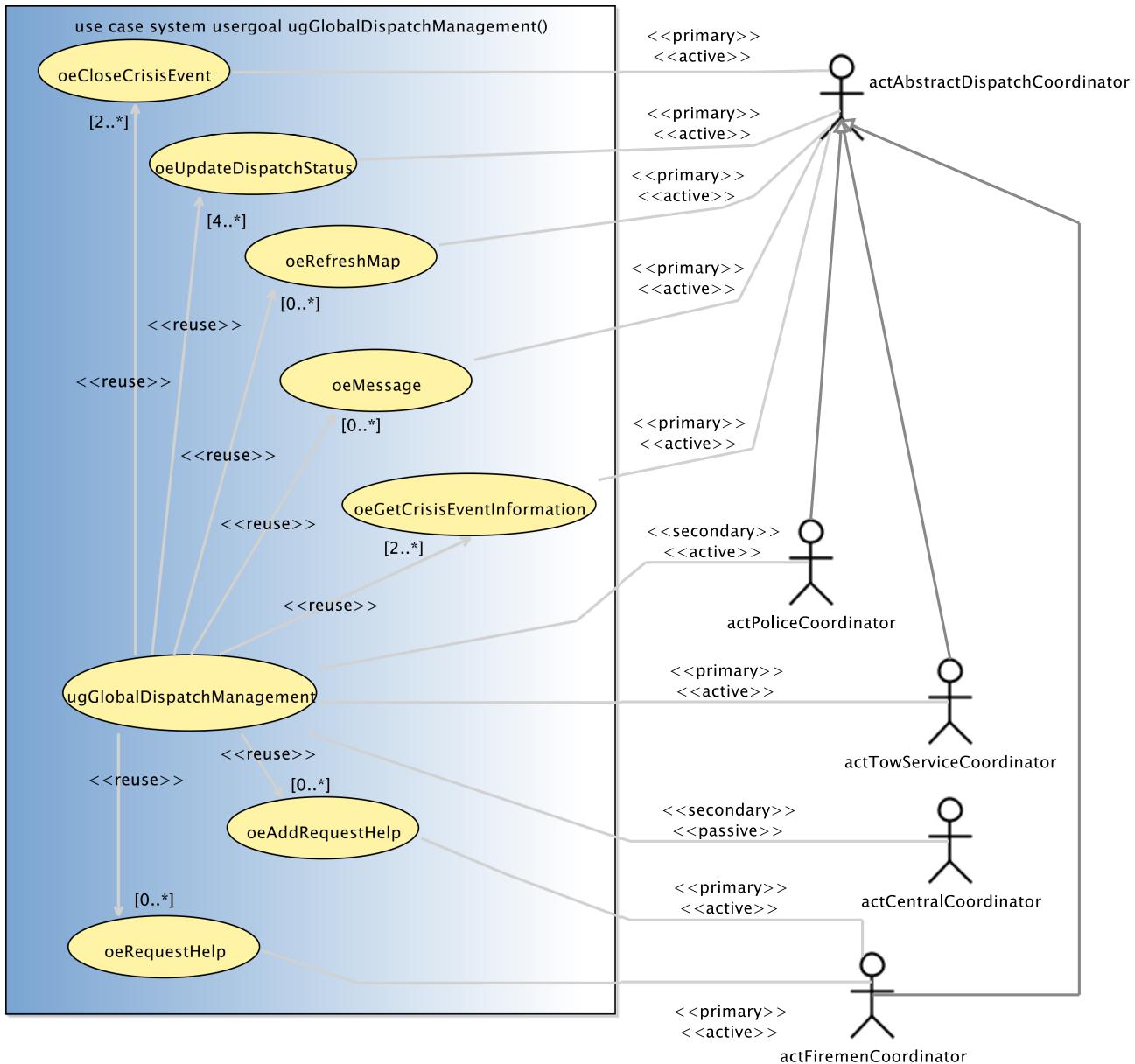


Figure 2.3: ugGlobalDispatchManagement

2.3.2 Use Case Instance(s)

2.3.2.1 Use-Case Instance - uciugCreateNewCrisiEvent:ugCreateNewCrisisEvent

Shows the ugCreateNewCrisisEvent instance.

USERGOAL USE-CASE INSTANCE	
<i>Instantiated Use Case</i>	
ugCreateNewCrisisEvent	
<i>Instance ID</i>	
uciugCreateNewCrisiEvent	

Figure 2.4 Shows the ugCreateNewCrisisEvent instance.

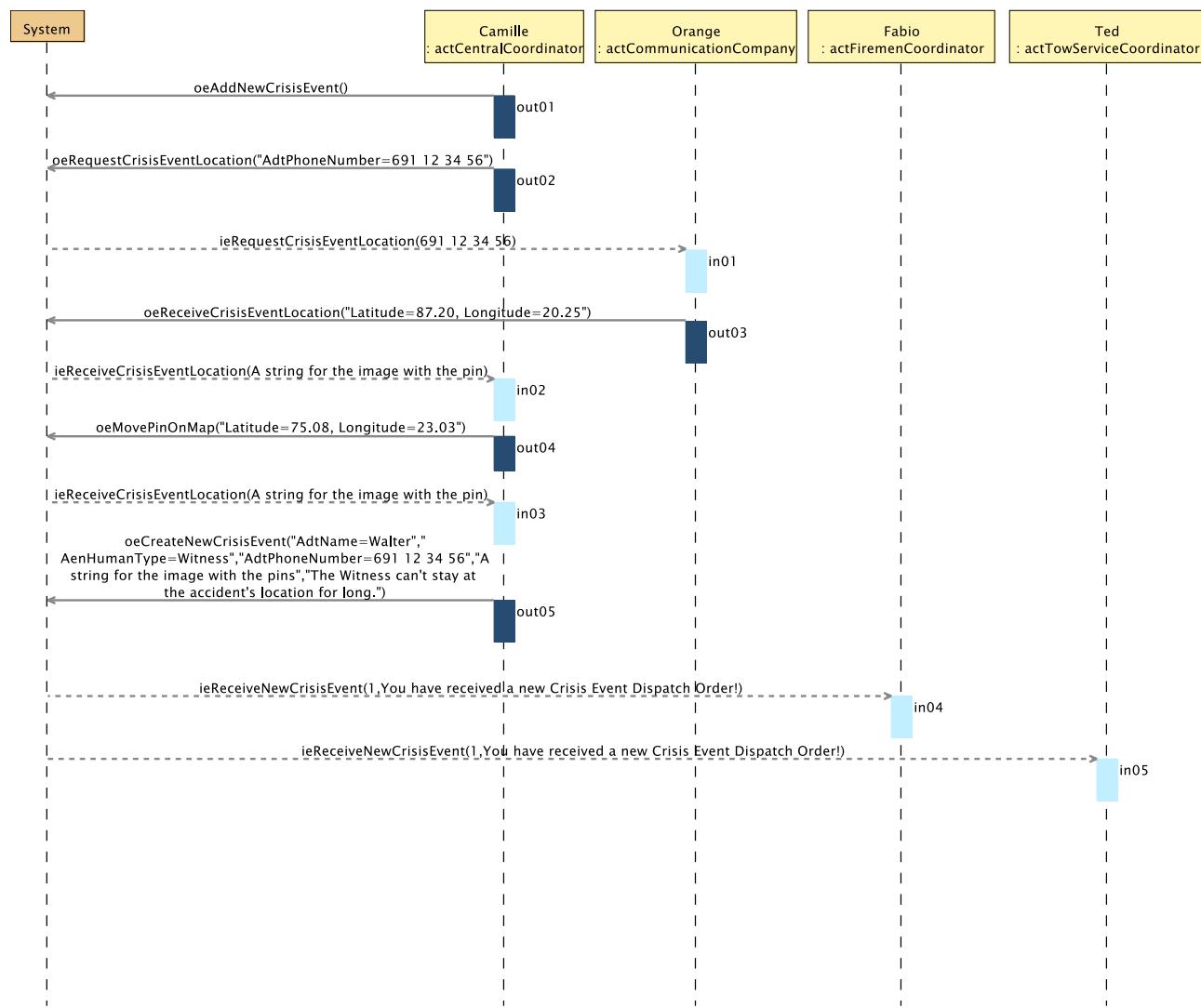


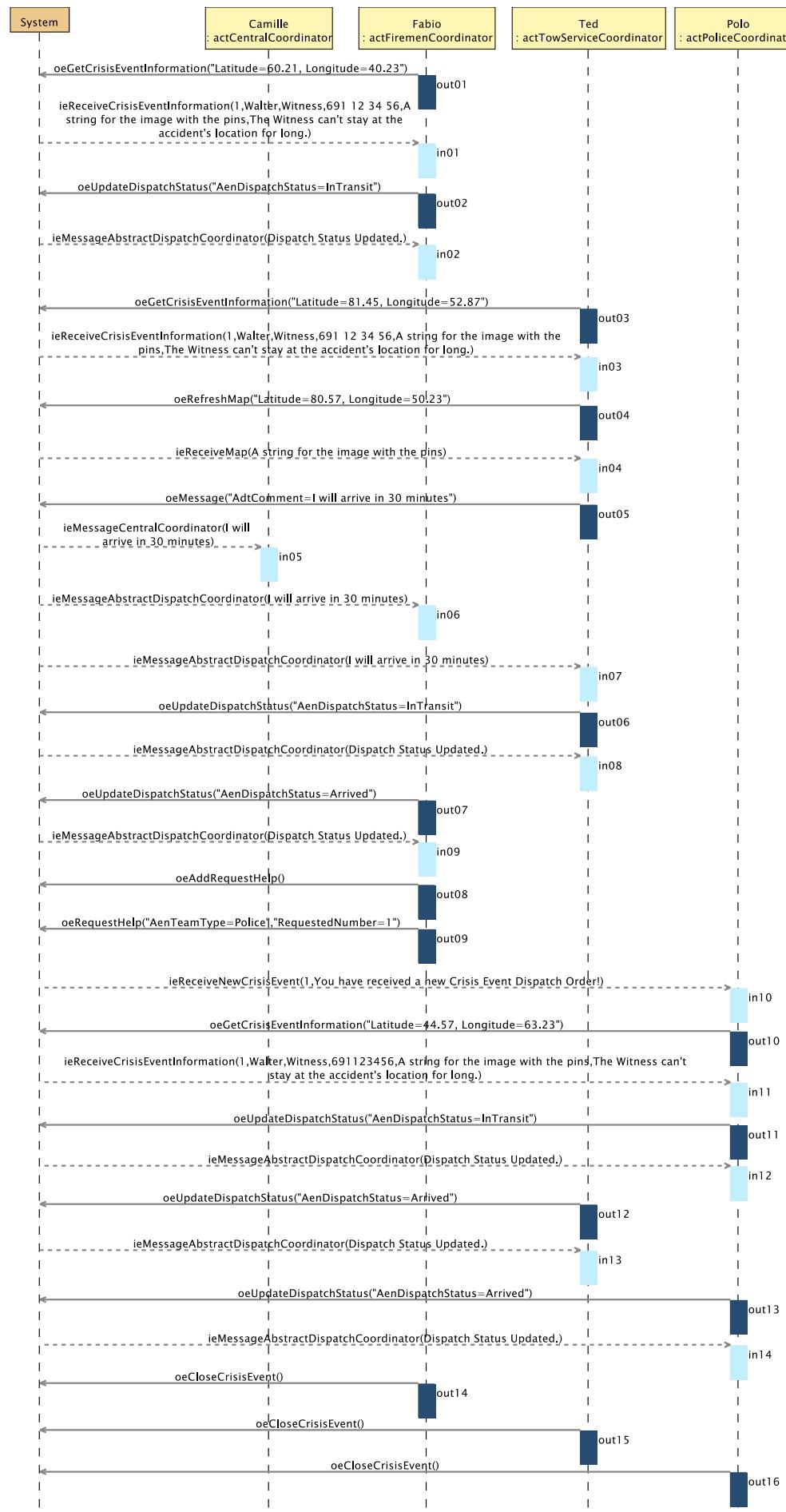
Figure 2.4: ugCreateNewCrisisEvent

2.3.2.2 Use-Case Instance - uciugGlobalDispatchManagement:ugGlobalDispatchManagement

Shows the ugGlobalDispatchManagement instance.

USERGOAL USE-CASE INSTANCE
<i>Instantiated Use Case</i> ugGlobalDispatchManagement
<i>Instance ID</i> uciugGlobalDispatchManagement

Figure 2.5 Shows the ugGlobalDispatchManagement instance.



Chapter 3

Environment Model

3.1 Environment model view(s)

There are no view(s) for the **Messir** environment model.

3.2 Actors and Interfaces Descriptions

We provide for the given views the description of the actors together with their associated input and output interface descriptions.

3.2.1 **actAbstractDispatchCoordinator** Actor

ACTOR
<i>actAbstractDispatchCoordinator</i>
An abstract Actor which brings together the common operations of the FiremenCoordinator, the PoliceCoordinator and the TowServiceCoordinator.
<i>OutputInterfaces</i>
OUT 1 oeMessage (AdtComment : dtComment) : ptBoolean
OUT 2 oeUpdateDispatchStatus (AetDispatchStatus : etDispatchStatus) : ptBoolean
<i>InputInterfaces</i>
IN 1 ieReceiveNewCrisisEvent (AdtCrisisID : dtCrisisID, AMesssage : dtString) : ptBoolean
IN 2 ieMessageAbstractDispatchCoordinator (AdtComment : dtComment) : ptBoolean

3.2.2 **actCentralCoordinator** Actor

ACTOR
<i>actCentralCoordinator</i>
Is representing the person that receives the victim's or witness' call in the emergency central.
<i>OutputInterfaces</i>
OUT 1 oeRequestCrisisEventLocation (AdtPhoneNumber : dtPhoneNumber) : ptBoolean

continues in next page ...

... Actor table continuation

OUT 2	<code>oeCreateNewCrisisEvent (AName:dtString, AetHumanType:etHumanType, AdtPhoneNumber:dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) :ptBoolean</code>
-------	---

InputInterfaces

IN 1	<code>ieReceiveCrisisEventLocation (AdtMapWithPin:dtMapWithPin) :ptBoolean</code>
------	---

IN 2	<code>ieMessageCentralCoordinator (AdtComment:dtComment) :ptBoolean</code>
------	--

3.2.3 actCommunicationCompany Actor**ACTOR***actCommunicationCompany*

Is representing any communication company in Luxembourg.

OutputInterfaces

OUT 1	<code>oeReceiveCrisisEventLocation (AdtGeoPos:dtGeoPos) :ptBoolean</code>
-------	---

InputInterfaces

IN 1	<code>ieRequestCrisisEventLocation (AdtPhoneNumber:dtPhoneNumber) :ptBoolean</code>
------	---

3.2.4 actFiremenCoordinator Actor**ACTOR***actFiremenCoordinator*

Is representing any firemen team leader able to manage a two Ambulances.

Extends

lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator

OutputInterfaces

OUT 1	<code>oeRequestHelp (AetTeamType:etTeamType, ARequestedNumber:ptInteger) :ptBoolean</code>
-------	--

3.2.5 actPoliceCoordinator Actor**ACTOR***actPoliceCoordinator*

Is representing a police team leader.

Extends

lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator

3.2.6 actTowServiceCoordinator Actor

ACTOR
<i>actTowServiceCoordinator</i>
Is representing a tow service driver.
<i>Extends</i>
lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator

Chapter 4

Concept Model

4.1 PrimaryTypes-Classes

4.1.1 Local view 12

Figure 4.1 Main view of the concept model

4.1.2 Local view 18

Figure 4.2 View of the actors and operations regarding a dispatched coordinator

4.2 PrimaryTypes-Datatypes

4.2.1 Local view 15

Figure 4.3 View of all the datatypes

4.2.2 Local view 16

Figure 4.4 View of all the different modes for the coordinators/actors

4.2.3 Local view 17

Figure 4.5 View of 'mapWithPin' and its relationships

4.3 Concept Model Types Descriptions

This section provides the textual descriptions of all the types defined in the concept model and that can be part of the graphical views provided.

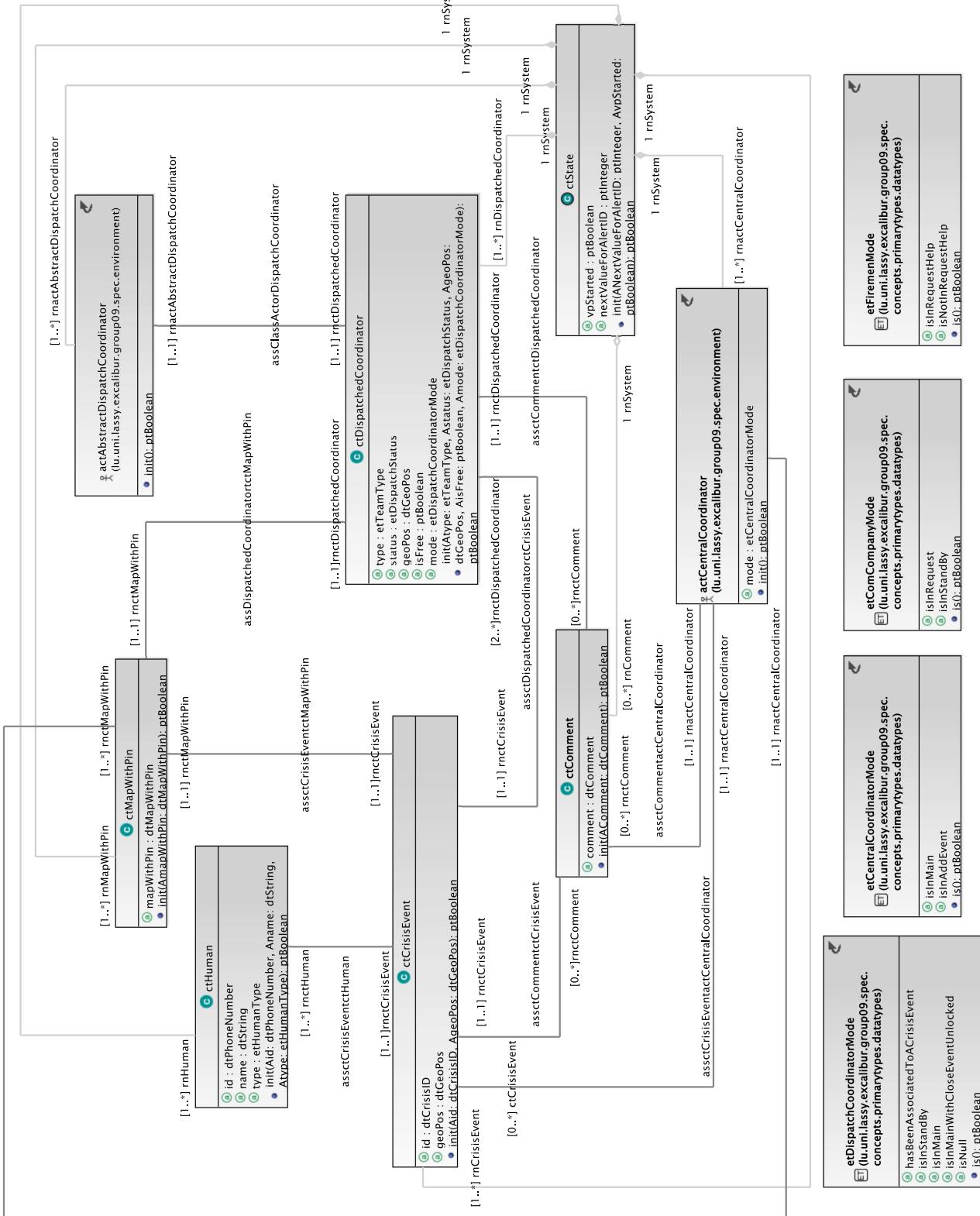


Figure 4.1: Concept Model - PrimaryTypes-Classes local view 12. Main view of the concept model.

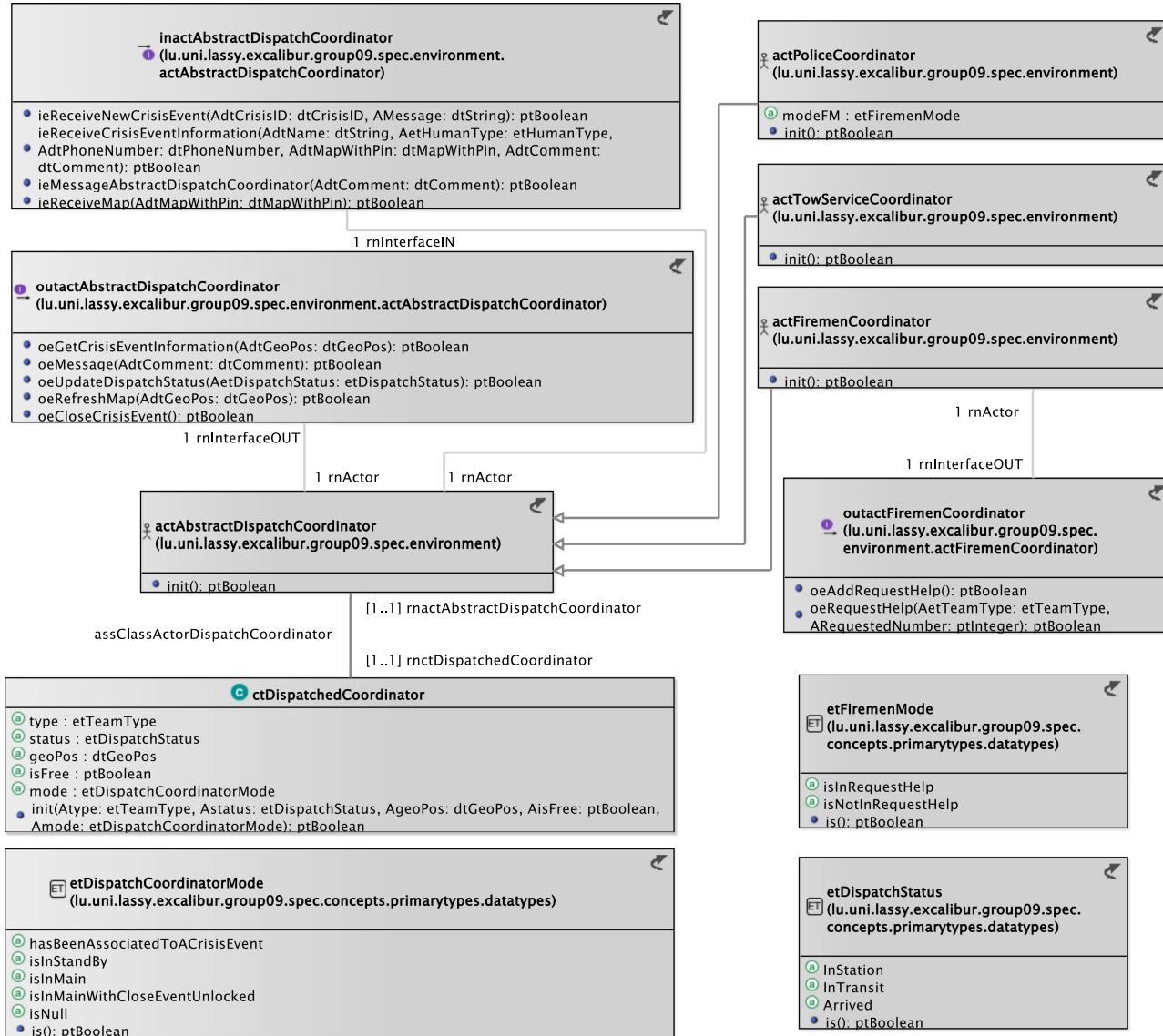


Figure 4.2: Concept Model - PrimaryTypes-Classes local view 18. View of the actors and operations regarding a dispatched coordinator.

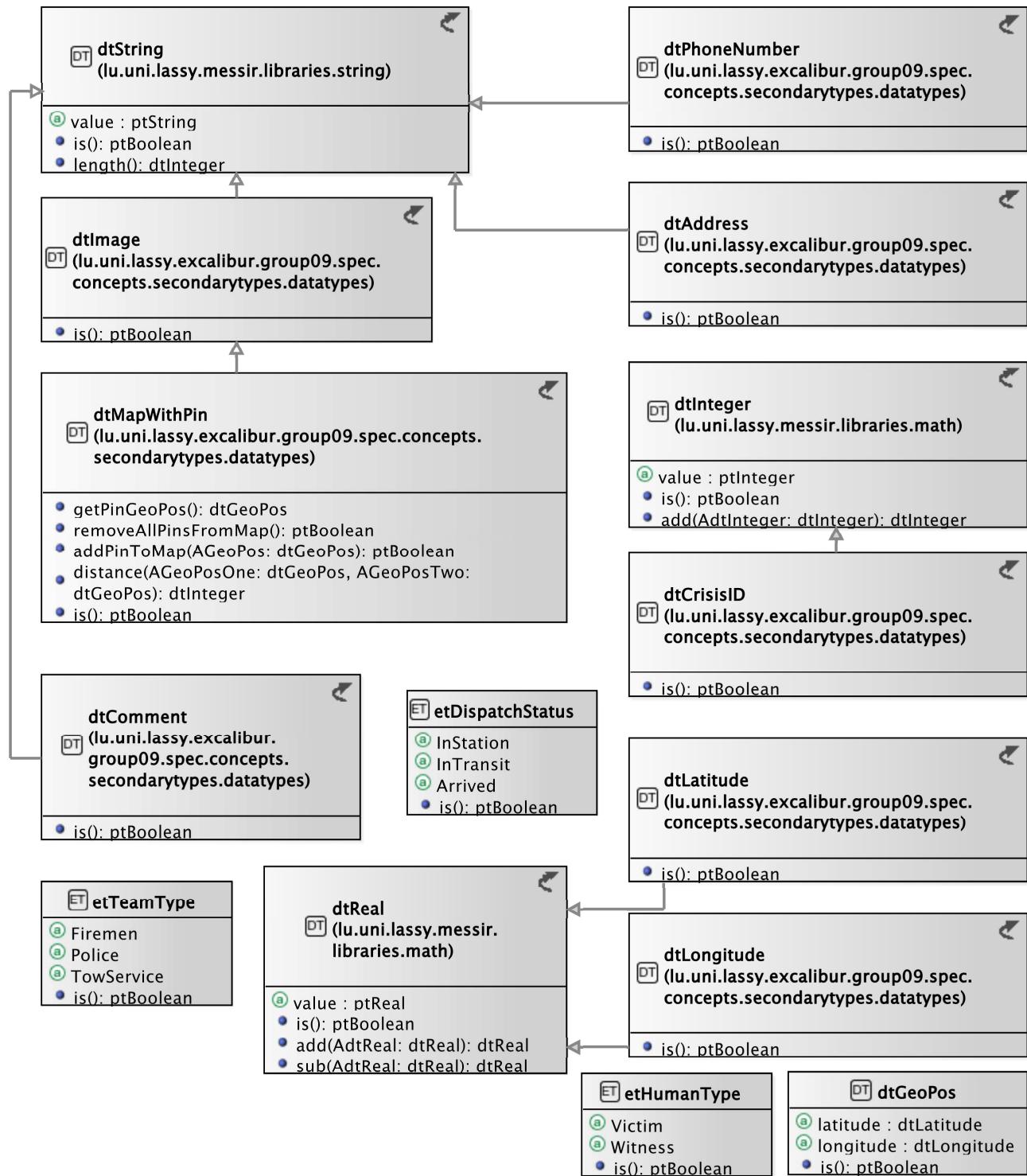


Figure 4.3: Concept Model - PrimaryTypes-Datatypes local view 15. View of all the datatypes.

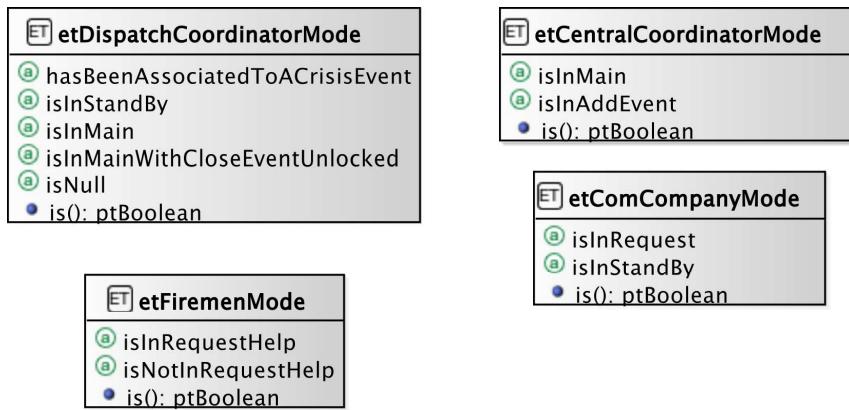


Figure 4.4: Concept Model - PrimaryTypes-Datatypes local view 16. View of all the different modes for the coordinators/actors.

4.3.1 Primary types - Class types descriptions

The table below is providing comments on the graphical views given for the class types of the primary types. Type logical operations are precisely specified in the operation model.

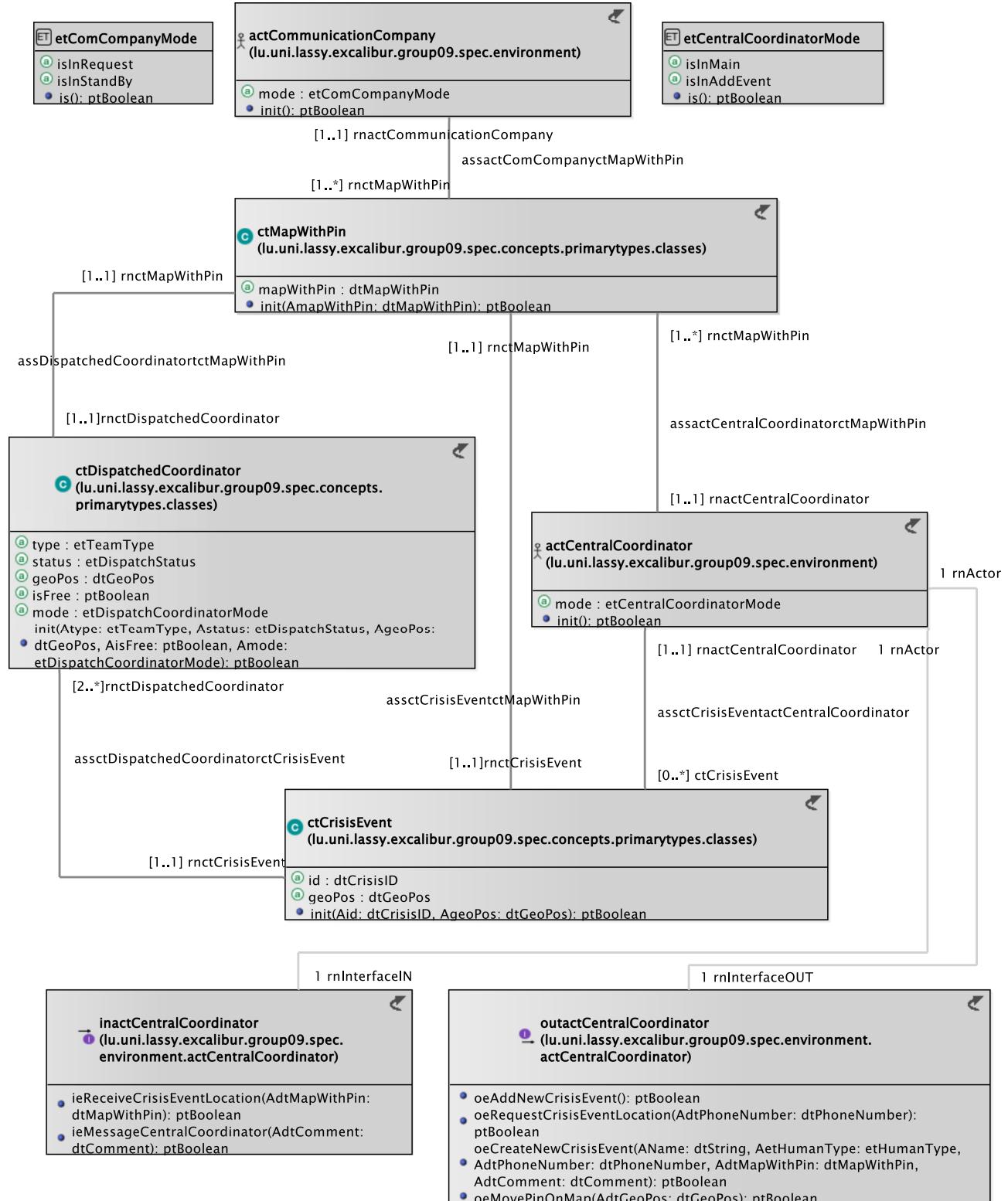


Figure 4.5: Concept Model - PrimaryTypes-Datatypes local view 17. View of 'mapWithPin' and its relationships.

CLASSES	
<i>ctComment</i>	
A class containing a comment.	
attribute	comment: dtComment
operation	init (AComment:dtComment) :ptBoolean
<i>ctCrisisEvent</i>	
A class containing the attributes identifying a crisis event.	
attribute	id: dtCrisisID
operation	init (Aid:dtCrisisID, AgeoPos:dtGeoPos) :ptBoolean
<i>ctDispatchedCoordinator</i>	
A class containing the attributes identifying a dispatched team.	
attribute	status: etDispatchStatus
attribute	type: etTeamType
operation	init (Atype:etTeamType, Astatus:etDispatchStatus, AgeoPos:dtGeoPos, AisFree:ptBoolean, Amode:etDispatchCoordinatorMode) :ptBoolean
<i>ctHuman</i>	
A class containing the attributes identifying an human.	
attribute	id: dtPhoneNumber
attribute	name: dtString
attribute	type: etHumanType
operation	init (Aid:dtPhoneNumber, Aname:dtString, Atype:etHumanType) :ptBoolean
<i>ctMapWithPin</i>	
A class containing an image which is the map including the pins.	
attribute	mapWithPin: dtMapWithPin
operation	init (AmapWithPin:dtMapWithPin) :ptBoolean
<i>ctState</i>	
used to model the system.	
attribute	vpStarted: ptBoolean
operation	init (ANextValueForAlertID:ptInteger, AvpStarted:ptBoolean) :ptBoolean

4.3.2 Primary types - Datatypes types descriptions

The table below is providing comments on the graphical views given for the datatype types of the primary types.

DATATYPES	
<i>dtGeoPos</i>	
	Two Real numbers used to identify a geographical position on earth.
attribute	latitude: <code>dtLatitude</code>
attribute	longitude: <code>dtLongitude</code>
operation	<code>is() :ptBoolean</code>

ENUMERATIONS	
<i>etCentralCoordinatorMode</i>	
	Modes of the Central Coordinator to identify what operations he/she can do at what moment.
operation	<code>is() :ptBoolean</code>
<i>etComCompanyMode</i>	
	Modes of the Communication Company to identify what operations it can do at what moment.
operation	<code>is() :ptBoolean</code>
<i>etDispatchCoordinatorMode</i>	
	Modes of a dispatched Coordinator to identify what operations he/she can do at what moment.
operation	<code>is() :ptBoolean</code>
<i>etDispatchStatus</i>	
	A String used to identify a dispatch status.
<i>etFiremenMode</i>	
	Additional mode for the Firemen Coordinator to identify what operations he/she can do at what moment.
operation	<code>is() :ptBoolean</code>
<i>etHumanType</i>	
	A String used to identify an Human type.
<i>etTeamType</i>	
	A String used to identify a team type.

4.3.3 Primary types - Association types descriptions

The table below is providing comments on the association types of the primary types.

UNDIRECTED ASSOCIATIONS	
<i>assactCentralCoordinatorctMapWithPin</i>	
	association between a Central Coordinator and a map with pin.
<i>assactComCompanyctMapWithPin</i>	
	Association of a communication company to a map with pin.
<i>assClassActorDispatchCoordinator</i>	
	Association of a dispatched coordinator to an actor of the same type.
<i>assctCommentactCentralCoordinator</i>	

continues in next page ...

... Undirected associations table continuation

<i>assctCommentctCrisisEvent</i>	Association of a comment to a central coordinator actor.
<i>assctCommentctDispatchedCoordinator</i>	Association of a comment to a dispatched coordinator.
<i>assctCrisisEventactCentralCoordinator</i>	Association of a crisis event to the central coordinator actor (who created it).
<i>assctCrisisEventctHuman</i>	Association of a crisis event to an human.
<i>assctCrisisEventctMapWithPin</i>	Association of a crisis event with a MapWithPin image.
<i>assctDispatchedCoordinatorctCrisisEvent</i>	Association of a dispatched coordinator to a crisis event.
<i>assDispatchedCoordinatorctMapWithPin</i>	Association of a dispatched coordinator with a MapWithPin image.

4.3.4 Primary types - Aggregation types descriptions

There are no aggregation types for the primary types.

4.3.4.1 Primary types - Composition types descriptions

There are no composition types for the primary types.

4.3.5 Secondary types - Class types descriptions

There are no elements in this category in the system analysed.

4.3.6 Secondary types - Datatypes types descriptions

The table below is providing comments on the graphical views given for the datatype types of the secondary types.

DATATYPES	
<i>dtAddress</i>	A String used to identify an address.
extends	dtString
operation	is () :ptBoolean
<i>dtComment</i>	A String used to identify a comment.
extends	dtString
operation	is () :ptBoolean
<i>dtCrisisID</i>	An Integer used to identify a crisis id.

continues in next page ...

... Datatypes table continuation

<i>extends</i>	dtInteger
<i>operation</i>	is () :ptBoolean
<i>dtImage</i>	
A String used to identify an image.	
<i>extends</i>	dtString
<i>operation</i>	is () :ptBoolean
<i>dtLatitude</i>	
used to define a latitude value of a geographical positions on earth.	
<i>extends</i>	dtReal
<i>operation</i>	is () :ptBoolean
<i>dtLongitude</i>	
used to define a longitude value of a geographical positions on earth.	
<i>extends</i>	dtReal
<i>operation</i>	is () :ptBoolean
<i>dtMapWithPin</i>	
An image which is a map including pins.	
<i>extends</i>	dtImage
<i>operation</i>	is () :ptBoolean
<i>dtPhoneNumber</i>	
A String used to store a phone number.	
<i>extends</i>	dtString
<i>operation</i>	is () :ptBoolean

4.3.7 Secondary types - Association types descriptions

There are no association types for the secondary types.

4.3.8 Secondary types - Aggregation types descriptions

There are no aggregation types for the secondary types.

4.3.9 Secondary types - Composition types descriptions

There are no composition types for the secondary types.

Chapter 5

Operation Model

This section contains the operation schemes of each operation defined in either an actor, its output interface, in a primary or secondary type (class, datatype or enumeration types). The **Messir** OCL code listing is joined to the comment table.

5.1 Environment - Out Interface Operation Scheme for actAbstractDispatchCoordinator

5.1.1 Operation Model for oeCloseCrisisEvent

The oeCloseCrisisEvent operation has the following properties:

OPERATION
<i>oeCloseCrisisEvent</i>
sent to close up the associated crisis event for the current coordinator.
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 The dispatch coordinator's mode is <code>isInMainWithCloseEventUnlocked</code> .
<i>Pre-Condition (functional)</i>
PreF 1 it is supposed that a dispatched coordinator can only be associated to a single crisis event at the same time.
<i>Post-Condition (functional)</i>
PostF 1 The coordinator's attribute <code>isFree</code> is set back to true and can thus be associated to another crisis event.
<i>Post-Condition (protocol)</i>
PostP 1 The dispatch coordinator is no longer associated to the current crisis event.
PostP 2 The dispatch coordinator's mode is set to <code>isInStandBy</code> .

5.1.2 Operation Model for oeGetCrisisEventInformation

The oeGetCrisisEventInformation operation has the following properties:

OPERATION
<i>oeGetCrisisEventInformation</i>
sent to get the stored information of the crisis event to which the dispatch coordinator is associated.

continues in next page ...

... Operation table continuation

<i>Parameters</i>	
1	AdtGeoPos: dtGeoPos a geographical position that identifies the actor's current position.
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	The dispatch coordinator's mode is <code>hasBeenAssociatedToACrisisEvent</code> .
<i>Pre-Condition (functional)</i>	
PreF 1	it is supposed that a dispatched coordinator can only be associated to a single crisis event at the same time.
PreF 2	the GeoPos given by the coordinator is a valid one.
<i>Post-Condition (functional)</i>	
PostF 1	the map with pins returned to the coordinator includes a pin of the actor's current position and another one of the crisis event's location.
<i>Post-Condition (protocol)</i>	
PostP 1	The dispatch coordinator's mode is set to <code>isInMain</code> .

5.1.3 Operation Model for oeMessage

The `oeMessage` operation has the following properties:

OPERATION	
<i>oeMessage</i>	
sent to transmit a message.	
<i>Parameters</i>	
1	AdtComment: dtComment A comment or message that the coordinator wants to transmit.
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	The dispatch coordinator's mode is <code>isInMain</code> or <code>isInMainWithCloseEventUnlocked</code> .
<i>Pre-Condition (functional)</i>	
PreF 1	it is supposed that a dispatched coordinator can only be associated to a single crisis event at the same time.

5.1.4 Operation Model for oeRefreshMap

The `oeRefreshMap` operation has the following properties:

OPERATION	
<i>oeRefreshMap</i>	
sent to refresh the map.	
<i>Parameters</i>	
1	AdtGeoPos: dtGeoPos the coordinator's current geographical position.

continues in next page ...

...Operation table continuation

<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 The dispatch coordinator's is <code>isInMain</code> or <code>isInMainWithCloseEventUnlocked</code> .
<i>Pre-Condition (functional)</i>
PreF 1 it is supposed that a dispatched coordinator can only be associated to a single crisis event at the same time.
PreF 2 the GeoPos given by the coordinator is a valid one.
<i>Post-Condition (functional)</i>
PostF 1 the map with pins returned to the coordinator includes a pin of the actor's current position and another one of the crisis event's location.

5.1.5 Operation Model for oeUpdateDispatchStatus

The `oeUpdateDispatchStatus` operation has the following properties:

OPERATION
<i>oeUpdateDispatchStatus</i>
sent to update the dispatch status.
Parameters
1 <code>AetDispatchStatus: etDispatchStatus</code>
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 The dispatch coordinator's mode is <code>isInMain</code> .
<i>Pre-Condition (functional)</i>
PreF 1 it is supposed that a dispatched coordinator can only be associated to a single crisis event at the same time.
<i>Post-Condition (functional)</i>
PostF 1 the attribute status of the coordinator is modified either from 'InStation' to 'InTransit' or from 'InTransit' to 'Arrived'
<i>Post-Condition (protocol)</i>
PostP 1 when the attribute status of the coordinator is set to 'Arrived', the actor's mode is set to <code>isInMainWithCloseEventUnlocked</code> .

5.2 Environment - Out Interface Operation Scheme for actCentralCoordinator**5.2.1 Operation Model for oeAddNewCrisisEvent**

The `oeAddNewCrisisEvent` operation has the following properties:

OPERATION
<i>oeAddNewCrisisEvent</i>
sent with the intention to add a new crisis event.

continues in next page ...

... Operation table continuation

Return type
ptBoolean
Pre-Condition (protocol)
PreP 1 The actor's mode is <code>isInMain</code> .
Post-Condition (protocol)
PostP 1 The actor's mode is set to <code>isInAddEvent</code> .

5.2.2 Operation Model for oeCreateNewCrisisEvent

The `oeCreateNewCrisisEvent` operation has the following properties:

OPERATION
<i>oeCreateNewCrisisEvent</i>
sent to create a new crisis event and to alert the corresponding coordinators.
Parameters
1 AName: dtString the name of the notifier that informed the Central Coordinator of the crisis event. 2 AetHumanType: etHumanType the notifier can be either a victim or a witness. 3 AdtPhoneNumber: dtPhoneNumber the phone number of the notifier. 4 AdtMapWithPin: dtMapWithPin a map with pin showing the crisis event's location.
Return type
ptBoolean
Pre-Condition (protocol)
PreP 1 The actor's mode is <code>isInAddEvent</code> .
Pre-Condition (functional)
PreF 1 The map with pin provided by the central coordinator only has a single pin.
Post-Condition (functional)
PostF 1 A new crisis event is created and initialised with a new crisis event id attribute which is the <code>nextValueForAlertID@pre</code> in <code>ctState</code> and the geographical position attribute of the crisis event which is extracted from the map with pin provided by the central coordinator. PostF 2 An alert message 'You have received a new dispatch order!' together with new crisis event id is sent to a free FiremenCoordinator and a free TowServiceCoordinator that are geographically the nearest of the crisis event's location and their dispatch status attributes are set to 'InStation'. PostF 3 The new crisis event is then associated to : the central coordinator who created this instance, the two selected dispatch coordinators, the map with pin instance that has the map with pin attribute communicated by the central coordinator in the parameters, the human instance, who may be initialised, if he/she is not yet in the system state, with his/her phone number as the unique id, a name and a type (witness/victim) which are given as parameters by the central coordinator, comment instance(s) which is/are initialised if the central coordinator has given some additional comments to the crisis event.

continues in next page ...

...Operation table continuation

PostF 4	The two selected dispatch coordinators' attribute <code>isFree</code> is set to false and can thus no more be associated to another crisis event.
PostF 5	the attribute <code>nextValueForAlertID</code> in <code>ctState</code> instance should be equal to the one @pre incremented by one.
Post-Condition (protocol)	
PostP 1	The actor's mode is set to <code>isInMain</code> .
PostP 2	the two selected dispatch coordinators' modes are set to <code>hasBeenAssociatedToACrisisEvent</code> .
PostP 3	the selected firemen coordinator's modeFM is set to <code>isNotInRequestHelp</code> .

5.2.3 Operation Model for oeMovePinOnMap

The `oeMovePinOnMap` operation has the following properties:

OPERATION
<i>oeMovePinOnMap</i>
sent to move the pin on the map (adjustments).
Parameters
1 AdtGeoPos: dtGeoPos the new geographical position of where the pin should be moved to.
Return type
ptBoolean
Pre-Condition (protocol)
PreP 1 The actor's mode is <code>isInAddEvent</code> .
Pre-Condition (functional)
PreF 1 It is supposed that the actor's is already associated with a newly created map with pin.
Post-Condition (functional)
PostF 1 The returned map has the previous pin replaced by a new one using the geographical position given by the actor.
PostF 2 The returned map only has a single pin on it.

5.2.4 Operation Model for oeRequestCrisisEventLocation

The `oeRequestCrisisEventLocation` operation has the following properties:

OPERATION
<i>oeRequestCrisisEventLocation</i>
sent to request a crisis event's location.
Parameters
1 AdtPhoneNumber: dtPhoneNumber The phone number of the witness/victim used to get the geographical position.
Return type
ptBoolean
Pre-Condition (protocol)
PreP 1 The actor's mode is <code>isInAddEvent</code> .
Pre-Condition (functional)

continues in next page ...

... Operation table continuation

PreF 1	it is supposed that the phone number given by the CentralCoordinator is always sent to the correct communication company.
<i>Post-Condition (functional)</i>	
PostF 1	the phone number can be identified by the communication company.
<i>Post-Condition (protocol)</i>	
PostP 1	The communication company's mode is set to <code>isInRequest</code> .

5.3 Environment - Out Interface Operation Scheme for actCommunicationCompany

5.3.1 Operation Model for oeReceiveCrisisEventLocation

The `oeReceiveCrisisEventLocation` operation has the following properties:

OPERATION	
<i>oeReceiveCrisisEventLocation</i>	
sent to get a map with pin returned to the central coordinator.	
<i>Parameters</i>	
1	AdtGeoPos: dtGeoPos the geographical position used to initialise the map with pin.
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	The actor's mode is <code>isInRequest</code> .
<i>Pre-Condition (functional)</i>	
PreF 1	the GeoPos given by the communication company is a valid one.
<i>Post-Condition (functional)</i>	
PostF 1	A new map with pin instance is created and initialised using the given geographical position as base.
PostF 2	The new map with pin returned to the CentralCoordinator only has a single pin, which is the one corresponding to the geographical position given in the parameters.
PostF 3	The new map with pin is then associated to the central coordinator who received it and the communication company who initialised it,
<i>Post-Condition (protocol)</i>	
PostP 1	The actor's mode is set to <code>isInStandBy</code> .

5.4 Environment - Out Interface Operation Scheme for actFiremenCoordinator

5.4.1 Operation Model for oeAddRequestHelp

The `oeAddRequestHelp` operation has the following properties:

OPERATION	
<i>oeAddRequestHelp</i>	
sent with the intention to request help from additional dispatch coordinators.	
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1 The firemen coordinator's mode is <code>isInMain</code> or <code>isInMainWithCloseEventUnlocked</code> . PreP 2 The firemen coordinator's modeFM is <code>isNotInRequestHelp</code> .	
<i>Post-Condition (protocol)</i>	
PostP 1 The firemen coordinator's mode is set to <code>isNull</code> . PostP 2 The firemen coordinator's modeFM is set to <code>isInRequestHelp</code> .	

5.4.2 Operation Model for oeRequestHelp

The `oeRequestHelp` operation has the following properties:

OPERATION	
<i>oeRequestHelp</i>	
sent to assign additional dispatch coordinators to the associated crisis event.	
<i>Parameters</i>	
1	<code>AetTeamType: etTeamType</code>
2	<code>ARRequestedNumber: ptInteger</code>
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1 The firemen coordinator's mode has is <code>isNull</code> . PreP 2 The firemen coordinator's modeFM is <code>isInRequestHelp</code> .	
<i>Pre-Condition (functional)</i>	
PreF 1 it is supposed that a dispatched (or firemen) coordinator can only be associated to a single crisis event at the same time.	
<i>Post-Condition (functional)</i>	
PostF 1 An alert message 'You have received a new dispatch order!' is sent to one or more free FiremenCoordinator(s) and/or one or more free TowServiceCoordinator(s) and/or one or more free PoliceCoordinator(s) that are geographically the nearest of the crisis event's location and their dispatch status attributes are set to 'InStation'. PostF 2 The crisis event (<code>self.rnActor.rnctCrisisEvent</code>) is then associated to the selected dispatch coordinator(s). PostF 3 The selected dispatch coordinator(s)' attribute <code>isFree</code> is set to false and can thus no more be associated to another crisis event.	
<i>Post-Condition (protocol)</i>	
PostP 1 The actor's mode is set to <code>isInMain</code> or <code>isInMainWithCloseEventUnlocked</code> . PostP 2 The selected dispatch coordinator(s)' modes are set to <code>hasBeenAssociatedToACrisisEvent</code> .	

continues in next page ...

... Operation table continuation

PostP 3	If a firemen coordinator has been selected, his modeFM is set to <code>isNotInRequestHelp</code> .
---------	--

5.5 Environment - Actor Operation Schemes

There are no elements in this category in the system analysed.

5.6 Primary Types - Operation Schemes for Classes

There are no elements in this category in the system analysed.

5.7 Primary Types - Operation Schemes for Datatypes

There are no elements in this category in the system analysed.

5.8 Primary Types - Operation Schemes for Enumerations

There are no elements in this category in the system analysed.

5.9 Secondary Types - Operation Schemes for Classes

There are no elements in this category in the system analysed.

5.10 Secondary Types - Operation Schemes for Datatype dtMapWithPin

5.10.1 Operation Model for addPinToMap

The `addPinToMap` operation has the following properties:

OPERATION	
<i>addPinToMap</i>	
used to add a pin to the map.	
<i>Parameters</i>	
1	<code>AGeoPos: dtGeoPos</code> the geographical position of the pin we want to add.
<i>Return type</i>	
<code>ptBoolean</code>	
<i>Post-Condition (functional)</i>	
PostF 1 The given geographical position is converted into a pin on the map.	

5.10.2 Operation Model for getPinGeoPos

The `getPinGeoPos` operation has the following properties:

OPERATION	
	<i>continues in next page ...</i>

...Operation table continuation

<i>getPinGeoPos</i>
used to get the geographical position of the pin that is currently shown on the map (used only when there's a single pin on the map).
<i>Return type</i>
dtGeoPos
<i>Post-Condition (functional)</i>
PostF 1 Returns a geographical position of the pin that was on the map.

5.10.3 Operation Model for removeAllPinsFromMap

The `removeAllPinsFromMap` operation has the following properties:

OPERATION
<i>removeAllPinsFromMap</i>
used to remove all pins on the map (usually used to afterwards regenerate new pins, so that the map stays clean).
<i>Return type</i>
ptBoolean
<i>Post-Condition (functional)</i>
PostF 1 All pins are removed from the map.

5.11 Secondary Types - Operation Schemes for Enumerations

There are no elements in this category in the system analysed.

Chapter 6

Test Model(s)

There are no elements in this category in the system analysed.

Chapter 7

Additional Constraints

Appendix A

Undocumented Messir Specification Elements

A.1 Undocumented Use Cases

A.1.1 Undocumented Subfunction Level Use Cases

- lu.uni.lassy.excalibur.group09.spec.usecases.oeAddRequestHelp
- lu.uni.lassy.excalibur.group09.spec.usecases.oeCloseCrisisEvent
- lu.uni.lassy.excalibur.group09.spec.usecases.oeCreateNewCrisisEvent
- lu.uni.lassy.excalibur.group09.spec.usecases.oeGetCrisisEventInformation
- lu.uni.lassy.excalibur.group09.spec.usecases.oeAddNewCrisisEvent
- lu.uni.lassy.excalibur.group09.spec.usecases.oeMessage
- lu.uni.lassy.excalibur.group09.spec.usecases.oeMovePinOnMap
- lu.uni.lassy.excalibur.group09.spec.usecases.oeRefreshMap
- lu.uni.lassy.excalibur.group09.spec.usecases.oeRequestCrisisEventLocation
- lu.uni.lassy.excalibur.group09.spec.usecases.oeRequestHelp
- lu.uni.lassy.excalibur.group09.spec.usecases.oeReceiveCrisisEventLocation
- lu.uni.lassy.excalibur.group09.spec.usecases.oeUpdateDispatchStatus

Appendix B

Messir Specification Files Listing

B.1 File ./src-gen/messir-spec/.views.msr

```
1 //  
2 //DON'T TOUCH THIS FILE !!!  
3 //  
4 package uidff8a216549a64951bf055c8b5a9dde2a {  
5   Concept Model {}  
6 }
```

Listing B.1: Messir Spec. file .views.msr.

B.2 File ./src-gen/messir-spec/operations/environment/environment-actAbstractDispatchCoordinator-oeCloseCrisisEvent.msr

```
1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actAbstractDispatchCoordinator.  
    outactAbstractDispatchCoordinator.oeCloseCrisisEvent {  
2  
3   import lu.uni.lassy.messir.libraries.primitives  
4   import lu.uni.lassy.messir.libraries.math  
5   import lu.uni.lassy.messir.libraries.string  
6   import lu.uni.lassy.messir.libraries.calendar  
7   import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes  
8   import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes  
9  
10  Operation Model {  
11  
12    operation: lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator.  
        outactAbstractDispatchCoordinator.oeCloseCrisisEvent():ptBoolean{  
13      // include below the specification information (pre, post or ocl or prolog)  
14  
15    }  
16  }  
17 }
```

Listing B.2: Messir Spec. file environment-actAbstractDispatchCoordinator-oeCloseCrisisEvent.msr.

B.3 File ./src-gen/messir-spec/operations/environment/environment-actAbstractDispatchCoordinator-oeGetCrisisEventInformation.msr

```
1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actAbstractDispatchCoordinator.  
    outactAbstractDispatchCoordinator.oeGetCrisisEventInformation {  
2  
3   import lu.uni.lassy.messir.libraries.primitives  
4   import lu.uni.lassy.messir.libraries.math  
5   import lu.uni.lassy.messir.libraries.string  
6   import lu.uni.lassy.messir.libraries.calendar
```

```

7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator.
      outactAbstractDispatchCoordinator.oeGetCrisisEventInformation(AdtGeoPos:dtGeoPos):ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.3: Messir Spec. file environment-actAbstractDispatchCoordinator-oeGetCrisisEventInformation.msr.

B.4 File ./src-gen/messir-spec/operations/environment/environment-actAbstractDispatchCoordinator-oeMessage.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actAbstractDispatchCoordinator.
  outactAbstractDispatchCoordinator.oeMessage {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator.
      outactAbstractDispatchCoordinator.oeMessage(AdtComment:dtComment):ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.4: Messir Spec. file environment-actAbstractDispatchCoordinator-oeMessage.msr.

B.5 File ./src-gen/messir-spec/operations/environment/environment-actAbstractDispatchCoordinator-oeRefreshMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actAbstractDispatchCoordinator.
  outactAbstractDispatchCoordinator.oeRefreshMap {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator.
      outactAbstractDispatchCoordinator.oeRefreshMap(AdtGeoPos:dtGeoPos):ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.5: Messir Spec. file environment-actAbstractDispatchCoordinator-oeRefreshMap.msr.

B.6 File ./src-gen/messir-spec/operations/environment/environment-actAbstractDispatchCoordinator-oeUpdateDispatchStatus.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actAbstractDispatchCoordinator.
    outactAbstractDispatchCoordinator.oeUpdateDispatchStatus {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12     operation: lu.uni.lassy.excalibur.group09.spec.environment.actAbstractDispatchCoordinator.
        outactAbstractDispatchCoordinator.oeUpdateDispatchStatus(AetDispatchStatus:etDispatchStatus):
            ptBoolean{
13         // include below the specification information (pre,post or ocl or prolog)
14
15     }
16 }
17 }
```

Listing B.6: Messir Spec. file environment-actAbstractDispatchCoordinator-oeUpdateDispatchStatus.msr.

B.7 File ./src-gen/messir-spec/operations/environment/environment-actCentralCoordinator-oeAddNewCrisisEvent.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
    outactCentralCoordinator.oeAddNewCrisisEvent {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7
8 Operation Model {
9
10     operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
        outactCentralCoordinator.oeAddNewCrisisEvent():ptBoolean{
11         // include below the specification information (pre,post or ocl or prolog)
12
13     }
14 }
15 }
```

Listing B.7: Messir Spec. file environment-actCentralCoordinator-oeAddNewCrisisEvent.msr.

B.8 File ./src-gen/messir-spec/operations/environment/environment-actCentralCoordinator-oeCreateNewCrisisEvent.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
    outactCentralCoordinator.oeCreateNewCrisisEvent {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes
10 import lu.uni.lassy.excalibur.group09.spec.environment
```

```

11
12 Operation Model {
13
14   operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
15     outactCentralCoordinator.oeCreateNewCrisisEvent(
16       AName:dtString,
17       AetHumanType:etHumanType,
18       AdtPhoneNumber:dtPhoneNumber,
19       AdtMapWithPin:dtMapWithPin,
20       AdtComment:dtComment
21     ):ptBoolean{
22     // include below the specification information (pre,post or ocl or prolog)
23     prep{
24       let AetCentralCoordinatorMode:etCentralCoordinatorMode in
25
26       //PreP 01
27       self.rnActor.mode@pre = AetCentralCoordinatorMode
28       and 'isInAddEvent' = AetCentralCoordinatorMode
29     }
30
31     postF{
32       let TheCrisisEvent:ctCrisisEvent in
33       let TheMessage:dtString in
34
35       let AdtGeoPosOfCrisisEvent:dtGeoPos in
36       let AdtCrisisID:dtCrisisID in
37
38       let TheFiremenCoordinator:ctDispatchedCoordinator in
39       let TheTowServiceCoordinator:ctDispatchedCoordinator in
40       let TheFiremenCoordinatorIN:actAbstractDispatchCoordinator in
41       let TheTowServiceCoordinatorIN:actAbstractDispatchCoordinator in
42
43       let AetFiremenMode:etFiremenMode in
44       let AFirstTeamType:etTeamType in
45       let ASecondTeamType:etTeamType in
46
47       let TheHuman:ctHuman in
48
49     //PostF 01
50     self.rnActor.rnSystem.nextValueForAlertID@pre = AdtCrisisID
51     and self.rnActor.rnctMapWithPin.mapWithPin.getPinGeoPos() = AdtGeoPosOfCrisisEvent
52     and TheCrisisEvent.init(
53       AdtCrisisID,
54       AdtGeoPosOfCrisisEvent
55     )
56
57     //PostF 02
58     and TheFiremenCoordinator.type@pre = AFirstTeamType
59     and 'Firemen' = AFirstTeamType
60     and TheTowServiceCoordinator.type@pre = ASecondTeamType
61     and 'TowService' = ASecondTeamType
62     and 'TRUE' = TheFiremenCoordinator.isFree@pre
63     and 'TRUE' = TheTowService.isFree@pre
64
65     /*
66      ctDispatchedCoordinator such that there doesn't exist another ctDispatchedCoordinator that has a
67      shorter distance
68      between its geographical position and the geographical position of the newly instanciated crisis
69      event.
70     */
71     and TheFiremenCoordinator = self.rnActor.rnSystem.rnctDispatchedCoordinator->select(
72       dc1 / dtMapWithPin.distance(dc1.geoPos,AdtGeoPosOfCrisisEvent) > distance(self.rnActor.
73         rnSystem.rnctDispatchedCoordinator.geoPos,AdtGeoPosOfCrisisEvent)->isEmpty()
74     )
75     and TheTowServiceCoordinator = self.rnActor.rnSystem.rnctDispatchedCoordinator->select(
76       dc1 / dtMapWithPin.distance(dc1.geoPos,AdtGeoPosOfCrisisEvent) > distance(self.rnActor.
77         rnSystem.rnctDispatchedCoordinator.geoPos,AdtGeoPosOfCrisisEvent)->isEmpty()
78     )

```

B.8. FILE /SRC-GEN.../ENVIRONMENT-ACTCENTRALCOORDINATOR-OECREATENEWCRISISEVENT.MSL

```
76  
77 and 'InStation' = TheFiremen.status@post  
78 and 'InStation' = TheFiremen.status@post  
79  
80 and 'You have received a new dispatch order!' = TheMessage.value  
81 and TheFiremenIN^ieReceiveNewCrisisEvent(AdtCrisisID, 'You have received a new dispatch order!')  
82 and TheTowServiceIN^ieReceiveNewCrisisEvent(AdtCrisisID, 'You have received a new dispatch order  
!')  
83  
84 //PostF 03  
85 and TheCrisisEvent.rnactCentralCoordinator = self.rnActor@pre  
86  
87 and TheCrisisEvent.rnctDispatchedCoordinator = TheFiremenCoordinator  
88 and TheCrisisEvent.rnctDispatchedCoordinator = TheTowServiceCoordinator  
89  
90 and TheCrisisEvent.rnctMapWithPin = self.rnActor.rnctMapWithPin@post  
91  
92 //IF an ctHuman instance with the same id (PhoneNumber) is already in the system state, associate  
it to that instance  
93 //ELSE initialise a new ctHuman instance and associate it  
94 and if(  
95   self.rnActor.rnSystem.rnHuman -> exists(h / h.id = AdtPhoneNumber)  
96 )  
97 then(  
98   TheHuman = self.rnActor.rnSystem.rnHuman -> select(h / h.id = AdtPhoneNumber)  
99   TheCrisisEvent.rnHuman = TheHuman  
100 )  
101 else(  
102   TheHuman.init(  
103     AdtPhoneNumber,  
104     AName,  
105     AetHumanType  
106   )  
107   TheCrisisEvent.rnHuman = TheHuman  
108 )  
109 endif  
110  
111 and TheCrisisEvent.rnctComment = self.rnActor.rnctComment@post  
112  
113 //PostF 04  
114 and 'FALSE' = TheFiremenCoordinator.isFree@post  
115 and 'FALSE' = TheTowServiceCoordinator.isFree@post  
116  
117 //PostF 05  
118 and self.rnActor.rnSystem.nextValueForAlertID@post = self.rnActor.rnSystem.  
nextValueForAlertID@pre + 1  
119  
120 }  
121  
122 postP{  
123   let TheCrisisEvent:ctCrisisEvent in  
124  
125   let AetCentralCoordinatorMode:etCentralCoordinatorMode in  
126   let AetDispatchCoordinatorMode:etDispatchCoordinatorMode in  
127  
128   let AFirstTeamType:etTeamType in  
129   let ASecondTeamType:etTeamType in  
130  
131   let TheFiremenCoordinator:ctDispatchedCoordinator in  
132   let TheTowServiceCoordinator:ctDispatchedCoordinator in  
133  
134   let AetFiremenMode:etFiremenMode in  
135  
136 //PostP 01  
137 and self.rnActor.mode@post = AetCentralCoordinatorMode  
138 and 'isInMain' = AetCentralCoordinatorMode  
139  
140 /*PostP 02 & 03*/  
141 and self.rnActor.rnctCrisisEvent = TheCrisisEvent  
142
```

```

143 //To make sure who is who
144 and TheFiremenCoordinator.type@pre = AFirstTeamType
145 and 'Firemen' = AFirstTeamType
146 and TheTowServiceCoordinator.type@pre = ASecondTeamType
147 and 'TowService' = ASecondTeamType
148
149 and TheCrisisEvent.rnctDispatchedCoordinator = TheFiremenCoordinator
150 and TheCrisisEvent.rnctDispatchedCoordinator = TheTowServiceCoordinator
151
152 //PostP_02
153 and TheFiremenCoordinator.mode@post = AetDispatchCoordinatorMode
154 and TheTowServiceCoordinator.mode@post = AetDispatchCoordinatorMode
155 and 'hasBeenAssociatedToACrisisEvent' = AetDispatchCoordinatorMode
156
157 //PostP_03
158 and TheFiremenCoordinator.modeFM@post = AetFiremenMode
159 and 'IsNotInRequestHelp' = AetFiremenMode
160 }
161
162 }
163 }
164 }

```

Listing B.8: Messir Spec. file environment-actCentralCoordinator-oeCreateNewCrisisEvent.msr.

B.9 File ./src-gen/messir-spec/operations/environment/environment-actCentralCoordinator-oeMovePinOnMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
    outactCentralCoordinator.oeMovePinOnMap {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
8
9 Operation Model {
10
11     operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
        outactCentralCoordinator.oeMovePinOnMap(AdtGeoPos:dtGeoPos) :ptBoolean{
12         // include below the specification information (pre, post or ocl or prolog)
13
14     }
15 }
16 }

```

Listing B.9: Messir Spec. file environment-actCentralCoordinator-oeMovePinOnMap.msr.

B.10 File ./src-gen/messir-spec/operations/environment/environment-actCentralCoordinator-oeRequestCrisisEventLocation.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
    outactCentralCoordinator.oeRequestCrisisEventLocation {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
9
10 Operation Model {
11
12     operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
        outactCentralCoordinator.oeRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) :ptBoolean{

```

B.11. FILE /.../ENVIRONMENT-ACTCOMMUNICATIONCOMPANY-OERECEIVECRISISEVENTLOCATION.MSR

```
13 // include below the specification information (pre,post or ocl or prolog)
14 preP {
15   let AvpStarted: ptBoolean in
16   self.rnActor.rnSystem.vpStarted = AvpStarted
17   and AvpStarted = true
18 }
19
20 preF { true }
21
22 postF {
23   let TheactYou:lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator in
24   let AptString:ptString in
25   /* Post Functional:*/
26   /* PostF01 */
27   AptString = 'Hello World !'
28   and TheactYou.InterfaceIN = self.rnActor.InterfaceIN
29   and TheactYou.InterfaceIN^ieHelloWorld(AptString)
30 }
31
32 postP { true }
33 }
34 }
35 }
```

Listing B.10: Messir Spec. file
environment-actCentralCoordinator-oeRequestCrisisEventLocation.msr.

B.11 File ./src-gen/messir-spec/operations/environment/environment-actCommunicationCompany-oeReceiveCrisisEventLocation.msr

```
1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCommunicationCompany.
  outactCommunicationCompany.oeReceiveCrisisEventLocation {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.environment.actCommunicationCompany.
    outactCommunicationCompany.oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos):ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.11: Messir Spec. file
environment-actCommunicationCompany-oeReceiveCrisisEventLocation.msr.

B.12 File ./src-gen/messir-spec/operations/environment/environment-actFiremenCoordinator-oeAddRequestHelp.msr

```
1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actFiremenCoordinator.
  outactFiremenCoordinator.oeAddRequestHelp {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7
8 Operation Model {
```

```

9
10 operation: lu.uni.lassy.excalibur.group09.spec.environment.actFiremenCoordinator.
    outactFiremenCoordinator.oeAddRequestHelp():ptBoolean{
11 // include below the specification information (pre,post or ocl or prolog)
12
13 }
14 }
15 }
```

Listing B.12: Messir Spec. file environment-actFiremenCoordinator-oeAddRequestHelp.msr.

B.13 File ./src-gen/messir-spec/operations/environment/environment-actFiremenCoordinator-oeRequestHelp.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actFiremenCoordinator.
    outactFiremenCoordinator.oeRequestHelp {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9
10 Operation Model {
11
12 operation: lu.uni.lassy.excalibur.group09.spec.environment.actFiremenCoordinator.
    outactFiremenCoordinator.oeRequestHelp(AetTeamType:etTeamType, ARequestedNumber:ptInteger):
    ptBoolean{
13 // include below the specification information (pre,post or ocl or prolog)
14
15 }
16 }
17 }
```

Listing B.13: Messir Spec. file environment-actFiremenCoordinator-oeRequestHelp.msr.

B.14 File ./src-gen/messir-spec/environment/environment.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.environment {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
13 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
14
15 Environment Model {
16
17     actor actCentralCoordinator role rnactCentralCoordinator cardinality [1..*] {
18
19         attribute mode: etCentralCoordinatorMode
20         operation init():ptBoolean
21
22         input interface inactCentralCoordinator {
23             operation ieReceiveCrisisEventLocation(AdtMapWithPin:dtMapWithPin) : ptBoolean
24             operation ieMessageCentralCoordinator(AdtComment:dtComment) : ptBoolean
25         }
26
27         output interface outactCentralCoordinator {
28             operation oeAddNewCrisisEvent() : ptBoolean
29         }
30     }
31
32 }
```

```

29  operation oeRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) : ptBoolean
30  operation oeCreateNewCrisisEvent(AName:dtString, AetHumanType:etHumanType, AdtPhoneNumber:
31      dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) : ptBoolean
32  operation oeMovePinOnMap (AdtGeoPos:dtGeoPos) : ptBoolean
33  }
34
35 actor actCommunicationCompany role rnactCommunicationCompany cardinality [1...*] {
36
37     attribute mode: etComCompanyMode
38     operation init() : ptBoolean
39
40     input interface inactCommunicationCompany {
41         operation ieRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) : ptBoolean
42     }
43
44     output interface outactCommunicationCompany {
45         operation oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos) : ptBoolean
46     }
47 }
48
49 actor actAbstractDispatchCoordinator role rnactAbstractDispatchCoordinator cardinality [1...*] {
50
51     operation init() : ptBoolean
52
53     input interface inactAbstractDispatchCoordinator {
54         operation ieReceiveNewCrisisEvent(AdtCrisisID:dtCrisisID, AMessage:dtString) : ptBoolean
55         operation ieReceiveCrisisEventInformation(AdtName:dtString, AetHumanType:etHumanType,
56             AdtPhoneNumber:dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) : ptBoolean
57         operation ieMessageAbstractDispatchCoordinator(AdtComment: dtComment) : ptBoolean
58         operation ieReceiveMap(AdtMapWithPin: dtMapWithPin) : ptBoolean
59     }
60
61     output interface outactAbstractDispatchCoordinator {
62         operation oeGetCrisisEventInformation(AdtGeoPos:dtGeoPos) : ptBoolean
63         operation oeMessage(AdtComment:dtComment) : ptBoolean
64         operation oeUpdateDispatchStatus(AetDispatchStatus:etDispatchStatus): ptBoolean
65         operation oeRefreshMap(AdtGeoPos:dtGeoPos) : ptBoolean
66         operation oeCloseCrisisEvent(): ptBoolean
67     }
68 }
69
70 actor actFiremenCoordinator role rnactFiremenCoordinator cardinality [1...*] extends
71     actAbstractDispatchCoordinator {
72
73     operation init() : ptBoolean
74
75     input interface inactFiremenCoordinator {
76     }
77
78     output interface outactFiremenCoordinator {
79         operation oeAddRequestHelp() : ptBoolean
80         operation oeRequestHelp(AetTeamType: etTeamType, ARRequestedNumber:ptInteger) : ptBoolean
81     }
82
83 actor actPoliceCoordinator role rnPoliceCoordinator cardinality [1...*] extends
84     actAbstractDispatchCoordinator {
85
86     attribute modeFM: etFiremenMode
87     operation init() : ptBoolean
88
89     input interface inactPoliceCoordinator {
90     }
91
92     output interface outactPoliceCoordinator {
93     }
94
95 actor actTowServiceCoordinator role rnTowServiceCoordinator cardinality [1...*] extends

```

```

actAbstractDispatchCoordinator {
95
96    operation init() : ptBoolean
97
98    input interface inactTowServiceCoordinator {
99    }
100
101   output interface outactTowServiceCoordinator {
102    }
103}
104
105}
106}

```

Listing B.14: Messir Spec. file environment.msr.

B.15 File [./src-gen/messir-spec/concepts/primarytypes-associations/primarytypes-associations.msr](#)

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.associations {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes
13 import lu.uni.lassy.excalibur.group09.spec.environment
14
15 Concept Model {
16
17 Primary Types {
18
19    association assctCrisisEventctHuman
20      ctCrisisEvent(rnctCrisisEvent) [1..1]
21      ctHuman(rnctHuman) [1...*]
22
23    association assctCrisisEventctMapWithPin
24      ctCrisisEvent(rnctCrisisEvent) [1..1]
25      ctMapWithPin(rnctMapWithPin) [1..1]
26
27    association assDispatchedCoordinatorctMapWithPin
28      ctDispatchedCoordinator(rnctDispatchedCoordinator) [1..1]
29      ctMapWithPin(rnctMapWithPin) [1..1]
30
31    association assactComCompanyctMapWithPin
32      actCommunicationCompany(rnactCommunicationCompany) [1..1]
33      ctMapWithPin(rnctMapWithPin) [1...*]
34
35    association assactCentralCoordinatorctMapWithPin
36      actCentralCoordinator(rnactCentralCoordinator) [1..1]
37      ctMapWithPin(rnctMapWithPin) [1...*]
38
39    association assClassActorDispatchCoordinator
40      ctDispatchedCoordinator(rnctDispatchedCoordinator) [1..1]
41      actAbstractDispatchCoordinator(rnactAbstractDispatchCoordinator) [1..1]
42
43    association assctDispatchedCoordinatorctCrisisEvent
44      ctDispatchedCoordinator(rnctDispatchedCoordinator) [2...*]
45      ctCrisisEvent(rnctCrisisEvent) [1..1]
46
47    association assctCommentctCrisisEvent
48      ctComment(rnctComment) [0...*]
49      ctCrisisEvent(rnctCrisisEvent) [1..1]

```

```

50
51 association assctCommentctDispatchedCoordinator
52   ctComment (rnctComment) [0..*]
53   ctDispatchedCoordinator (rnctDispatchedCoordinator) [1..1]
54
55 association assctCommentactCentralCoordinator
56   ctComment (rnctComment) [0..*]
57   actCentralCoordinator (rnactCentralCoordinator) [1..1]
58
59 association assctCrisisEventactCentralCoordinator
60   ctCrisisEvent (ctCrisisEvent) [0..*]
61   actCentralCoordinator (rnactCentralCoordinator) [1..1]
62 }
63 }
64 }
```

Listing B.15: Messir Spec. file primarytypes-associations.msr.

B.16 File [./src-gen/messir-spec/concepts/primarytypes-classes/primarytypes-classes.msr](#)

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
13 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
14
15 import lu.uni.lassy.messir.libraries.primitives
16
17 Concept Model {
18
19 Primary Types {
20
21   state class ctState {
22     attribute vpStarted: ptBoolean
23     attribute nextValueForAlertID:ptInteger
24     operation init( ANextValueForAlertID:ptInteger,
25       AvpStarted:ptBoolean
26     ) : ptBoolean
27   }
28
29   class ctHuman role rnHuman cardinality [1..*] {
30     attribute id: dtPhoneNumber
31     attribute name: dtString
32     attribute type: etHumanType
33
34     operation init( Aid:dtPhoneNumber,
35       Aname:dtString,
36       Atype:etHumanType
37     ) : ptBoolean
38
39   }
40
41   class ctCrisisEvent role rnCrisisEvent cardinality [1..*] {
42     attribute id: dtCrisisID
43     attribute geoPos: dtGeoPos
44
45     operation init( Aid:dtCrisisID,
46       AgeoPos:dtGeoPos
47     ) : ptBoolean

```

```

48 }
49
50 class ctComment role rnComment cardinality [0..*] {
51   attribute comment: dtComment
52
53   operation init( AComment: dtComment
54
55   ) : ptBoolean
56 }
57
58 class ctDispatchedCoordinator role rnDispatchedCoordinator cardinality [1..*] {
59   attribute type: etTeamType
60   attribute status: etDispatchStatus
61   attribute geoPos: dtGeoPos
62   attribute isFree: ptBoolean
63   attribute mode: etDispatchCoordinatorMode
64
65   operation init( Atype:etTeamType,
66     Astatus:etDispatchStatus,
67     AgeoPos:dtGeoPos,
68     AisFree:ptBoolean,
69     Amode:etDispatchCoordinatorMode
70   ) : ptBoolean
71 }
72
73 class ctMapWithPin role rnMapWithPin cardinality [1..*] {
74   attribute mapWithPin: dtMapWithPin
75
76   operation init( AmapWithPin:dtMapWithPin
77   ) : ptBoolean
78 }
79
80
81 }
82 }
83 }
```

Listing B.16: Messir Spec. file primarytypes-classes.msr.

B.17 File [./src-gen/messir-spec/concepts/primarytypes-datatatypes/primarytypes-datatatypes.msr](#)

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes {
7
8   import lu.uni.lassy.messir.libraries.calendar
9   import lu.uni.lassy.messir.libraries.math
10  import lu.uni.lassy.messir.libraries.primitives
11  import lu.uni.lassy.messir.libraries.string
12  import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
13
14 Concept Model {
15
16   Primary Types {
17
18     datatype dtGeoPos {
19       attribute latitude:dtLatitude
20       attribute longitude:dtLongitude
21       operation is():ptBoolean
22     }
23
24     enum etDispatchStatus {
25       constants["InStation", "InTransit", "Arrived"]
26       operation is():ptBoolean
27     }
28
29   }
30 }
```

```

27 }
28
29 enum etHumanType {
30     constants["Victim", "Witness"]
31     operation is():ptBoolean
32 }
33
34 enum etTeamType {
35     constants["Firemen", "Police", "TowService"]
36     operation is():ptBoolean
37 }
38
39 enum etCentralCoordinatorMode {
40     constants["isInMain", "isInAddEvent"]
41     operation is():ptBoolean
42 }
43
44 enum etDispatchCoordinatorMode {
45     constants["hasBeenAssociatedToACrisisEvent", "isInStandBy", "isInMain", "isInMainWithCloseEventUnlocked", "isNull"]
46     operation is():ptBoolean
47 }
48
49 enum etFiremenMode {
50
51     constants["isInRequestHelp", "isNotInRequestHelp"]
52     operation is():ptBoolean
53 }
54
55
56 enum etComCompanyMode {
57     constants["isInRequest", "isInStandBy"]
58     operation is():ptBoolean
59 }
60
61 }
62 }
63 }
```

Listing B.17: Messir Spec. file primarytypes-datatypes.msr.

B.18 File ./src-gen/messir-spec/concepts/secondarytypes-associations/secondarytypes-associations.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.associations {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12
13 Concept Model {
14
15 Secondary Types {
16
17 }
18 }
19 }
```

Listing B.18: Messir Spec. file secondarytypes-associations.msr.

B.19 File ../src-gen/messir-spec/concepts/secondarytypes-classes/secondarytypes-classes.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.classes {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12
13 Concept Model {
14
15 Secondary Types {
16
17 }
18 }
19 }
```

Listing B.19: Messir Spec. file secondarytypes-classes.msr.

B.20 File ../src-gen/messir-spec/operations/concepts/secondarytypes-datatatypes/secondarytypes-datatatypes-dtMapWithPin-addPinToMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.operations.datatypes.
dtMapWithPin.addPinToMap {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
8 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
9
10 Operation Model {
11
12 operation: lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.dtMapWithPin.
addPinToMap(AGeoPos:dtGeoPos):ptBoolean{
13 // include below the specification information (pre, post or ocl or prolog)
14
15 }
16 }
17 }
```

Listing B.20: Messir Spec. file secondarytypes-datatypes-dtMapWithPin-addPinToMap.msr.

B.21 File ../src-gen/messir-spec/operations/concepts/secondarytypes-datatatypes/secondarytypes-datatypes-dtMapWithPin-getPinGeoPos.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.operations.datatypes.
dtMapWithPin.getPinGeoPos {
2
3 import lu.uni.lassy.messir.libraries.primitives
4 import lu.uni.lassy.messir.libraries.math
5 import lu.uni.lassy.messir.libraries.string
6 import lu.uni.lassy.messir.libraries.calendar
7 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
```

```

8 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
9
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.dtMapWithPin.
13     getPinGeoPos():dtGeoPos{
14     // include below the specification information (pre,post or ocl or prolog)
15   }
16 }
17 }
```

Listing B.21: Messir Spec. file secondarytypes-datatypes-dtMapWithPin-getPinGeoPos.msr.

B.22 File ./src-gen/messir-spec/operations/concepts/secondarytypes-datatypes/secondarytypes-datatypes-dtMapWithPin-removeAllPinsFromMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.operations.datatypes.
2   dtMapWithPin.removeAllPinsFromMap {
3
4   import lu.uni.lassy.messir.libraries.primitives
5   import lu.uni.lassy.messir.libraries.math
6   import lu.uni.lassy.messir.libraries.string
7   import lu.uni.lassy.messir.libraries.calendar
8   import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
9   import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
10
11 Operation Model {
12
13   operation: lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes.dtMapWithPin.
14     removeAllPinsFromMap():ptBoolean{
15     // include below the specification information (pre,post or ocl or prolog)
16   }
17 }
```

Listing B.22: Messir Spec. file secondarytypes-datatypes-dtMapWithPin-removeAllPinsFromMap.msr.

B.23 File ./src-gen/messir-spec/concepts/secondarytypes-datatypes/secondarytypes-datatypes.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
13
14 Concept Model {
15
16 Secondary Types {
17
18   datatype dtPhoneNumber extends dtString {
19     operation is() : ptBoolean
20   }
21 }
```

```

22  datatype dtAddress extends dtString {
23      operation is() : ptBoolean
24  }
25
26  datatype dtCrisisID extends dtInteger {
27      operation is() : ptBoolean
28  }
29
30  datatype dtLongitude extends dtReal {
31      operation is() : ptBoolean
32  }
33
34  datatype dtLatitude extends dtReal {
35      operation is() : ptBoolean
36  }
37
38  datatype dtImage extends dtString {
39      operation is() : ptBoolean
40  }
41
42  datatype dtMapWithPin extends dtImage {
43      operation getPinGeoPos() : dtGeoPos
44      operation removeAllPinsFromMap() : ptBoolean
45      operation addPinToMap(AGeoPos:dtGeoPos) : ptBoolean
46      operation distance(AGeoPosOne:dtGeoPos, AGeoPosTwo:dtGeoPos) : dtInteger
47      operation is() : ptBoolean
48  }
49
50  datatype dtComment extends dtString {
51      operation is() : ptBoolean
52  }
53 }
54
55 }
56 }
```

Listing B.23: Messir Spec. file secondarytypes-datatatypes.msr.

B.24 File ./src-gen/messir-spec/tests/tests.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.tests {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12
13 Test Model {
14
15 }
16
17 }
```

Listing B.24: Messir Spec. file tests.msr.

B.25 File ./src-gen/messir-spec/usecases/usecaseinstance-ugCreateNewCrisisEvent-uciugCreateNewCrisisEvent.msr

```

1 package usecases.uciugCreateNewCrisisEvent {
2 import lu.uni.lassy.excalibur.group09.spec.usecases
3 import lu.uni.lassy.excalibur.group09.spec.usecases
4 import lu.uni.lassy.excalibur.group09.spec.environment
```

```

5 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
6
7 Use Case Model {
8 use case instance uciugCreateNewCrisisEvent : ugCreateNewCrisisEvent {
9 actors {
10 Camille : actCentralCoordinator
11 Orange : actCommunicationCompany
12 Fabio : actFiremenCoordinator
13 Ted : actTowServiceCoordinator
14 }
15
16 use case steps {
17 Camille executed instanceof subfunction oeAddNewCrisisEvent() {
18 }
19
20 Camille executed instanceof subfunction oeRequestCrisisEventLocation("AdtPhoneNumber=691 12 34
      56") {
21 ieRequestCrisisEventLocation("691 12 34 56") returned to Orange
22 }
23
24 Orange executed instanceof subfunction oeReceiveCrisisEventLocation("Latitude=87.20, Longitude
      =20.25") {
25 ieReceiveCrisisEventLocation("A string for the image with the pin") returned to Camille
26 }
27
28 Camille executed instanceof subfunction oeMovePinOnMap("Latitude=75.08, Longitude=23.03") {
29 ieReceiveCrisisEventLocation("A string for the image with the pin") returned to Camille
30 }
31
32 Camille executed instanceof subfunction oeCreateNewCrisisEvent("AdtName=Walter", "AenHumanType=
      Witness", "AdtPhoneNumber=691 12 34 56", "A string for the image with the pins", "The
      Witness can't stay at the accident's location for long.") {
33 ieReceiveNewCrisisEvent("1", "You have received a new Crisis Event Dispatch Order!") returned to
      Fabio
34 ieReceiveNewCrisisEvent("1", "You have received a new Crisis Event Dispatch Order!") returned to
      Ted
35 }
36
37 }
38
39 }
40 }
41 }

```

Listing B.25: Messir Spec. file
usecaseinstance-ugCreateNewCrisisEvent-uciugCreateNewCrisisEvent.msr.

B.26 File ./src-gen/messir-spec/usecases/usecaseinstance-ugGlobalDispatchManagement-uciugGlobalDispatchManagement.msr

```

1 package usecases.uciugGlobalDispatchManagement {
2 import lu.uni.lassy.excalibur.group09.spec.usecases
3 import lu.uni.lassy.excalibur.group09.spec.usecases
4 import lu.uni.lassy.excalibur.group09.spec.environment
5 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
6
7 Use Case Model {
8 use case instance uciugGlobalDispatchManagement : ugGlobalDispatchManagement {
9 actors {
10 Camille : actCentralCoordinator
11 Fabio : actFiremenCoordinator
12 Ted : actTowServiceCoordinator
13 Polo : actPoliceCoordinator
14 }
15 use case steps {
16 Fabio executed instanceof subfunction oeGetCrisisEventInformation("Latitude=60.21, Longitude
      =40.23") {
17 ieReceiveCrisisEventInformation("1", "Walter", "Witness", "691 12 34 56", "A string for the image

```

```

        with the pins","The Witness can't stay at the accident's location for long.") returned to
        Fabio
18    }
19
20    Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
21        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
22    }
23
24    Ted executed instanceof subfunction oeGetCrisisEventInformation("Latitude=81.45, Longitude
25        =52.87") {
26        ieReceiveCrisisEventInformation("1","Walter","Witness","691 12 34 56","A string for the image
27            with the pins","The Witness can't stay at the accident's location for long.") returned to
28            Ted
29    }
30
31    Ted executed instanceof subfunction oeRefreshMap("Latitude=80.57, Longitude=50.23") {
32        ieReceiveMap("A string for the image with the pins") returned to Ted
33    }
34
35    Ted executed instanceof subfunction oeMessage("AdtComment=I will arrive in 30 minutes") {
36        ieMessageCentralCoordinator("I will arrive in 30 minutes") returned to Camille
37        ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Fabio
38        ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Ted
39    }
40
41    Ted executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
42        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Ted
43    }
44
45    Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
46        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
47    }
48
49    }
50
51    Fabio executed instanceof subfunction oeRequestHelp("AenTeamType=Police", "RequestedNumber=1")
52        {
53            ieReceiveNewCrisisEvent("1","You have received a new Crisis Event Dispatch Order!") returned
54                to Polo
55        }
56
57    Polo executed instanceof subfunction oeGetCrisisEventInformation("Latitude=44.57, Longitude
58        =63.23") {
59        ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
60            with the pins","The Witness can't stay at the accident's location for long.") returned to
61            Polo
62    }
63
64    Polo executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
65        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Polo
66    }
67
68    Ted executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
69        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Ted
70    }
71
72    Polo executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
73        ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Polo
74    }
75
76    Fabio executed instanceof subfunction oeCloseCrisisEvent() {
77    }
78
79    Ted executed instanceof subfunction oeCloseCrisisEvent() {
80    }
81
82    Polo executed instanceof subfunction oeCloseCrisisEvent() {
83    }

```

```

78
79    }
80  }
81  }
82 }
```

Listing B.26: Messir Spec. file
usecaseinstance-ugGlobalDispatchManagement-uciugGlobalDispatchManagement.msr.

B.27 File ./src-gen/messir-spec/usecases/usecases.msr

```

1 /*
2 * @author Kira
3 * @date Tue Oct 25 23:54:03 CEST 2016
4 */
5
6 package lu.uni.lassy.excalibur.group09.spec.usecases {
7
8 import lu.uni.lassy.messir.libraries.calendar
9 import lu.uni.lassy.messir.libraries.math
10 import lu.uni.lassy.messir.libraries.primitives
11 import lu.uni.lassy.messir.libraries.string
12 import lu.uni.lassy.excalibur.group09.spec.environment
13 import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
14 import lu.uni.lassy.excalibur.group09.spec.concepts.secondarytypes.datatypes
15
16 Use Case Model {
17
18 use case system summary suGlobalManagementOfEvent() {
19   actor actCentralCoordinator[primary, active]
20   actor actCommunicationCompany[secondary, active]
21   actor actFiremenCoordinator[secondary, active]
22   actor actTowServiceCoordinator[secondary, active]
23
24 reuse ugCreateNewCrisisEvent[1...*]
25 reuse ugGlobalDispatchManagement[1...*]
26
27 step a: actCentralCoordinator executes ugCreateNewCrisisEvent
28 step b: actFiremenCoordinator executes ugGlobalDispatchManagement
29 step c: actTowServiceCoordinator executes ugGlobalDispatchManagement
30
31 ordering constraint "step (a) must be executed before step (b) or step (c)"
32 ordering constraint "step (b) XOR step (c)"
33
34 }
35
36 use case system usergoal ugCreateNewCrisisEvent() {
37   actor actCentralCoordinator[primary, active]
38   actor actCommunicationCompany[secondary, active]
39   actor actFiremenCoordinator[secondary, passive]
40   actor actTowServiceCoordinator[secondary, passive]
41
42 reuse oeAddNewCrisisEvent[1...*]
43 reuse oeRequestCrisisEventLocation[1...*]
44 reuse oeReceiveCrisisEventLocation[1...*]
45 reuse oeCreateNewCrisisEvent[1...*]
46 reuse oeMovePinOnMap[0...*]
47
48 step a: actCentralCoordinator executes oeAddNewCrisisEvent
49 step b: actCentralCoordinator executes oeRequestCrisisEventLocation
50 step c: actCommunicationCompany executes oeReceiveCrisisEventLocation
51 step d: actCentralCoordinator executes oeMovePinOnMap
52 step e: actCentralCoordinator executes oeCreateNewCrisisEvent
53
54 ordering constraint "step (a) must be executed first"
55 ordering constraint "if step (c) then previously step (b)"
56 ordering constraint "if step (d) then previously step (c)"
57 ordering constraint "step (e) executed as last"
58 ordering constraint "step (a), (b), (c), (e) must be executed at least once"
```

```

59  }
60
61 use case system usergoal ugGlobalDispatchManagement() {
62   actor actFiremenCoordinator[primary, active]
63   actor actTowServiceCoordinator[primary, active]
64   actor actCentralCoordinator[secondary, passive]
65   actor actPoliceCoordinator[secondary, active]
66
67   reuse oeGetCrisisEventInformation[2...*]
68   reuse oeUpdateDispatchStatus[4...*]
69   reuse oeRefreshMap[0...*]
70   reuse oeMessage[0...*]
71   reuse oeRequestHelp[0...*]
72   reuse oeCloseCrisisEvent[2...*]
73   reuse oeAddRequestHelp[0...*]
74
75   step a: actFiremenCoordinator executes oeGetCrisisEventInformation
76   step b: actFiremenCoordinator executes oeUpdateDispatchStatus
77   step c: actTowServiceCoordinator executes oeGetCrisisEventInformation
78   step d: actTowServiceCoordinator executes oeUpdateDispatchStatus
79   step e: actTowServiceCoordinator executes oeRefreshMap
80   step f: actTowServiceCoordinator executes oeMessage
81   step g: actFiremenCoordinator executes oeAddRequestHelp
82   step h: actFiremenCoordinator executes oeRequestHelp
83   step i: actPoliceCoordinator executes oeGetCrisisEventInformation
84   step j: actPoliceCoordinator executes oeUpdateDispatchStatus
85   step k: actFiremenCoordinator executes oeCloseCrisisEvent
86   step l: actTowServiceCoordinator executes oeCloseCrisisEvent
87   step m: actPoliceCoordinator executes oeCloseCrisisEvent
88
89   ordering constraint "if step (b),(d),(j) then previously step (a),(c),(i) respectively"
90   ordering constraint "if step (k),(l),(m) then previously step (b),(d),(j) at least two times
      respectively"
91   ordering constraint "step (h) can only be executed if step (g) has at least been executed once
      previously"
92   ordering constraint "if step (i) then previously step (h)"
93
94 }
95
96 use case system subfunction oeAddNewCrisisEvent() {
97   actor actCentralCoordinator[primary, active]
98 }
99
100 use case system subfunction oeRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) {
101   actor actCentralCoordinator[primary, active]
102   actor actCommunicationCompany[secondary, passive]
103   returned messages{
104     ieRequestCrisisEventLocation(AdtPhoneNumber) returned to actCommunicationCompany //Slide 208..
105   }
106 }
107
108 use case system subfunction oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos) {
109   actor actCommunicationCompany[primary, active]
110   actor actCentralCoordinator[secondary, passive]
111   returned messages{
112     ieReceiveCrisisEventLocation(AdtMapWithPin) returned to actCentralCoordinator
113   }
114 }
115
116 use case system subfunction oeMovePinOnMap() {
117   actor actCentralCoordinator[primary, active]
118   returned messages{
119     ieReceiveCrisisEventLocation(AdtMapWithPin) returned to actCentralCoordinator
120   }
121 }
122
123 use case system subfunction oeCreateNewCrisisEvent(AName:dtString, AetHumanType:etHumanType,
      AdtPhoneNumber:dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) {
124   actor actCentralCoordinator[primary, active]
125   actor actAbstractDispatchCoordinator[secondary, passive]

```

```

126  returned messages{
127    ieReceiveNewCrisisEvent(AdtCrisisID, AdtMessage) returned to actAbstractDispatchCoordinator
128  }
129 }
130
131 use case system subfunction oeGetCrisisEventInformation(AdtGeoPos:dtGeoPos) {
132   actor actAbstractDispatchCoordinator[primary, active]
133   returned messages{
134     ieReceiveCrisisEventInformation (AdtCrisisID, AdtName, AetHumanType, AdtPhoneNumber,
135       AdtMapWithPin, AdtComment) returned to actAbstractDispatchCoordinator
136   }
137 }
138
139 use case system subfunction oeMessage(AdtComment:dtComment) {
140   actor actAbstractDispatchCoordinator[primary, active]
141   actor actCentralCoordinator[secondary, passive]
142   actor actAbstractDispatchCoordinator[secondary, multiple]
143   returned messages{
144     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
145     ieMessageCentralCoordinator(AdtComment) returned to actCentralCoordinator
146   }
147 }
148
149 use case system subfunction oeUpdateDispatchStatus(AetDispatchStatus:etDispatchStatus) {
150   actor actAbstractDispatchCoordinator[primary, active]
151   returned messages{
152     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
153   }
154 }
155
156 use case system subfunction oeRefreshMap(AdtGeoPos:dtGeoPos) {
157   actor actAbstractDispatchCoordinator[primary, active]
158   returned messages{
159     ieReceiveMap(AdtMapWithPin) returned to actAbstractDispatchCoordinator
160   }
161 }
162
163 use case system subfunction oeAddRequestHelp() {
164   actor actFiremenCoordinator[primary, active]
165 }
166
167 use case system subfunction oeRequestHelp(AetTeamType: etTeamType, RequestedNumber:ptInteger) {
168   actor actFiremenCoordinator[primary, active]
169   actor actAbstractDispatchCoordinator[secondary, passive]
170   returned messages{
171     ieReceiveNewCrisisEvent(AdtCrisisID, AdtMessage) returned to actAbstractDispatchCoordinator
172   }
173 }
174
175 use case system subfunction oeCloseCrisisEvent() {
176   actor actAbstractDispatchCoordinator[primary, active]
177 }
178 }
179
180 }

```

Listing B.27: Messir Spec. file usecases.msr.

Bibliography

- [1] Guelfi, N.: Messir: A Scientific Method for the Software Engineer. to be published (2017)
- [2] Armour, F., Miller, G.: Advanced Use Case Modeling: Software Systems. Addison-Wesley (2001)