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MESSIR Analysis Document
- v 0.0 -

(Report type: Default)

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Chapter 1

Introduction

1.1 Overview

1.2 Purpose and recipients of the document

1.3 Application Domain

1.4 Definitions, acronyms and abbreviations

1.5 Document structure

Chapter 2

General Description

2.1 Domain Stakeholders

2.2 System's Actors

The objective of this section is not to provide the full requirement elicitation document in this section but to reuse a part of this document to provide a informal introduction to the **Messip** specification of the system under development. The use case model is made of a use case diagrams modelling abstractly and informally the actors and their use cases together with a set of use cases descriptions. In addition, those diagrams and description tables are adapted to the **Messip** specification since actor and messages names together with parameters are partly adapted to be consistent with the specification identifiers (see [1] for more details).

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 **Messip** 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	
Name	suGlobalManagementOfEvent
Scope	system
Level	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

continues in next page ...

... Use-Case Description table continuation

b	the actor	actFiremenCoordinator	executes the	<u>ugGlobalDispatchManagement</u>	use case
c	the actor	actTowServiceCoordinator	executes the	<u>ugGlobalDispatchManagement</u>	use case
Steps Ordering Constraints					
1	step (a) must be executed before step (b) or step (c)				
2	step (b) XOR step (c)				
Additional Information					
none					

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

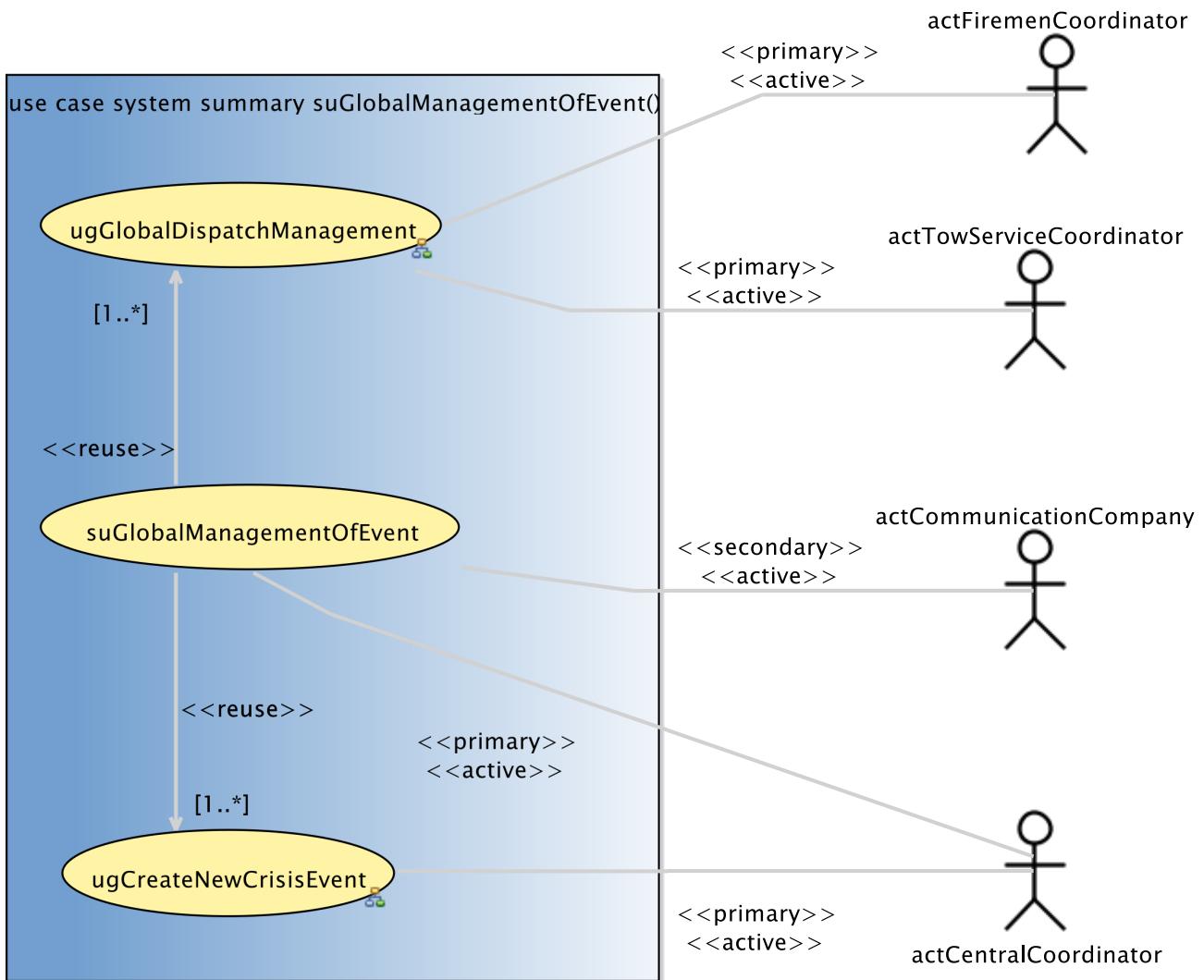


Figure 2.1:

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 [0..*]</u>
3	<u>oeReceiveCrisisEventLocation [0..*]</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 pins, 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.

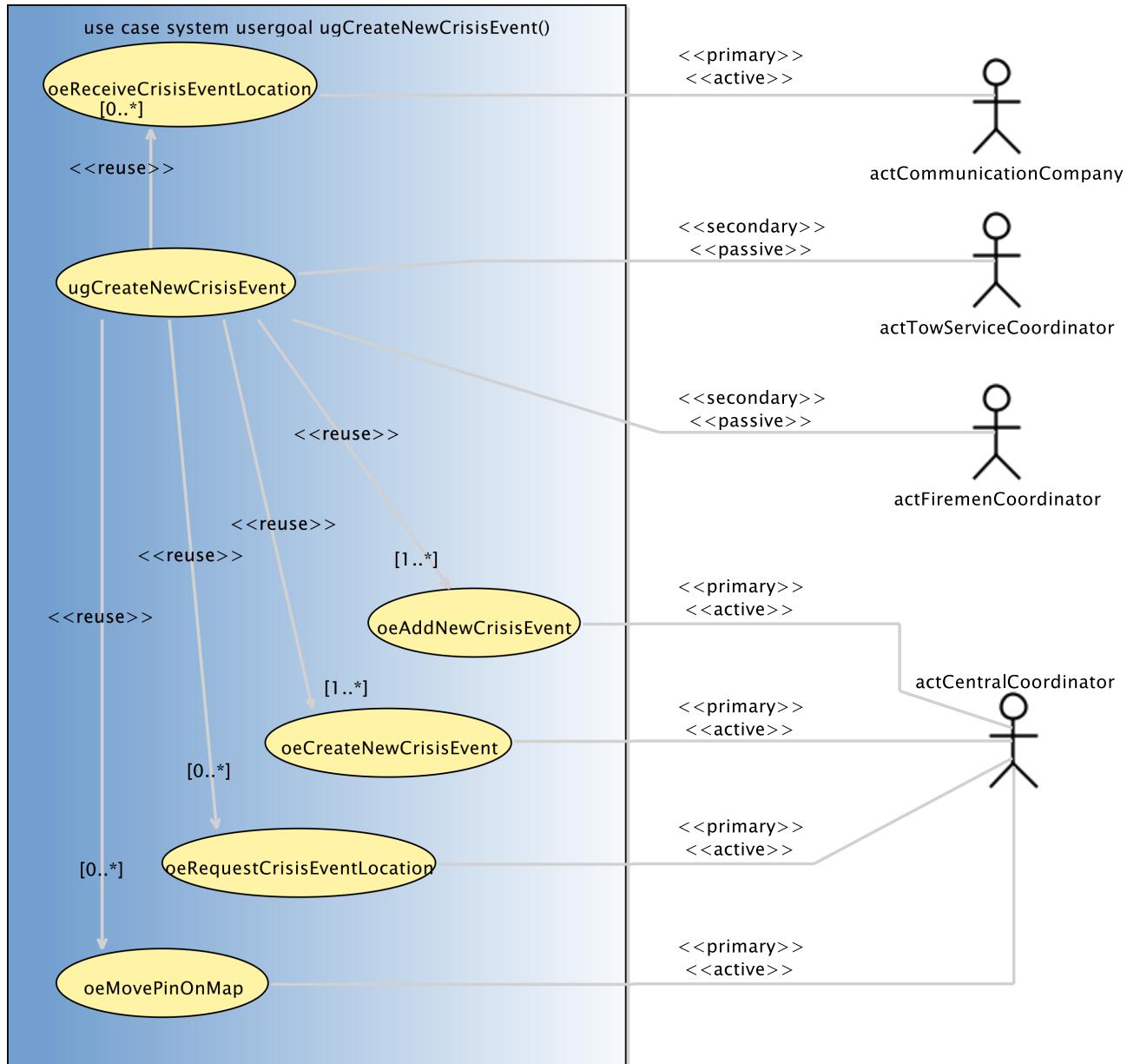


Figure 2.2: ugCreateNewCrisisEvent

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

continues in next page ...

... 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.

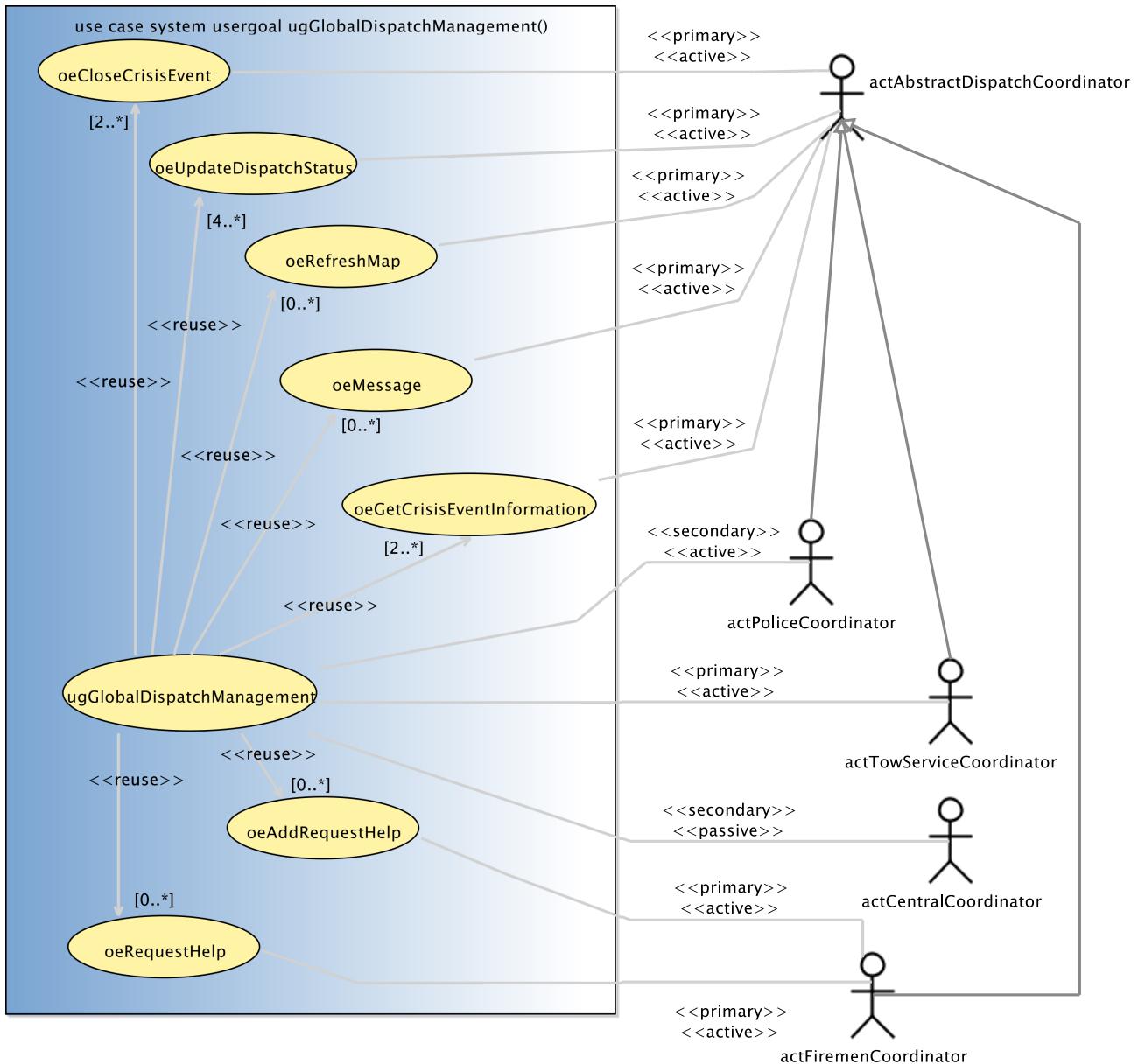


Figure 2.3: ugGlobalDispatchManagement

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.

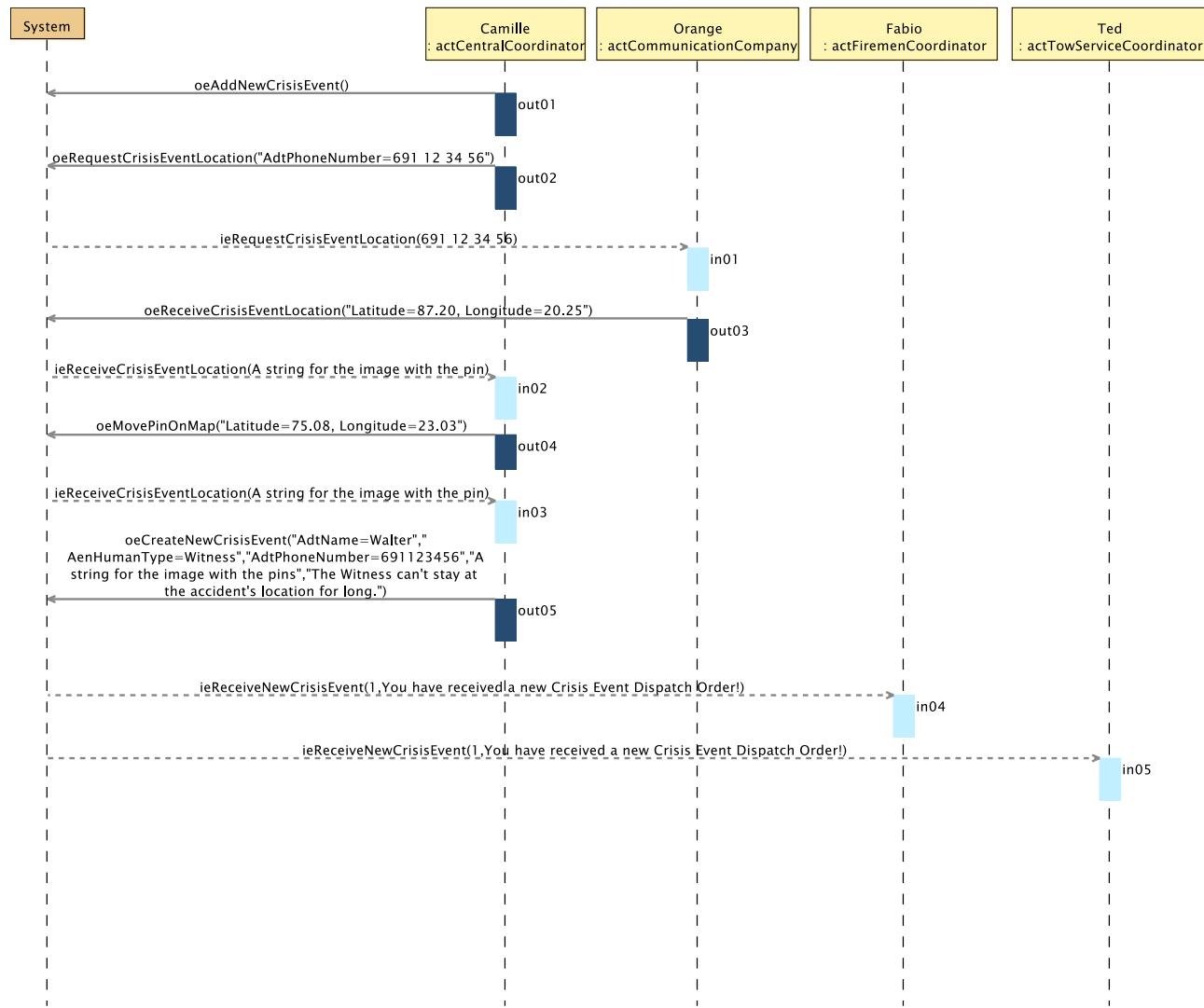


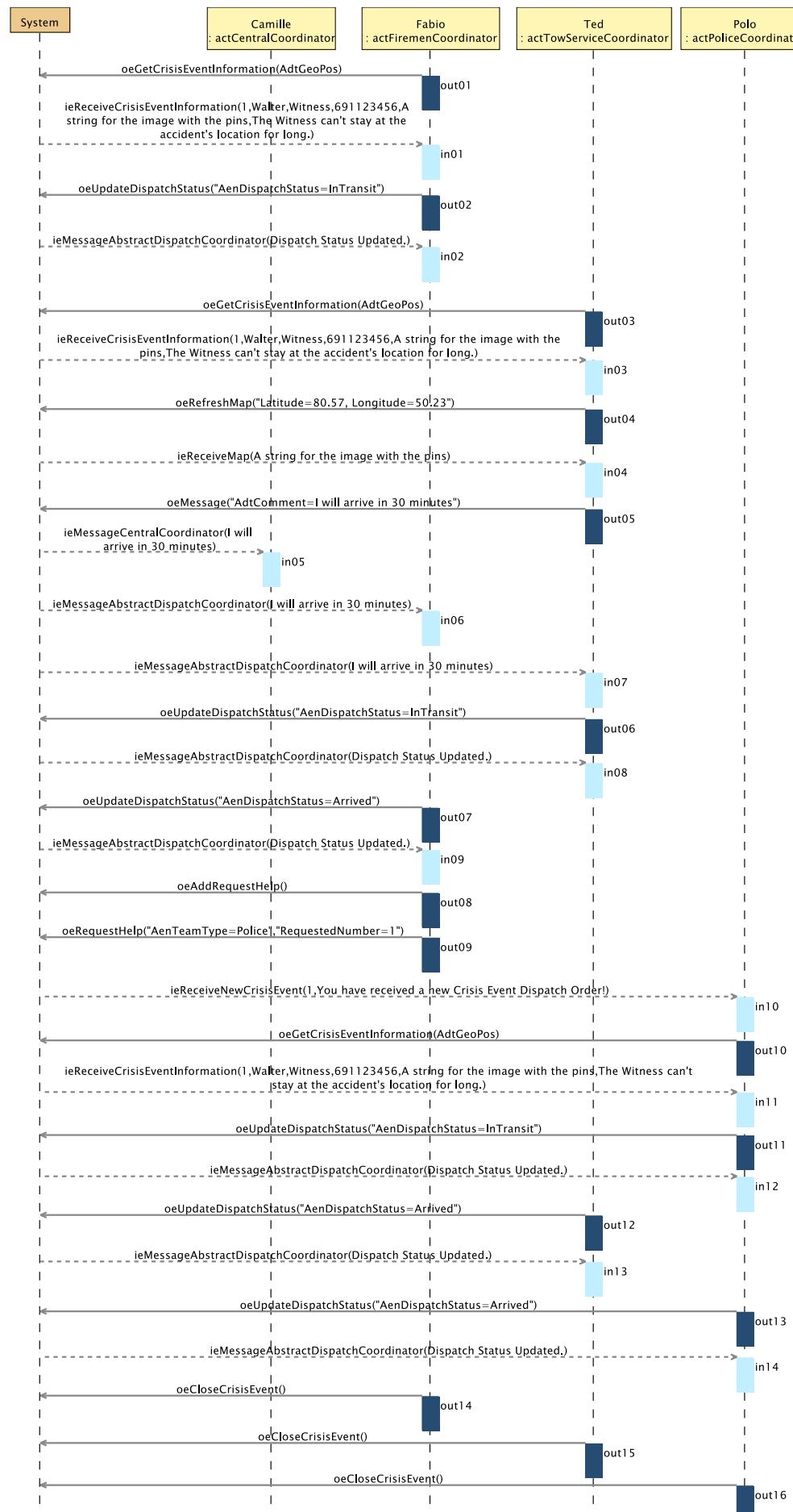
Figure 2.4: ugCreateNewCrisisEvent

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 FiremanCoordinator, 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.

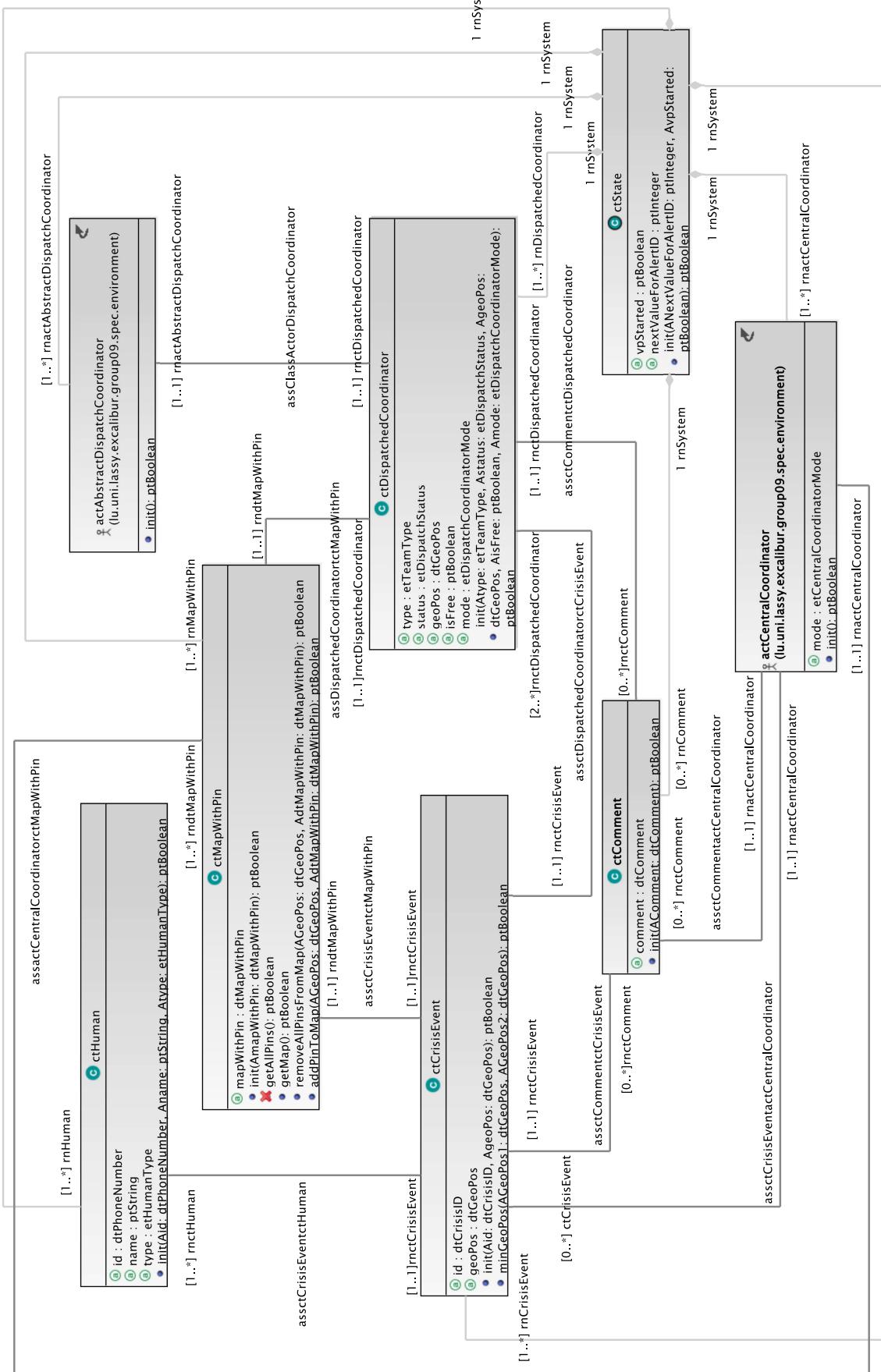


Figure 4.1: Concept Model - PrimaryTypes-Classes local view 12. Main view of the concept model.

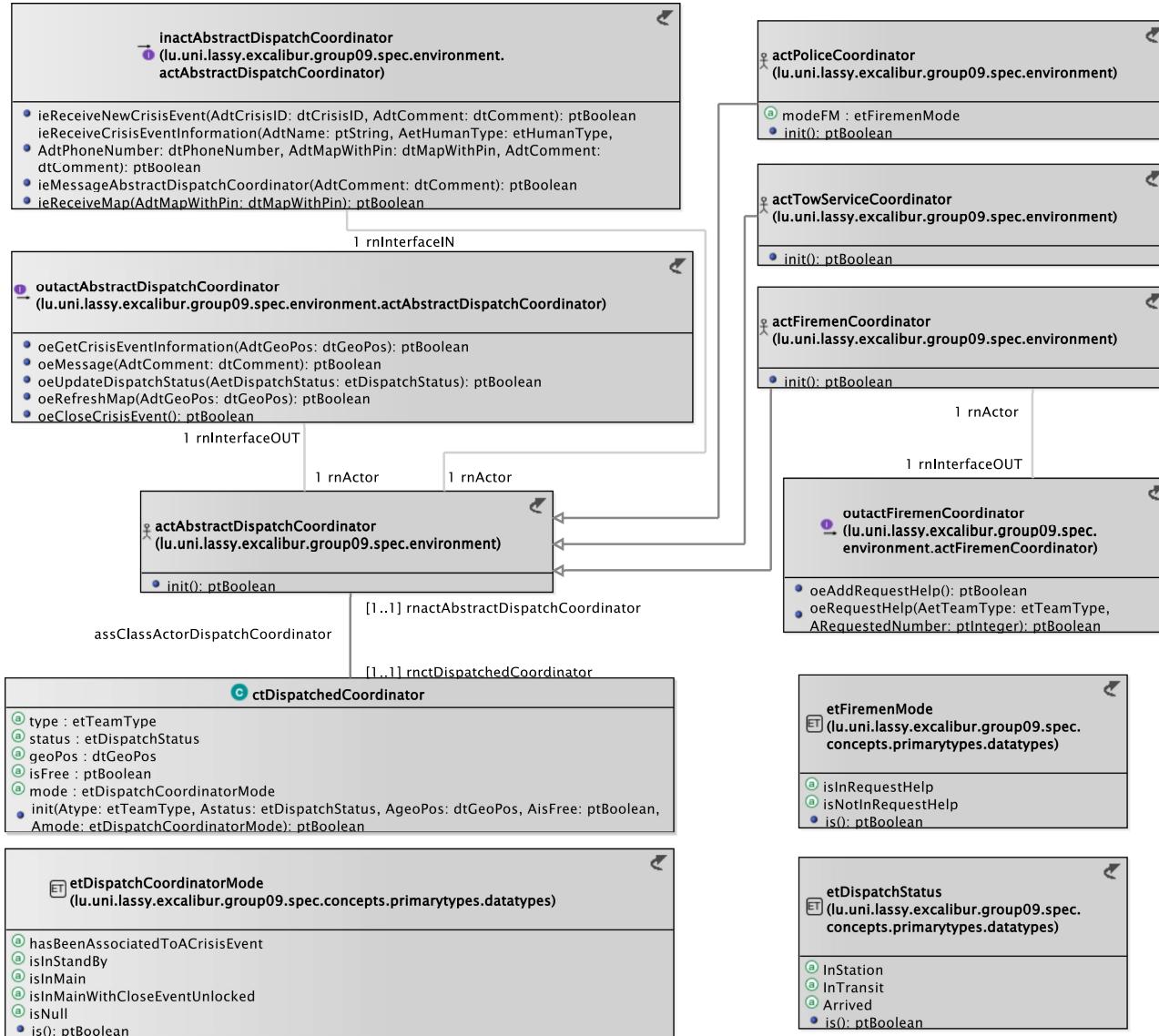


Figure 4.2: Concept Model - PrimaryTypes-Classes local view 18. View of the actors and operations regarding a dispatched coordinator.

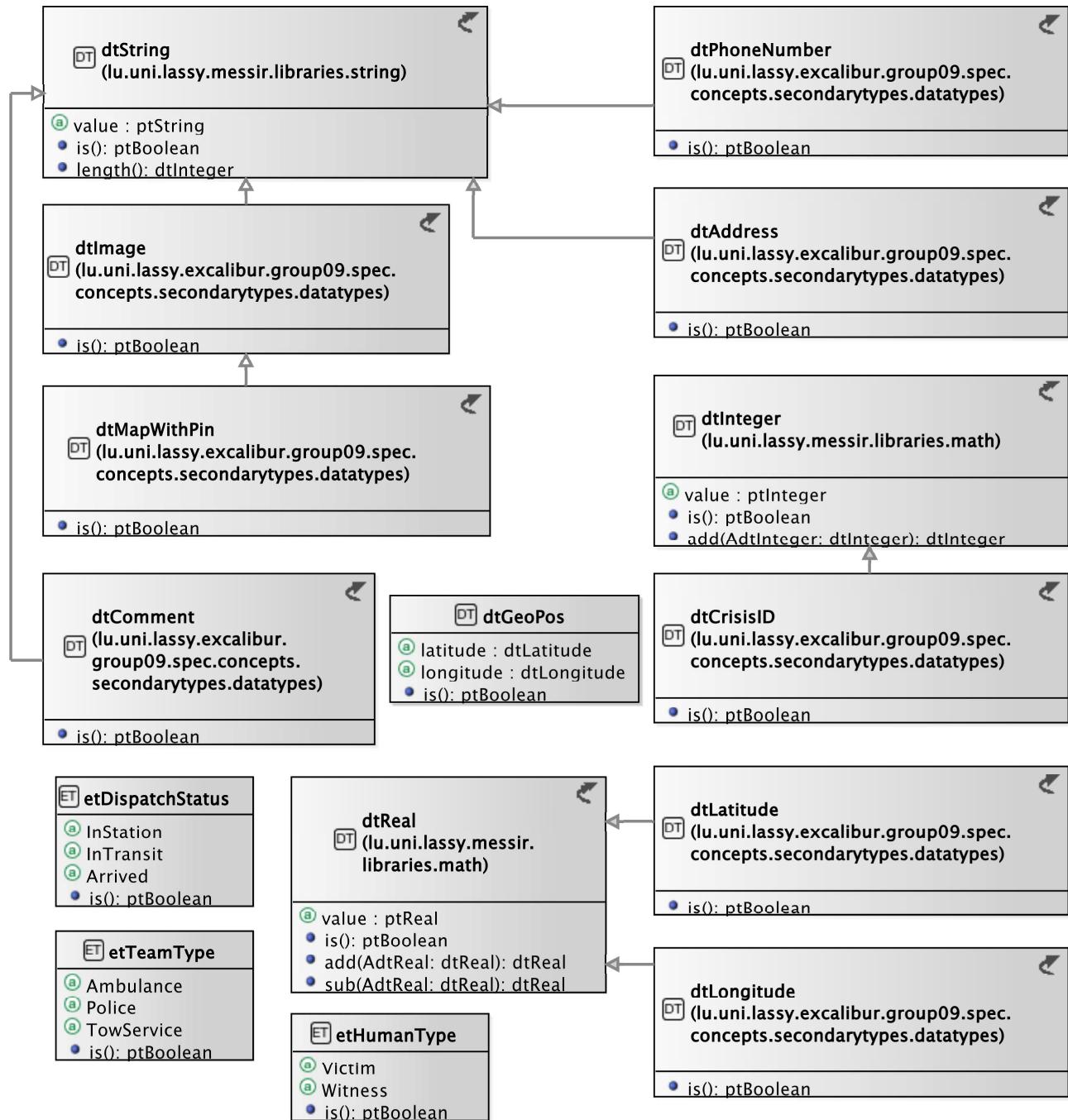


Figure 4.3: Concept Model - PrimaryTypes-Datatypes local view 15. View of all the datatypes.

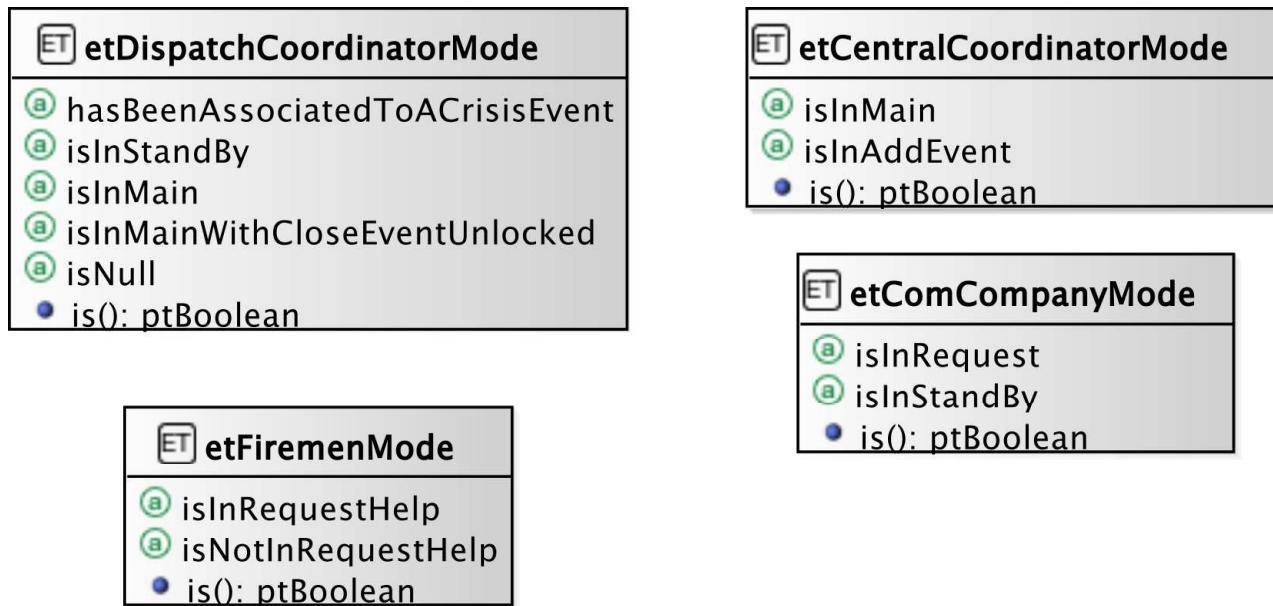


Figure 4.4: Concept Model - PrimaryTypes-Datatypes local view 16. View of all the different modes for the coordinators/actors.

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.

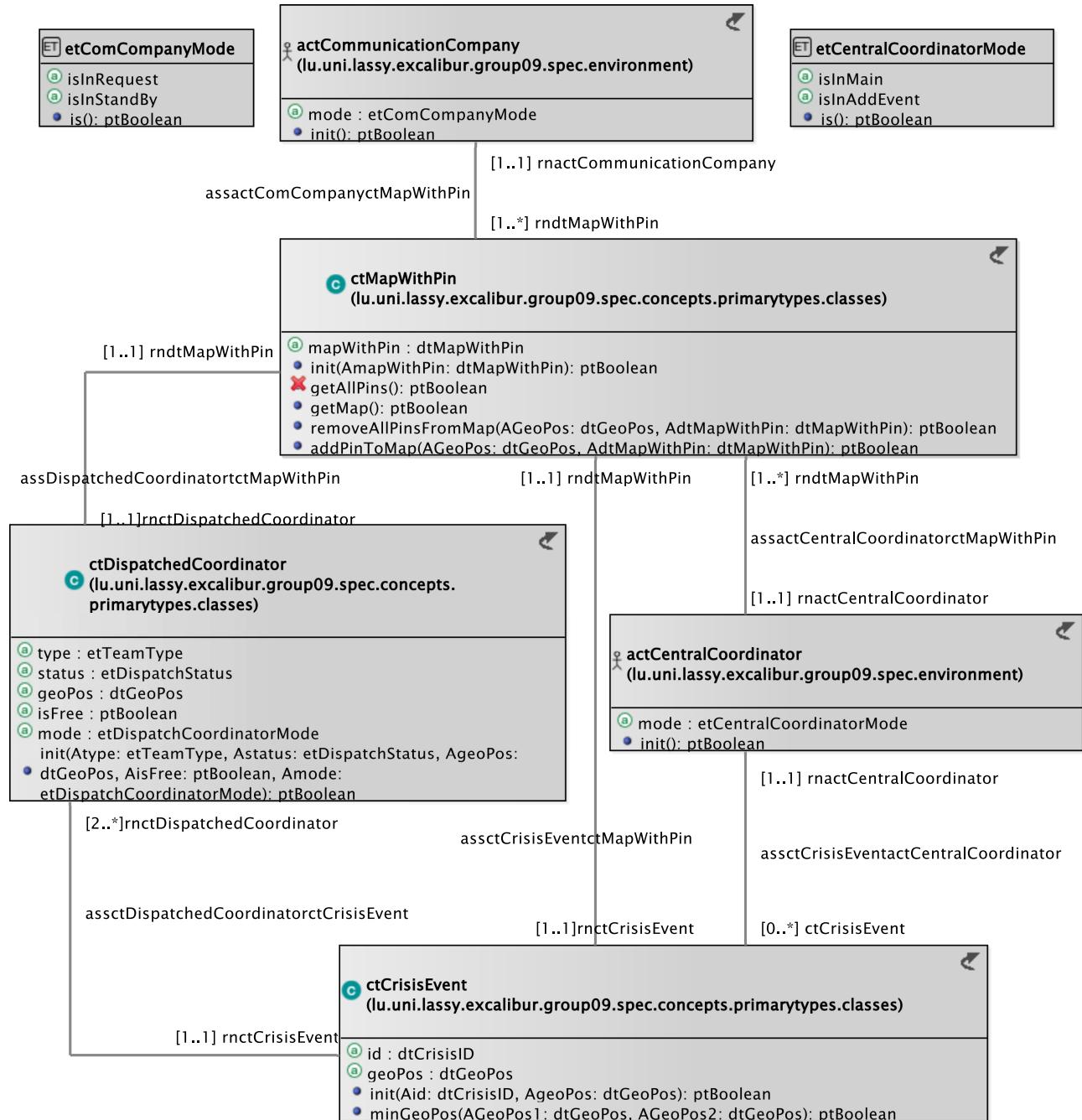


Figure 4.5: Concept Model - PrimaryTypes-Datatypes local view 17. View of 'mapWithPin' and its relationships.

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 has been set to <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 has been 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 has been set to <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 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 has been 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
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	The dispatch coordinator's mode has been set to <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

continues in next page ...

...Operation table continuation

<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 The dispatch coordinator's mode has been set to <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.
<i>Parameters</i>
1 AetDispatchStatus: etDispatchStatus
<i>Return type</i>
ptBoolean
<i>Pre-Condition (protocol)</i>
PreP 1 The dispatch coordinator's mode has been set to <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>

continues in next page ...

... Operation table continuation

sent with the intention to add a new crisis event.
--

Return type

ptBoolean

Pre-Condition (protocol)

PreP 1 The actor's mode has been set to <code>isInMain</code> .

Post-Condition (protocol)

PostP 1 The actor's mode has been 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.
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1	The actor's mode has been set to <code>isInAddEvent</code> .
<i>Pre-Condition (functional)</i>	
PreF 1	The map with pin created by the communication company and maybe modified by the central coordinator only has a single pin.
<i>Post-Condition (functional)</i>	
PostF 1	A new crisis event is created and initialised with a new crisis event ID which is the <code>nextValueForAlertID@pre</code> in <code>ctState</code> and the geographical position of the crisis event which is extracted from the map with pin created by the communication company and maybe modified by the central coordinator.
PostF 2	An alert message 'You have received a new dispatch order!' 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 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 created by the communication company and maybe modified by the central coordinator, the human, who may be initialised, if he/she is not yet in the database, with his/her phone number as the unique id, a name and a type (witness/victim), comments 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.
<i>Post-Condition (protocol)</i>	
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 <code>AdtGeoPos: dtGeoPos</code>
Return type
<code>ptBoolean</code>
<i>Pre-Condition (protocol)</i>
PreP 1 The actor's mode has been set to <code>isAddEvent</code> .
<i>Pre-Condition (functional)</i>
PreF 1 It is supposed that a map with pin has already been initialised by the communication company.
<i>Post-Condition (functional)</i>
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.
<i>Post-Condition (protocol)</i>
PostP 1

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 <code>AdtPhoneNumber: dtPhoneNumber</code>
Return type
<code>ptBoolean</code>

continues in next page ...

... Operation table continuation

<i>Pre-Condition (protocol)</i>
PreP 1 The actor's mode has been set to <code>isAddEvent</code> .
<i>Pre-Condition (functional)</i>
PreF 1 it is supposed that the phone number given by the <code>CentralCoordinator</code> 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.
Parameters
1 <code>AdtGeoPos: dtGeoPos</code>
Return type
<code>ptBoolean</code>
<i>Pre-Condition (protocol)</i>
PreP 1 The actor's mode has been set to <code>isInRequest</code> .
<i>Pre-Condition (functional)</i>
PreF 1 the <code>GeoPos</code> given by the communication company is a valid one.
<i>Post-Condition (functional)</i>
PostF 1 A new map with pin is created and initialised with the <code>ctMapWithPin</code> using the given geographical position as base and its own inner operations (cf. Chapter 5.6).
PostF 2 The new map with pin returned to the <code>CentralCoordinator</code> includes a single pin, which is the one corresponding to the geographical position of the notifier's phone.
PostF 3 The new map with pin is then associated to the central coordinator who received it and the communication company who created it,
<i>Post-Condition (protocol)</i>
PostP 1 The actor's mode has been 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 has been set to isInMain or isInMainWithCloseEventUnlocked. PreP 2 The firemen coordinator's modeFM has been set to isNotInRequestHelp.	
<i>Post-Condition (protocol)</i>	
PostP 1 The firemen coordinator's modeFM is set to isInRequestHelp. PostP 2 The firemen coordinator's mode is set to isNull.	

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	AetTeamType: etTeamType
2	ARRequestedNumber: ptInteger
<i>Return type</i>	
ptBoolean	
<i>Pre-Condition (protocol)</i>	
PreP 1 The firemen coordinator's mode has been set to isNull. PreP 2 The firemen coordinator's modeFM has been set to isInRequestHelp.	
<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. PostF 2 The new crisis event is then associated to the selected dispatch coordinator(s).	

continues in next page ...

... Operation table continuation

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> .
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 Class ctCrisisEvent

5.6.1 Operation Model for minGeoPos

The `minGeoPos` operation has the following properties:

OPERATION
<i>minGeoPos</i>
used to compare which of the given two geographical position is nearer to the geographical position of the crisis event.
<i>Parameters</i>
1 AGeoPos1: <code>dtGeoPos</code>
2 AGeoPos2: <code>dtGeoPos</code>
<i>Return type</i>
<code>ptBoolean</code>
<i>Post-Condition (functional)</i>
PostF 1 Returns a single geographical position which is the one nearer to the crisis event.

5.7 Primary Types - Operation Schemes for Class ctMapWithPin

5.7.1 Operation Model for addPinToMap

The `addPinToMap` operation has the following properties:

OPERATION
<i>addPinToMap</i>
used to add a pin to a map.
<i>Parameters</i>
1 AGeoPos: <code>dtGeoPos</code>
2 AdtMapWithPin: <code>dtMapWithPin</code>

continues in next page ...

...Operation table continuation

<i>Return type</i>
ptBoolean
<i>Post-Condition (functional)</i>
PostF 1 convert the given geographical position into a pin on a map.

5.7.2 Operation Model for getPin

The `getPin` operation has the following properties:

OPERATION
<i>getPin</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>
ptBoolean
<i>Post-Condition (functional)</i>
PostF 1 returns a geographical positions.

5.7.3 Operation Model for getMap

The `getMap` operation has the following properties:

OPERATION
<i>getMap</i>
used to get the (updated) map with pin(s).
<i>Return type</i>
ptBoolean
<i>Post-Condition (functional)</i>
PostF 1 Returns a map with pin with a surrounding area of 20km around the pins after having updated the map and the pins using its own inner operations.

5.7.4 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>Parameters</i>
1 AGeoPos: dtGeoPos
2 AdtMapWithPin: dtMapWithPin
<i>Return type</i>
ptBoolean
<i>Post-Condition (functional)</i>

continues in next page ...

... Operation table continuation

PostF 1	removes all pins currently on the map.
---------	--

5.8 Primary Types - Operation Schemes for Datatypes

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

5.9 Primary Types - Operation Schemes for Enumerations

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

5.10 Secondary Types - Operation Schemes for Classes

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

5.11 Secondary Types - Operation Schemes for Datatypes

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

5.12 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-oeConfirmCrisisEventLocation.msr

```

1 //package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
    outactCentralCoordinator.oeConfirmCrisisEventLocation {
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.oeConfirmCrisisEventLocation():ptBoolean{
```

```

11 //  // include below the specification information (pre,post or ocl or prolog)
12 //
13 //
14 //
15 //

```

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

B.9 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
11 Operation Model {
12
13     operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
        outactCentralCoordinator.oeCreateNewCrisisEvent(
14         AName:dtString,
15         AetHumanType:etHumanType,
16         AdtPhoneNumber:dtPhoneNumber,
17         AdtMapWithPin:dtMapWithPin,
18         AdtComment:dtComment
19     ):ptBoolean{
20         // include below the specification information (pre,post or ocl or prolog)
21         prep{
22             //PreP 01
23             let AetCentralCoordinatorMode:etCentralCoordinatorMode in
24             self.rnActor.mode@pre = AetCentralCoordinatorMode
25             and 'isInAddEvent' = AetCentralCoordinatorMode
26
27         }
28
29         postF{
30             let TheCrisisEvent:ctCrisisEvent in
31             let TheMessage:dtString in
32             let AdtGeoPos:dtGeoPos in
33             let AdtCrisisID:dtCrisisID in
34
35             let AetFiremenMode:etFiremenMode in
36             let AFirstTeamType:etTeamType in
37             let ASecondTeamType:etTeamType in
38             let TheFiremenCoordinator:ctDispatchedCoordinator in
39             let TheTowServiceCoordinator:ctDispatchedCoordinator in
40
41             let TheHuman:ctHuman in
42
43             //PostF 01
44             self.rnActor.rnSystem.nextValueForAlertID@pre = AdtCrisisID
45             and self.rnActor.rnctMapWith.getPin() = AdtGeoPos
46             and TheCrisisEvent.init(
47                 AdtCrisisID,
48                 AdtGeoPos
49             )
50
51             //PostF 02
52             and TheFiremenCoordinator.type@pre = AFirstTeamType
53             and 'Firemen' = AFirstTeamType
54             and TheTowServiceCoordinator.type@pre = ASecondTeamType
55             and 'TowService' = ASecondTeamType

```

B.9. FILE /SRC-GEN.../ENVIRONMENT-ACTCENTRALCOORDINATOR-OECREATENEWCRISISEVENT.MS

```
56 //MISSING NEAREST CONDITION
57 //!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
58 and 'TRUE' = TheFiremenCoordinator.isFree@pre
59 and 'TRUE' = TheTowService.isFree@pre
60 and 'InStation' = TheFiremen.status@post
61 and 'InStation' = TheFiremen.status@post
62
63 and 'You have received a new dispatch order!' = TheMessage.value
64 and
65
66 //PostF 03
67 and TheCrisisEvent.rnactCentralCoordinator = self.rnActor@pre
68
69 and TheCrisisEvent.rnctDispatchedCoordinator = TheFiremenCoordinator
70 and TheCrisisEvent.rnctDispatchedCoordinator = TheTowServiceCoordinator
71
72 and TheCrisisEvent.rnctMapWithPin = self.rnActor.rnctMapWith@post
73
74 //MISSING HOW TO CHECK IF IT'S ALREADY IN DATABASE
75 //!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
76 and if()
77 then(
78     TheCrisisEvent.rnHuman = TheHuman
79 )
80 else(
81     TheHuman.init(
82         AdtPhoneNumber,
83         AName,
84         AetHumanType
85     )
86     TheCrisisEvent.rnHuman = TheHuman
87 )
88 endif
89
90 and TheCrisisEvent.rnctComment = self.rnActor.rnctComment@post
91
92 //PostF 04
93 and 'FALSE' = TheFiremenCoordinator.isFree@post
94 and 'FALSE' = TheTowServiceCoordinator.isFree@post
95
96 //PostF 05
97 and self.rnActor.rnSystem.nextValueForAlertID@post = self.rnActor.rnSystem.
98     nextValueForAlertID@pre + 1
99 }
100
101 postP{
102 let TheCrisisEvent:ctCrisisEvent in
103 let AetCentralCoordinatorMode:etCentralCoordinatorMode in
104 let AetDispatchCoordinatorMode:etDispatchCoordinatorMode in
105 let AetFiremenMode:etFiremenMode in
106 let AFIRSTTeamType:etTeamType in
107 let ASecoundTeamType:etTeamType in
108 let TheFiremenCoordinator:ctDispatchedCoordinator in
109 let TheTowServiceCoordinator:ctDispatchedCoordinator in
110
111 //PostP 01
112 and self.rnActor.mode@post = AetCentralCoordinatorMode
113 and 'isInMain' = AetCentralCoordinatorMode
114
115 /*PostP 02 & 03*/
116 and self.rnActor.rnctCrisisEvent = TheCrisisEvent
117 and TheCrisisEvent.rnctDispatchedCoordinator = TheFiremenCoordinator
118 and TheCrisisEvent.rnctDispatchedCoordinator = TheTowServiceCoordinator
119
120 and TheFiremenCoordinator.type@pre = AFIRSTTeamType
121 and 'Firemen' = AFIRSTTeamType
122 and TheTowServiceCoordinator.type@pre = ASecoundTeamType
```

```

123 and 'TowService' = ASecondTeamType
124
125 //PostP_02
126 and TheFiremenCoordinator.mode@post = AetDispatchCoordinatorMode
127 and TheTowServiceCoordinator.mode@post = AetDispatchCoordinatorMode
128 and 'hasBeenAssociatedToACrisisEvent' = AetDispatchCoordinatorMode
129
130 //PostP_03
131 and TheFirementCoordinator.modeFM@post = AetFiremenMode
132 and 'IsNotInRequestHelp' = AetFiremenMode
133 }
134
135 }
136 }
137 }
```

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

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

```

1 //package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
2   outactCentralCoordinator.oeInitialiseNewCrisisEvent {
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 //
9 // Operation Model {
10 //
11   operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
12     outactCentralCoordinator.oeInitialiseNewCrisisEvent():ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
14   }
15 //
```

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

B.11 File ./src-gen/messir-spec/operations/environment/environment-actCentralCoordinator-oeMovePinOnMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.environment.operations.actCentralCoordinator.
2   outactCentralCoordinator.oeMovePinOnMap {
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
10 Operation Model {
11
12   operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
13     outactCentralCoordinator.oeMovePinOnMap(AdtGeoPos:dtGeoPos):ptBoolean{
14   // include below the specification information (pre,post or ocl or prolog)
15   }
16 }
```

Listing B.11: Messir Spec. file environment-actCentralCoordinator-oeMovePinOnMap.msr.

B.12 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{
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.12: Messir Spec. file
 environment-actCentralCoordinator-oeRequestCrisisEventLocation.msr.

B.13 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.13:           Messir           Spec.           file
environment-actCommunicationCompany-oeReceiveCrisisEventLocation.msr.
```

B.14 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.14: Messir Spec. file environment-actFiremenCoordinator-oeAddRequestHelp.msr.

B.15 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.15: Messir Spec. file environment-actFiremenCoordinator-oeRequestHelp.msr.

B.16 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       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:ptString, 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   actor actFiremenCoordinator role rnactFiremenCoordinator cardinality [1..*] extends
70     actAbstractDispatchCoordinator {
71
72     operation init() : ptBoolean
73
74     input interface inactFiremenCoordinator {
75   }

```

```

76   output interface outactFiremenCoordinator {
77     operation oeAddRequestHelp() : ptBoolean
78     operation oeRequestHelp(AetTeamType: etTeamType, ARequestedNumber:ptInteger) : ptBoolean
79   }
80 }
81
82 actor actPoliceCoordinator role rnPoliceCoordinator cardinality [1...*] extends
83   actAbstractDispatchCoordinator {
84
85   attribute modeFM: etFiremenMode
86   operation init() : ptBoolean
87
88   input interface inactPoliceCoordinator {
89 }
90
91   output interface outactPoliceCoordinator {
92 }
93
94 actor actTowServiceCoordinator role rnTowServiceCoordinator cardinality [1...*] extends
95   actAbstractDispatchCoordinator {
96
97   operation init() : ptBoolean
98
99   input interface inactTowServiceCoordinator {
100 }
101
102   output interface outactTowServiceCoordinator {
103 }
104
105 }
106 }
```

Listing B.16: Messir Spec. file environment.msr.

B.17 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.17: Messir Spec. file primarytypes-associations.msr.

B.18 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/primarytypes-classes-ctCrisisEvent-minGeoPos.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes.operations.classes.
   ctCrisisEvent.minGeoPos {
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.primarytypes.classes.ctCrisisEvent.
      minGeoPos(AGeoPos1:dtGeoPos, AGeoPos2:dtGeoPos):ptBoolean{
13     // include below the specification information (pre, post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.18: Messir Spec. file primarytypes-classes-ctCrisisEvent-minGeoPos.msr.

B.19 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/primarytypes-classes-ctMapWithPin-addPinToMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes.operations.classes.
   ctMapWithPin.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.primarytypes.classes.ctMapWithPin.
      addPinToMap(AGeoPos:dtGeoPos, AdtMapWithPin:dtMapWithPin):ptBoolean{
13     // include below the specification information (pre,post or ocl or prolog)
14
15   }
16 }
17 }
```

Listing B.19: Messir Spec. file primarytypes-classes-ctMapWithPin-addPinToMap.msr.

B.20 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/primarytypes-classes-ctMapWithPin-getAllPins.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes.operations.classes.
   ctMapWithPin.getAllPins {
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.concepts.primarytypes.classes.ctMapWithPin.getPin()
      :ptBoolean{
11     // include below the specification information (pre,post or ocl or prolog)
12
13   }
14 }
15 }
```

Listing B.20: Messir Spec. file primarytypes-classes-ctMapWithPin-getAllPins.msr.

B.21 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/primarytypes-classes-ctMapWithPin-getMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes.operations.classes.
   ctMapWithPin.getMap {
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.primarytypes.classes.ctMapWithPin.getMap()
   :ptBoolean
13 // include below the specification information (pre,post or ocl or prolog)
14
15 }
16 }
17 }
```

Listing B.21: Messir Spec. file primarytypes-classes-ctMapWithPin-getMap.msr.

B.22 File ./src-gen/messir-spec/operations/concepts/primarytypes-classes/primarytypes-classes-ctMapWithPin-removeAllPinsFromMap.msr

```

1 package lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.classes.operations.classes.
   ctMapWithPin.removeAllPinsFromMap {
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.primarytypes.classes.ctMapWithPin.
   removeAllPinsFromMap(AGeoPos:dtGeoPos, AdtMapWithPin:dtMapWithPin):ptBoolean{
13 // include below the specification information (pre,post or ocl or prolog)
14
15 }
16 }
17 }
```

Listing B.22: Messir Spec. file primarytypes-classes-ctMapWithPin-removeAllPinsFromMap.msr.

B.23 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   operation minGeoPos(AGeoPos1:dtGeoPos, AGeoPos2:dtGeoPos) : ptBoolean
50
51 }
52
53 class ctComment role rnComment cardinality [0..*] {
54   attribute comment: dtComment
55
56   operation init( AComment: dtComment
57
58   ): ptBoolean
59 }
60
61 class ctDispatchedCoordinator role rnDispatchedCoordinator cardinality [1..*] {
62   attribute type: etTeamType
63   attribute status: etDispatchStatus
64   attribute geoPos: dtGeoPos
65   attribute isFree: ptBoolean
66   attribute mode: etDispatchCoordinatorMode
67
68   operation init( Atype:etTeamType,
69     Astatus:etDispatchStatus,
70     AgeoPos:dtGeoPos,
71     AisFree:ptBoolean,
72     Amode:etDispatchCoordinatorMode
73   ): ptBoolean
74 }
75
76 class ctMapWithPin role rnMapWithPin cardinality [1..*] {
77   attribute mapWithPin: dtMapWithPin
78
79   operation init( AmapWithPin:dtMapWithPin
80   ): ptBoolean
81
82   operation getPin() : ptBoolean
83   operation getMap() : ptBoolean
84   operation removeAllPinsFromMap(AGeoPos:dtGeoPos, AdtMapWithPin:dtMapWithPin) : ptBoolean
85   operation addPinToMap(AGeoPos:dtGeoPos, AdtMapWithPin:dtMapWithPin) : ptBoolean
86 }
87
88 }
89 }
90 }
```

Listing B.23: Messir Spec. file primarytypes-classes.msr.

B.24 File [./src-gen/messir-spec/concepts/primarytypes-datatypes/primarytypes-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.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 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 enum etComCompanyMode {
56     constants["isInRequest", "isInStandBy"]
57     operation is():ptBoolean
58 }
59
60
61 }
62 }
63 }
```

Listing B.24: Messir Spec. file primarytypes-datatypes.msr.

B.25 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.25: Messir Spec. file secondarytypes-associations.msr.

B.26 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.26: Messir Spec. file secondarytypes-classes.msr.

B.27 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 is() : ptBoolean
44 }
45
46 datatype dtComment extends dtString {
47     operation is() : ptBoolean
48 }
49 }
50
51 }
52 }

```

Listing B.27: Messir Spec. file secondarytypes-datatypes.msr.

B.28 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.28: Messir Spec. file tests.msr.

B.29 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
21           56") {
22           ieRequestCrisisEventLocation("691 12 34 56") returned to Orange
23         }
24
25         Orange executed instanceof subfunction oeReceiveCrisisEventLocation("Latitude=87.20, Longitude
26           =20.25") {
27           ieReceiveCrisisEventLocation("A string for the image with the pin") returned to Camille
28         }
29
30         Camille executed instanceof subfunction oeMovePinOnMap("Latitude=75.08, Longitude=23.03") {
31           ieReceiveCrisisEventLocation("A string for the image with the pin") returned to Camille
32         }
33
34         Camille executed instanceof subfunction oeCreateNewCrisisEvent("AdtName=Walter", "AenHumanType=
35           Witness", "AdtPhoneNumber=691123456", "A string for the image with the pins", "The Witness
36           can't stay at the accident's location for long.") {
37           ieReceiveNewCrisisEvent("1", "You have received a new Crisis Event Dispatch Order!") returned to
38             Fabio
39           ieReceiveNewCrisisEvent("1", "You have received a new Crisis Event Dispatch Order!") returned to
40             Ted
41         }
42       }
43     }
44   }
45 }
```

Listing B.29: Messir Spec. file
usecaseinstance-ugCreateNewCrisisEvent-uciugCreateNewCrisisEvent.msr.

B.30 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 {
```

B.30. FILE /.../USECASEINSTANCE-UGGLOBALDISPATCHMANAGEMENT-UCIUGGLOBALDISPATCHMAN

```
10     Camille : actCentralCoordinator
11     Fabio   : actFiremenCoordinator
12     Ted    : actTowServiceCoordinator
13     Polo   : actPoliceCoordinator
14 }
15 use case steps {
16     Fabio executed instanceof subfunction oeGetCrisisEventInformation() {
17         ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
18             with the pins","The Witness can't stay at the accident's location for long.") returned to
19                 Fabio
20 }
21
22     Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
23         ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
24 }
25
26     Ted executed instanceof subfunction oeGetCrisisEventInformation() {
27         ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
28             with the pins","The Witness can't stay at the accident's location for long.") returned to
29                 Ted
30 }
31
32     Ted executed instanceof subfunction oeRefreshMap("Latitude=80.57, Longitude=50.23") {
33         ieReceiveMap("A string for the image with the pins") returned to Ted
34 }
35
36     Ted executed instanceof subfunction oeMessage("AdtComment=I will arrive in 30 minutes") {
37         ieMessageCentralCoordinator("I will arrive in 30 minutes") returned to Camille
38         ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Fabio
39         ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Ted
40 }
41
42     Ted executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
43         ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Ted
44 }
45
46     Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
47         ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
48 }
49
50     Fabio executed instanceof subfunction oeAddRequestHelp() {
51
52 }
53
54     Fabio executed instanceof subfunction oeRequestHelp("AenTeamType=Police", "RequestedNumber=1")
55         {
56         ieReceiveNewCrisisEvent("1","You have received a new Crisis Event Dispatch Order!") returned
57             to Polo
58     }
59
60     Polo executed instanceof subfunction oeGetCrisisEventInformation() {
61         ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
62             with the pins","The Witness can't stay at the accident's location for long.") returned to
63                 Polo
64 }
65
66     Polo executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
67         ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Polo
68 }
69
70     Fabio executed instanceof subfunction oeCloseCrisisEvent() {
71 }
```

```

72
73     Ted executed instanceof subfunction oeCloseCrisisEvent() {
74     }
75
76     Polo executed instanceof subfunction oeCloseCrisisEvent() {
77     }
78
79     }
80   }
81 }
82 }
```

Listing B.30: Messir Spec. file
usecaseinstance-ugGlobalDispatchManagement-uciugGlobalDispatchManagement.msr.

B.31 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[0...*]
44     reuse oeReceiveCrisisEventLocation[0...*]
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
91         respectively"
92     ordering constraint "step (h) can only be executed if step (g) has at least been executed once
93         previously"
94     ordering constraint "if step (i) then previously step (h)"
95 }
96
97 use case system subfunction oeAddNewCrisisEvent() {
98     actor actCentralCoordinator[primary, active]
99 }
100
101 use case system subfunction oeRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) {
102     actor actCentralCoordinator[primary, active]
103     actor actCommunicationCompany[secondary, passive]
104     returned messages{
105         ieRequestCrisisEventLocation(AdtPhoneNumber) returned to actCommunicationCompany //Slide 208..
106     }
107 }
108
109 use case system subfunction oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos) {
110     actor actCommunicationCompany[primary, active]
111     actor actCentralCoordinator[secondary, passive]
112     returned messages{
113         ieReceiveCrisisEventLocation(AdtMapWithPin) returned to actCentralCoordinator
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(AdtString AName, AdtHumanType etHumanType,
124   AdtPhoneNumber dtPhoneNumber, AdtMapWithPin dtMapWithPin, AdtComment dtComment) {
125   actor actCentralCoordinator[primary, active]
126   actor actAbstractDispatchCoordinator[secondary, passive]
127   returned messages{
128     ieReceiveNewCrisisEvent(AdtCrisisID, AdtMessage) returned to actAbstractDispatchCoordinator
129   }
130
131 use case system subfunction oeGetCrisisEventInformation(AdtGeoPos dtGeoPos) {
132   actor actAbstractDispatchCoordinator[primary, active]
133   returned messages{
134     ieReceiveCrisisEventInformation (AdtCrisisID, AdtName, AdtHumanType, AdtPhoneNumber,
135       AdtMapWithPin, AdtComment) returned to actAbstractDispatchCoordinator
136   }
137
138 use case system subfunction oeMessage(AdtComment dtComment) {
139   actor actAbstractDispatchCoordinator[primary, active]
140   actor actCentralCoordinator[secondary, passive]
141   actor actAbstractDispatchCoordinator[secondary, multiple]
142   returned messages{
143     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
144     ieMessageCentralCoordinator(AdtComment) returned to actCentralCoordinator
145   }
146 }
147
148 use case system subfunction oeUpdateDispatchStatus(AetDispatchStatus etDispatchStatus) {
149   actor actAbstractDispatchCoordinator[primary, active]
150   returned messages{
151     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
152   }
153 }
154
155 use case system subfunction oeRefreshMap(AdtGeoPos dtGeoPos) {
156   actor actAbstractDispatchCoordinator[primary, active]
157   returned messages{
158     ieReceiveMap(AdtMapWithPin) returned to actAbstractDispatchCoordinator
159   }
160 }
161
162 use case system subfunction oeAddRequestHelp() {
163   actor actFiremenCoordinator[primary, active]
164 }
165
166 use case system subfunction oeRequestHelp(AetTeamType etTeamType, RequestedNumber ptInteger) {
167   actor actFiremenCoordinator[primary, active]
168   actor actAbstractDispatchCoordinator[secondary, passive]
169   returned messages{
170     ieReceiveNewCrisisEvent(AdtCrisisID, AdtMessage) returned to actAbstractDispatchCoordinator
171   }
172 }
173
174 use case system subfunction oeCloseCrisisEvent() {
175   actor actAbstractDispatchCoordinator[primary, active]
176 }
177
178 }
179
180 }
```

Listing B.31: 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)