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**MESSIR** Analysis Document  
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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
<b>Steps Ordering Constraints</b>					
1	step (a) must be executed before step (b) or step (c)				
2	step (b) XOR step (c)				
<b>Additional Information</b>					
none					

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

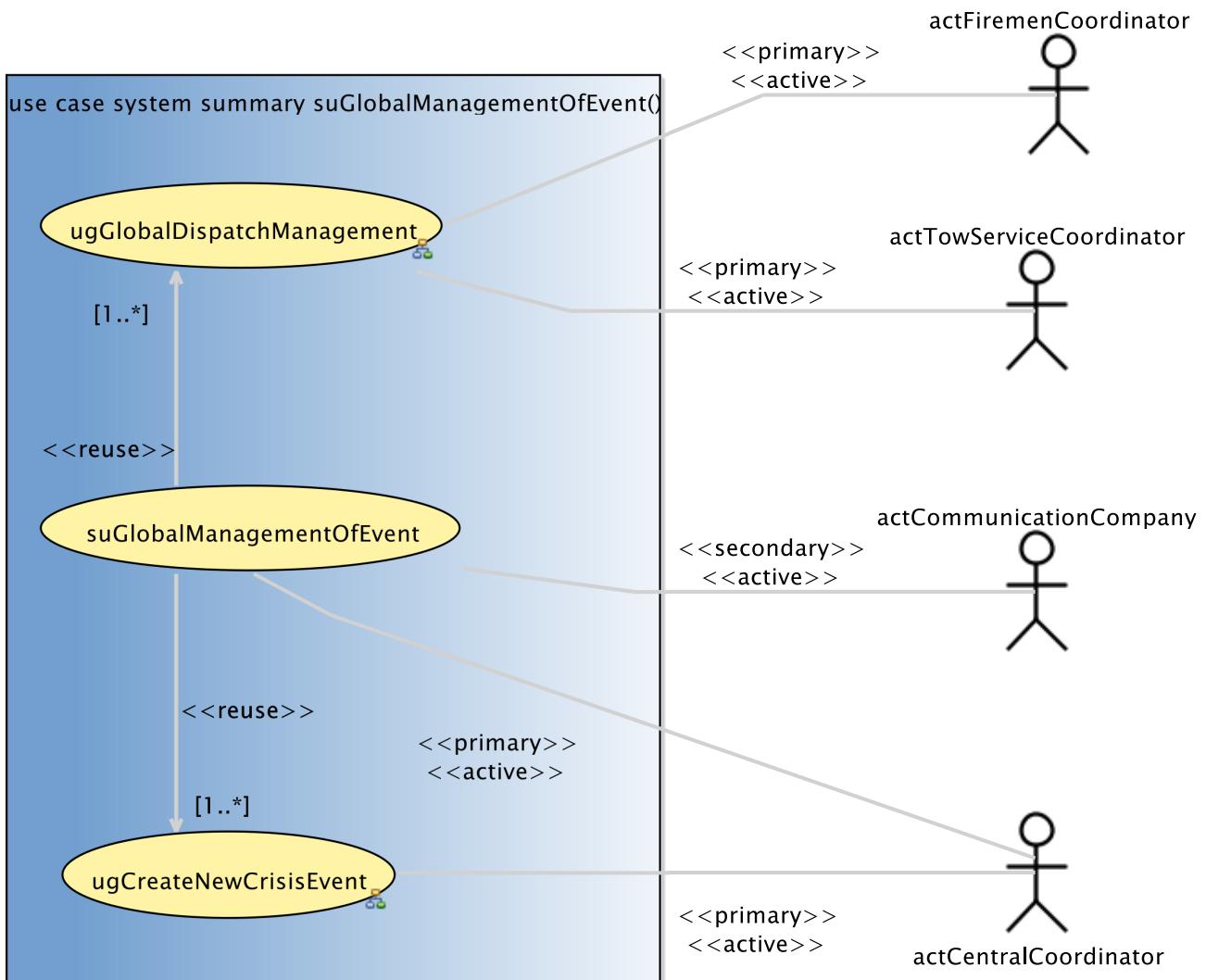


Figure 2.1:

### 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
<b>Primary actor(s)</b>	
1	actCentralCoordinator [active]
<b>Secondary actor(s)</b>	
1	actCommunicationCompany [active]
2	actFiremenCoordinator [passive]
3	actTowServiceCoordinator [passive]
<b>Goal(s) description</b>	
The goal is to manage the creation of a new crisis event including all the necessary information.	
<b>Reuse</b>	
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>
<b>Protocol condition(s)</b>	
1	none.
<b>Pre-condition(s)</b>	
1	none.
<b>Main post-condition(s)</b>	
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.
<b>Main Steps</b>	
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
<b>Steps Ordering Constraints</b>	
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
<b>Additional Information</b>	
none	

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

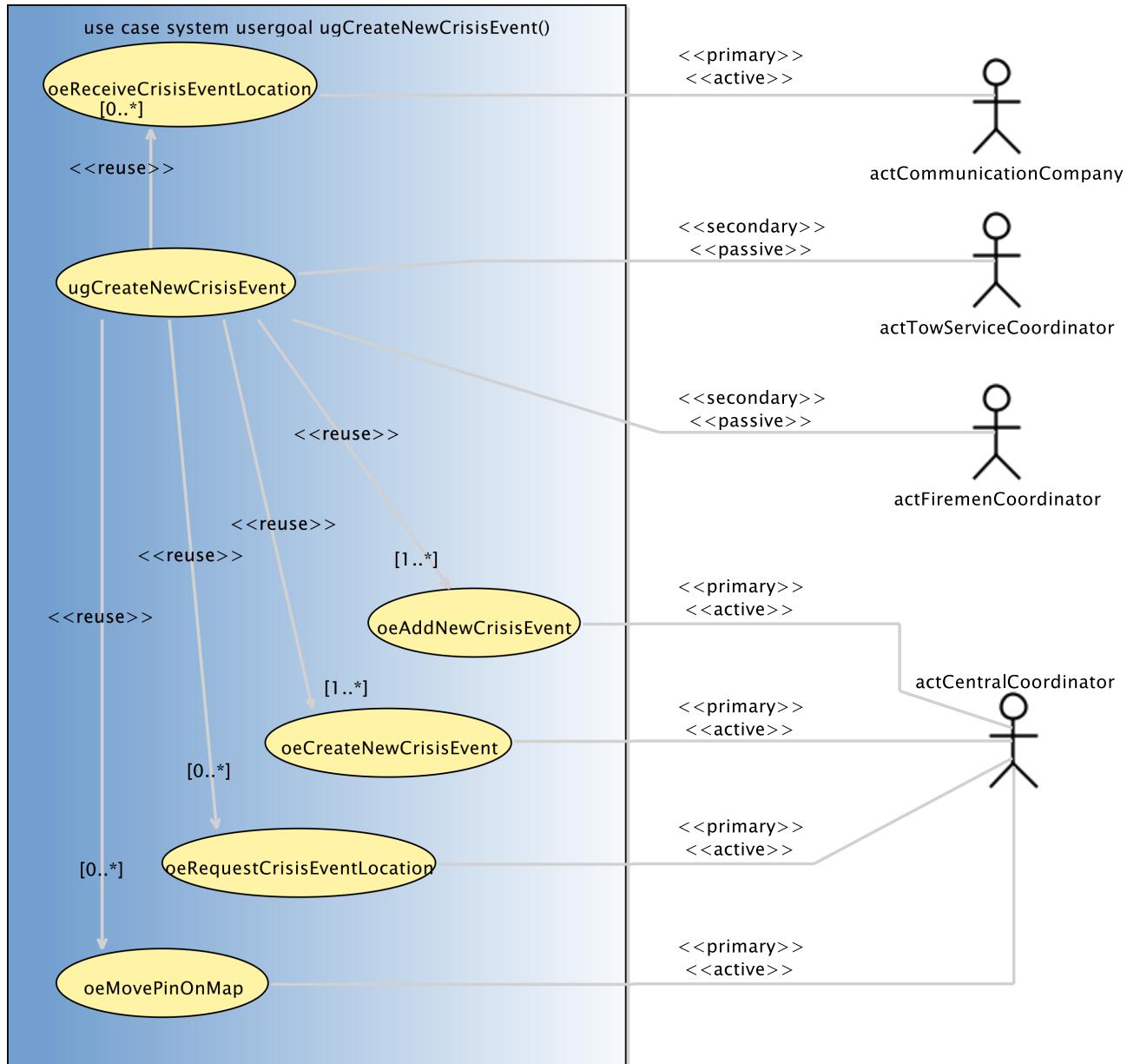


Figure 2.2: ugCreateNewCrisisEvent

### 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
<b>Primary actor(s)</b>	
1	actFiremenCoordinator [active]
2	actTowServiceCoordinator [active]
<b>Secondary actor(s)</b>	
1	actCentralCoordinator [passive]
2	actPoliceCoordinator [active]
<b>Goal(s) description</b>	
The goal is to have the requested coordinators arrive on the crisis event's location.	
<b>Reuse</b>	
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..*]
<b>Protocol condition(s)</b>	
1	none.
<b>Pre-condition(s)</b>	
1	the sender is associated to a crisis event.
<b>Main post-condition(s)</b>	
1	modifications have been made to the system and its environment concerning a crisis event.
<b>Main Steps</b>	
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.

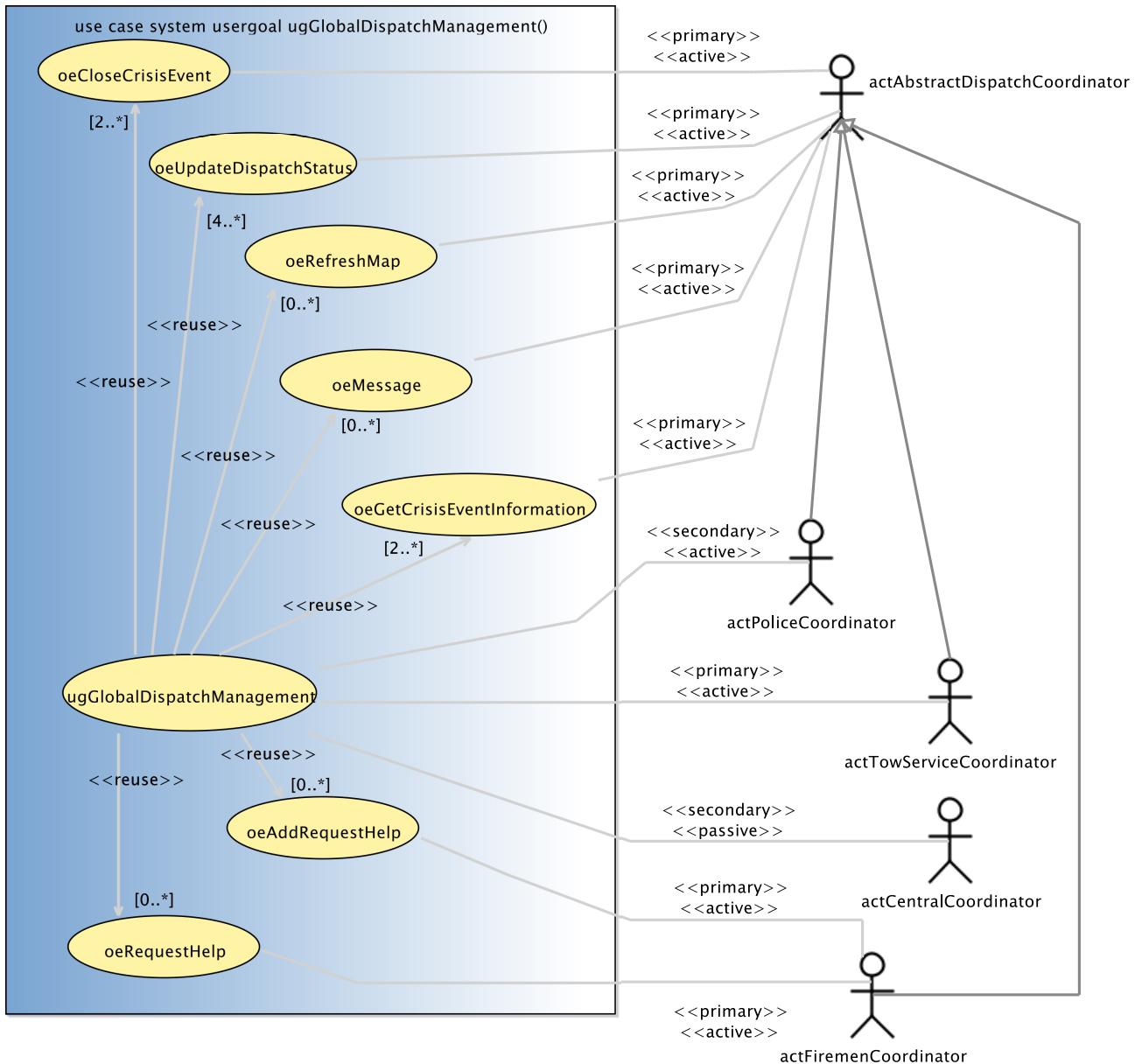


Figure 2.3: ugGlobalDispatchManagement

### 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.

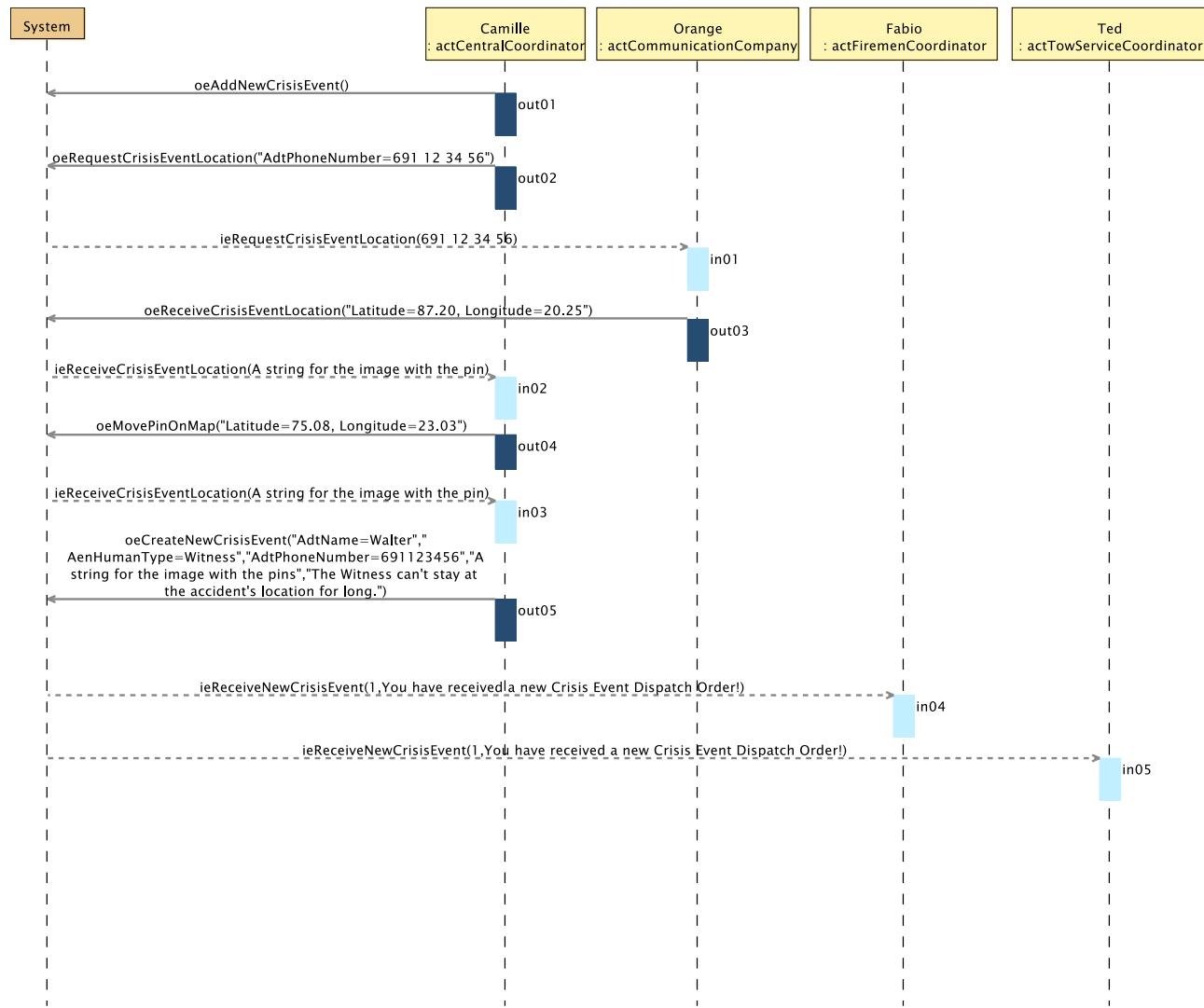


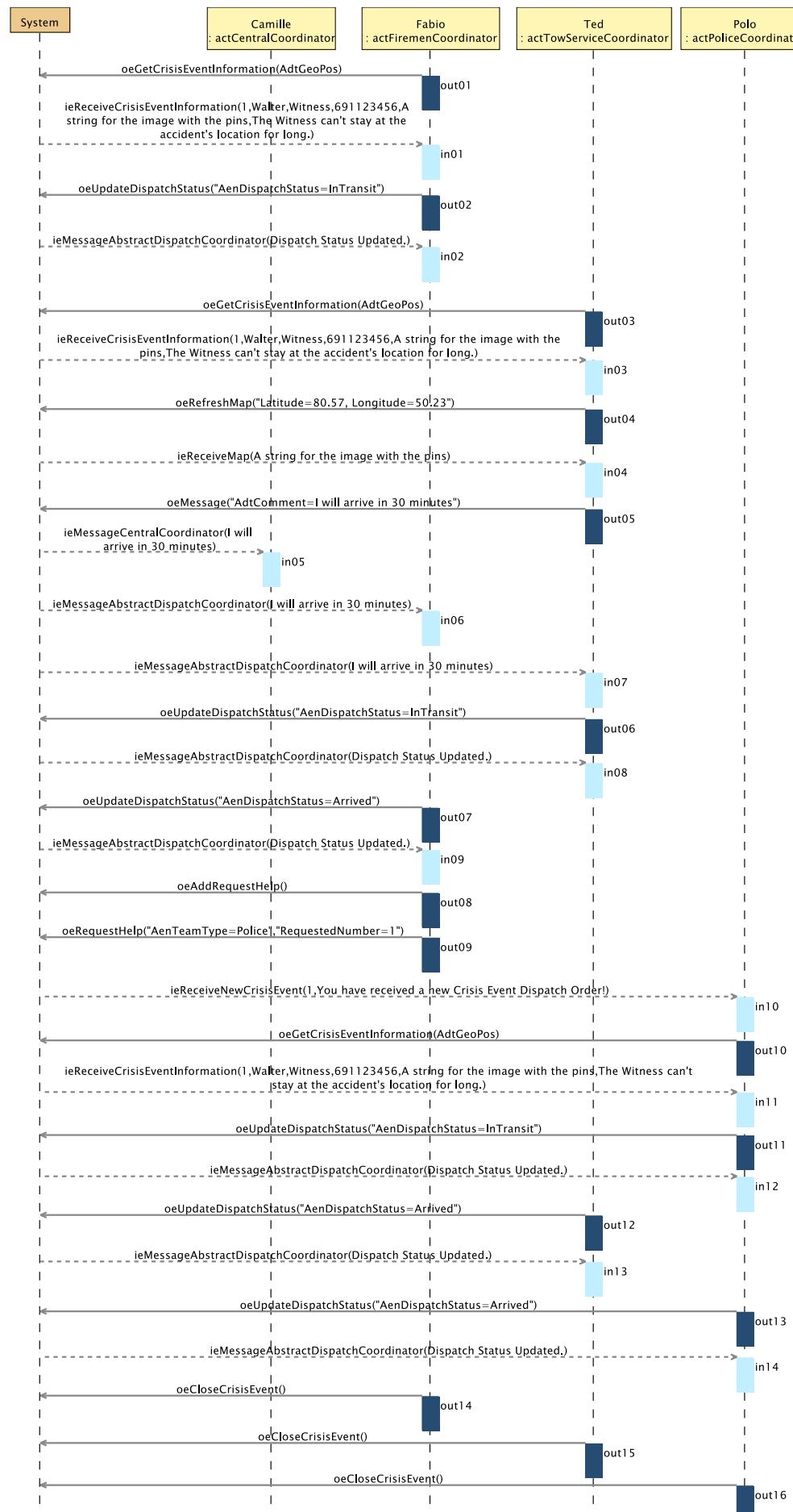
Figure 2.4: ugCreateNewCrisisEvent

**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 <b>oeMessage (AdtComment : dtComment) : ptBoolean</b>
OUT 2 <b>oeUpdateDispatchStatus (AetDispatchStatus : etDispatchStatus) : ptBoolean</b>
<i>InputInterfaces</i>
IN 1 <b>ieReceiveNewCrisisEvent (AdtCrisisID : dtCrisisID, AdtComment : dtComment) : ptBoolean</b>
IN 2 <b>ieMessageAbstractDispatchCoordinator (AdtComment : dtComment) : ptBoolean</b>

#### 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 <b>oeRequestCrisisEventLocation (AdtPhoneNumber : dtPhoneNumber) : ptBoolean</b>

*continues in next page ...*

**...Actor table continuation**

OUT 2	<code>oeCreateNewCrisisEvent (AdtName:ptString, 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.

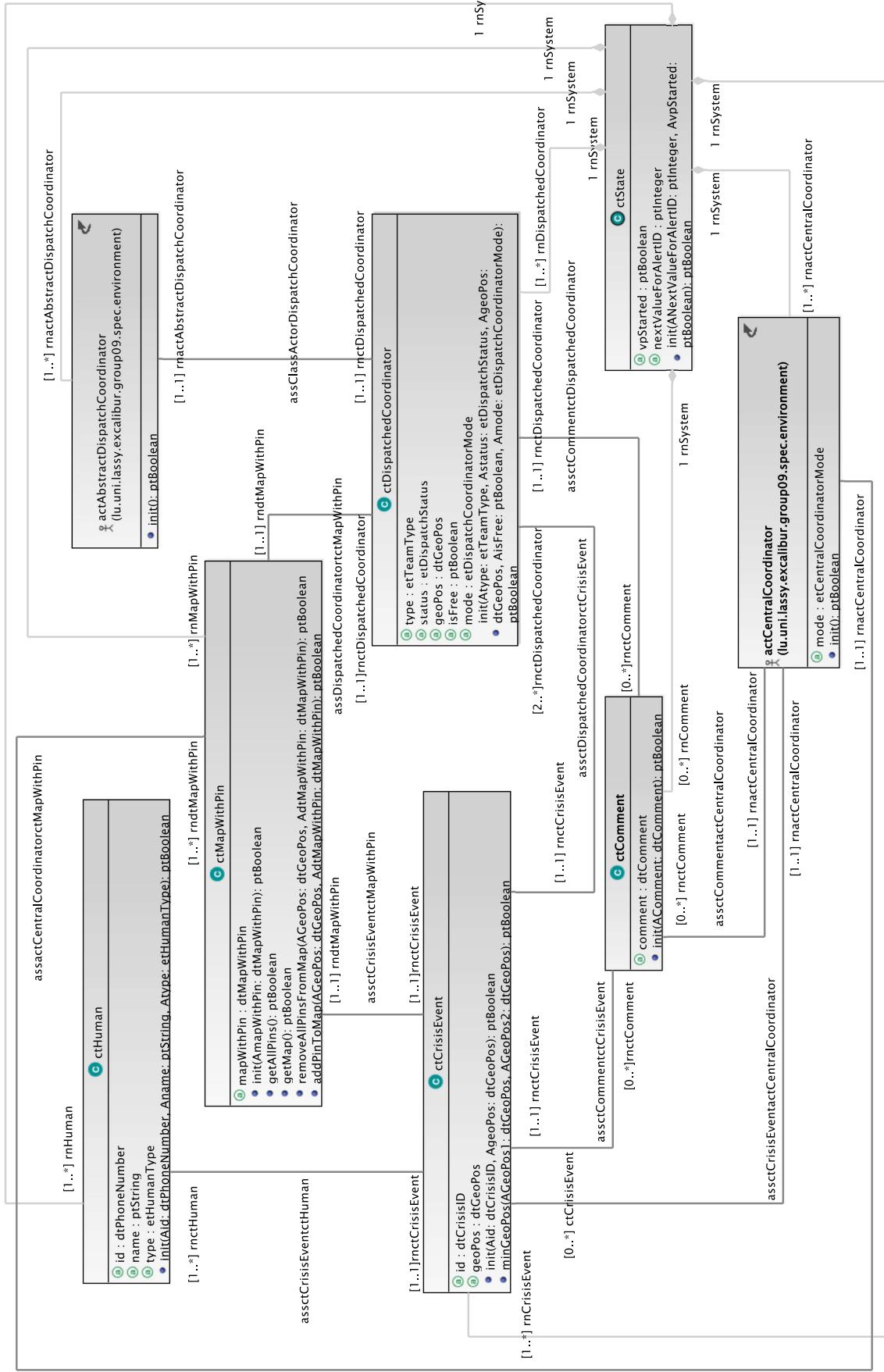


Figure 4.1: Concept Model - PrimaryTypes-Classes local view 12. Main view of the concept model.

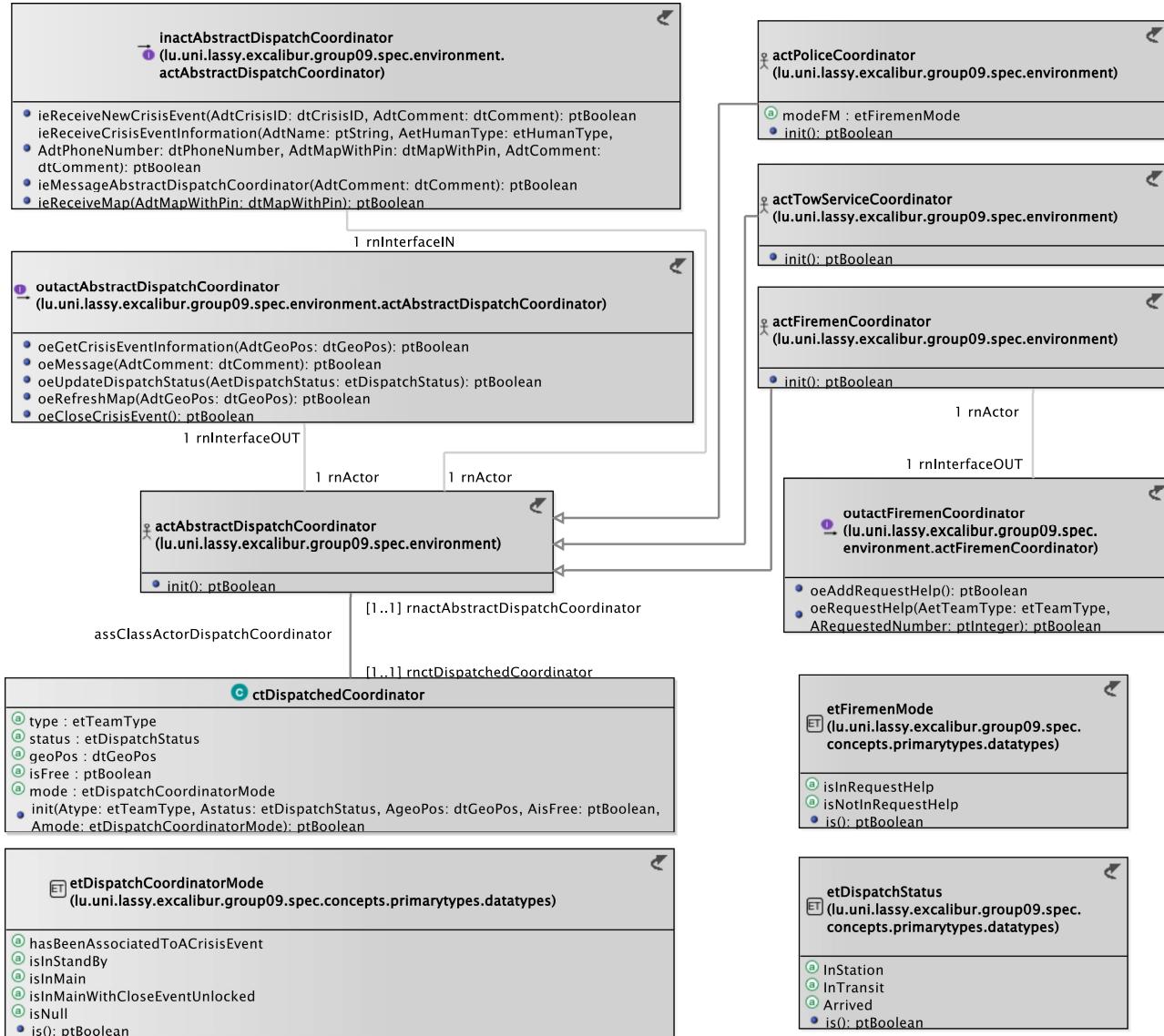


Figure 4.2: Concept Model - PrimaryTypes-Classes local view 18. View of the actors and operations regarding a dispatched coordinator.

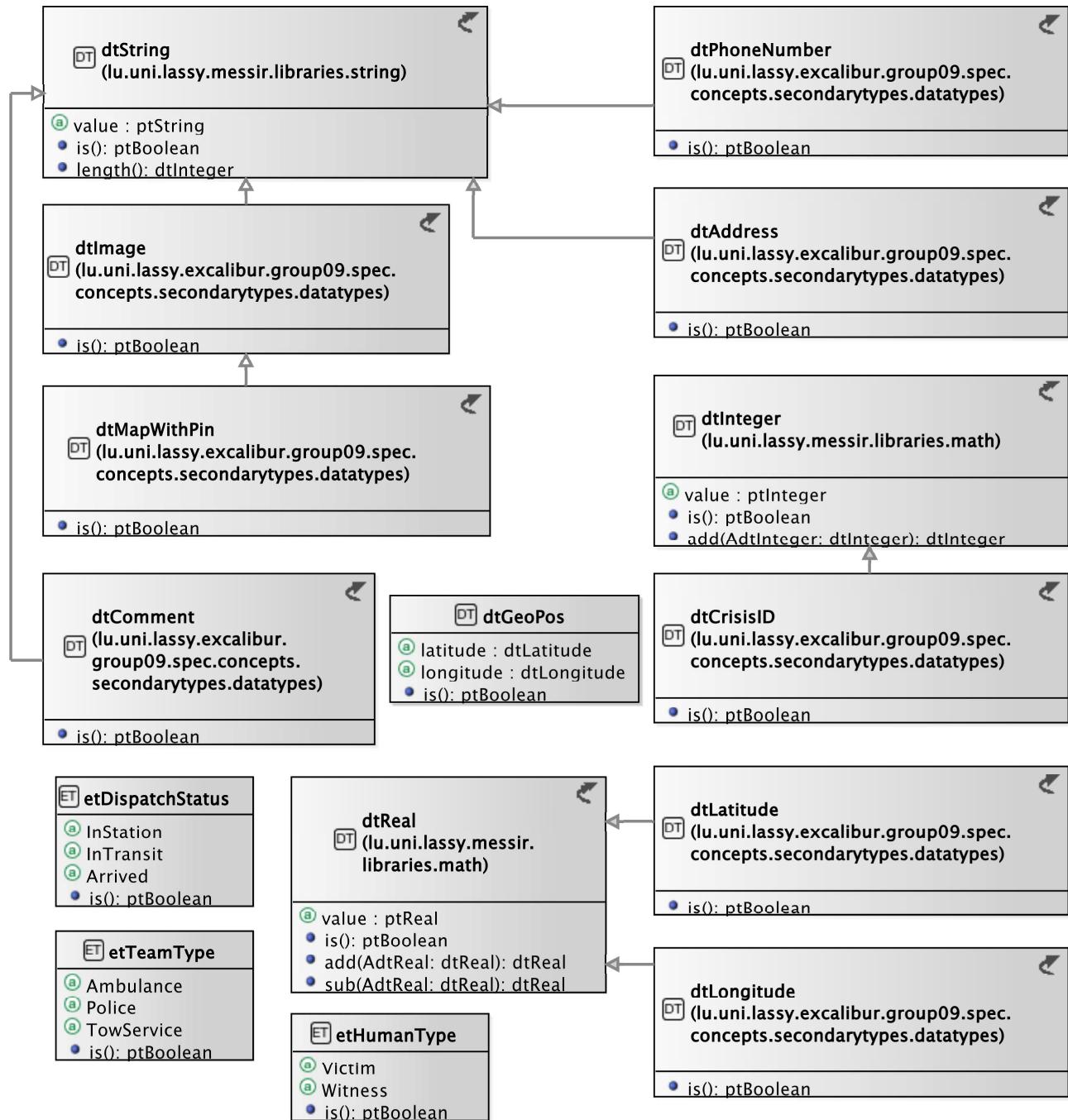


Figure 4.3: Concept Model - PrimaryTypes-Datatypes local view 15. View of all the datatypes.

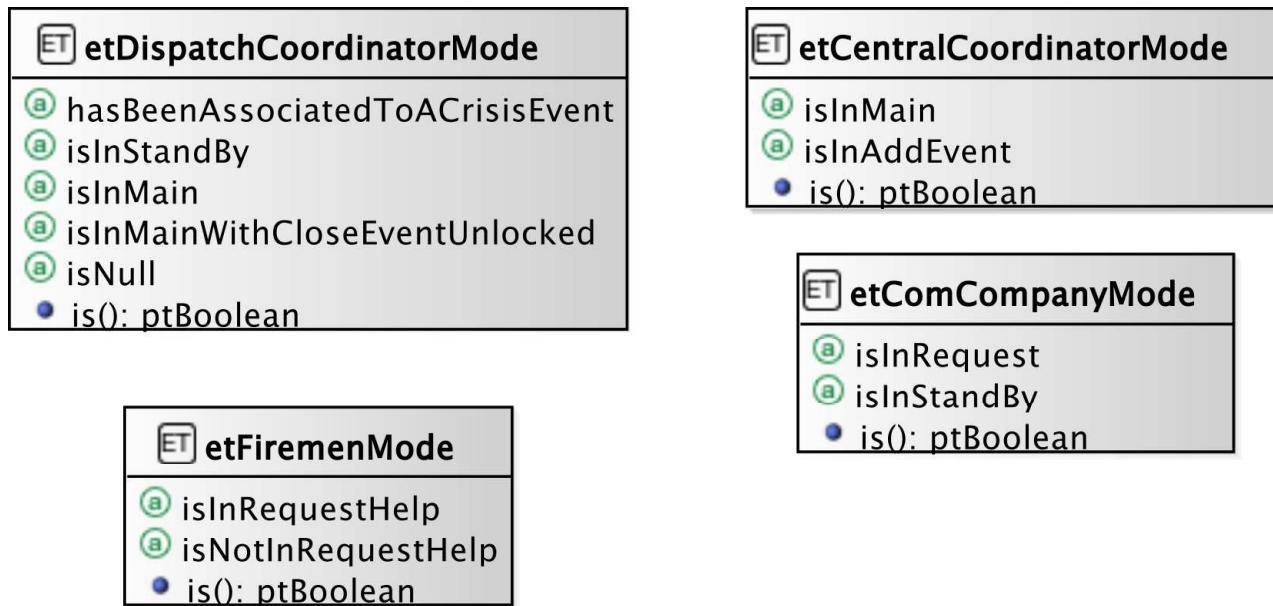


Figure 4.4: Concept Model - PrimaryTypes-Datatypes local view 16. View of all the different modes for the coordinators/actors.

#### 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.

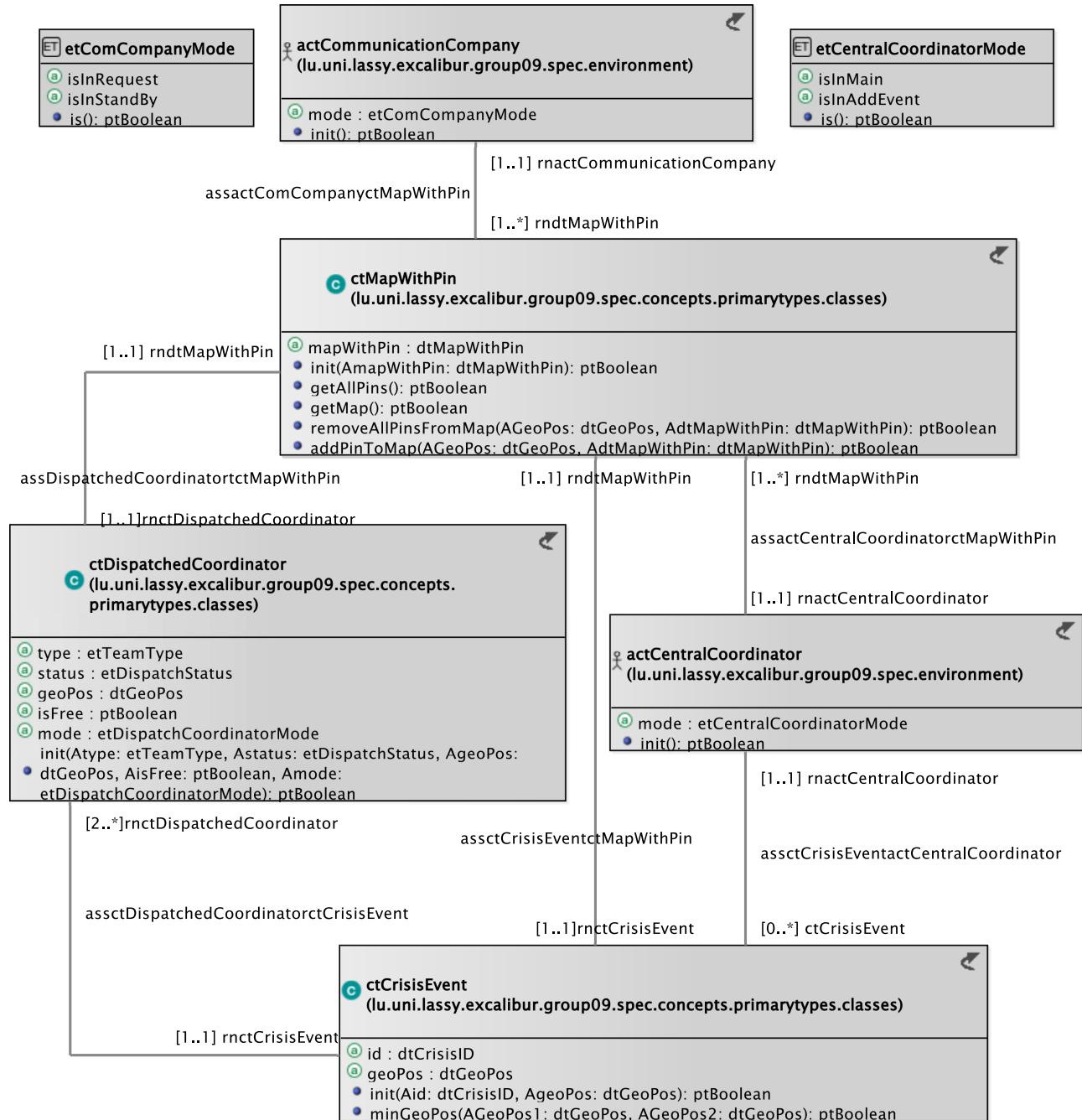


Figure 4.5: Concept Model - PrimaryTypes-Datatypes local view 17. View of 'mapWithPin' and its relationships.

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

#### 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.

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

<b>ENUMERATIONS</b>	
<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.

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

**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	<b>AdtGeoPos: dtGeoPos</b> 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:

<b>OPERATION</b>	
<i>oeMessage</i>	
sent to transmit a message.	
<i>Parameters</i>	
1	<b>AdtComment: dtComment</b>
<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:

<b>OPERATION</b>	
<i>oeRefreshMap</i>	
sent to refresh the map.	
<i>Parameters</i>	
1	<b>AdtGeoPos: dtGeoPos</b>

*continues in next page ...*

***...Operation table continuation***

<b><i>Return type</i></b>
ptBoolean
<b><i>Pre-Condition (protocol)</i></b>
PreP 1 The dispatch coordinator's mode has been set to <code>isInMain</code> or <code>isInMainWithCloseEventUnlocked</code> .
<b><i>Pre-Condition (functional)</i></b>
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.
<b><i>Post-Condition (functional)</i></b>
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:

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

<b>OPERATION</b>
<b><i>oeAddNewCrisisEvent</i></b>

*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:

<b>OPERATION</b>	
<i>oeCreateNewCrisisEvent</i>	
sent to create a new crisis event and to alert the corresponding coordinators.	
<b>Parameters</b>	
1	<b>AdtName: ptString</b> the name of the notifier that informed the Central Coordinator of the crisis event.
2	<b>AetHumanType: etHumanType</b> the notifier can be either a victim or a witness.
3	<b>AdtPhoneNumber: dtPhoneNumber</b> the phone number of the notifier.
4	<b>AdtMapWithPin: dtMapWithPin</b> a map with pins showing the crisis event's location.
<b><i>Return type</i></b>	
ptBoolean	
<b><i>Pre-Condition (protocol)</i></b>	
PreP 1	The actor's mode has been set to <code>isInAddEvent</code> .
<b><i>Pre-Condition (functional)</i></b>	
PreF 1	The map with pin created by the communication company and maybe modified by the central coordinator only has a single pin.
<b><i>Post-Condition (functional)</i></b>	
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.
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., an 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.
<b>Post-Condition (protocol)</b>	
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:

<b>OPERATION</b>
<b><i>oeMovePinOnMap</i></b>
sent to move the pin on the map (adjustments).
<b>Parameters</b>
1 <code>AdtGeoPos: dtGeoPos</code>
<b>Return type</b>
<code>ptBoolean</code>
<b>Pre-Condition (protocol)</b>
PreP 1    The actor's mode has been set to <code>isAddEvent</code> .
<b>Pre-Condition (functional)</b>
PreF 1    It is supposed that a map with pin has already been initialised by the communication company.
<b>Post-Condition (functional)</b>
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.
<b>Post-Condition (protocol)</b>
PostP 1

**5.2.4 Operation Model for oeRequestCrisisEventLocation**

The `oeRequestCrisisEventLocation` operation has the following properties:

<b>OPERATION</b>
<b><i>oeRequestCrisisEventLocation</i></b>
sent to request a crisis event's location.
<b>Parameters</b>
1 <code>AdtPhoneNumber: dtPhoneNumber</code>
<b>Return type</b>
<code>ptBoolean</code>

*continues in next page ...*

***... Operation table continuation***

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

<b>OPERATION</b>
<i>oeReceiveCrisisEventLocation</i>
sent to get a map with pin returned to the central coordinator.
<b>Parameters</b>
1 <code>AdtGeoPos: dtGeoPos</code>
<b>Return type</b>
<code>ptBoolean</code>
<b>Pre-Condition (protocol)</b>
PreP 1 The actor's mode has been set to <code>isInRequest</code> .
<b>Pre-Condition (functional)</b>
PreF 1 the <code>GeoPos</code> given by the communication company is a valid one.
<b>Post-Condition (functional)</b>
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,
<b>Post-Condition (protocol)</b>
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:

<b>OPERATION</b>	
<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:

<b>OPERATION</b>	
<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.
<b><i>Post-Condition (protocol)</i></b>	
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:

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

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

*continues in next page ...*

***...Operation table continuation***

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

**5.7.2 Operation Model for getAllPins**

The `getAllPins` operation has the following properties:

<b>OPERATION</b>
<b><i>getAllPins</i></b>
used to get the geographical positions of the pins that is currently shown on the map. (usually used only when there's actually a single pin on the map)
<b><i>Return type</i></b>
ptBoolean
<b><i>Post-Condition (functional)</i></b>
PostF 1 returns a list of geographical positions.

**5.7.3 Operation Model for getMap**

The `getMap` operation has the following properties:

<b>OPERATION</b>
<b><i>getMap</i></b>
used to get the (updated) map with pin(s).
<b><i>Return type</i></b>
ptBoolean
<b><i>Post-Condition (functional)</i></b>
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:

<b>OPERATION</b>
<b><i>removeAllPinsFromMap</i></b>
used to remove all pins on the map. (usually used to afterwards regenerate new pins, so that the map stays clean)
<b><i>Parameters</i></b>
1 AGeoPos: dtGeoPos
2 AdtMapWithPin: dtMapWithPin
<b><i>Return type</i></b>
ptBoolean
<b><i>Post-Condition (functional)</i></b>

*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
10 Operation Model {
11
12     operation: lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator.
            outactCentralCoordinator.oeCreateNewCrisisEvent(AdtName:ptString, AetHumanType:etHumanType,
            AdtPhoneNumber:dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) :ptBoolean{
13     // include below the specification information (pre,post or ocl or prolog)
14
15 }
16
17 }

```

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.
    outactCentralCoordinator.oeInitialiseNewCrisisEvent {
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.oeInitialiseNewCrisisEvent() :ptBoolean(
11 //     // include below the specification information (pre,post or ocl or prolog)
12 //
13 //
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.
    outactCentralCoordinator.oeMovePinOnMap {
2
3 import lu.uni.lassy.messir.libraries.primitives

```

## B.12. FILE /.../ENVIRONMENT-ACTCENTRALCOORDINATOR-OEREQUESTCRISISEVENTLOCATION.MSR

```
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.
12         outactCentralCoordinator.oeMovePinOnMap(AdtGeoPos:dtGeoPos):ptBoolean{
13             // include below the specification information (pre,post or ocl or prolog)
14         }
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.
2     outactCentralCoordinator.oeRequestCrisisEventLocation {
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.environment.actCentralCoordinator.
14             outactCentralCoordinator.oeRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber):ptBoolean{
15             // include below the specification information (pre,post or ocl or prolog)
16         }
17         preP {
18             let AvpStarted: ptBoolean in
19                 self.rnActor.rnSystem.vpStarted = AvpStarted
20                 and AvpStarted = true
21         }
22         preF { true }
23         postF {
24             let TheactYou:lu.uni.lassy.excalibur.group09.spec.environment.actCentralCoordinator in
25             let AptString:ptString in
26                 /* Post Functional:*/
27                 /* PostF01 */
28                 AptString = 'Hello World !'
29                 and TheactYou.InterfaceIN = self.rnActor.InterfaceIN
30                 and TheactYou.InterfaceIN^ieHelloWorld(AptString)
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.
2     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.
13     outactCommunicationCompany.oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos):ptBoolean{
14   // include below the specification information (pre,post or ocl or prolog)
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.
2   outactFiremenCoordinator.oeAddRequestHelp {
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.actFiremenCoordinator.
12     outactFiremenCoordinator.oeAddRequestHelp():ptBoolean{
13   // include below the specification information (pre,post or ocl or prolog)
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.
2   outactFiremenCoordinator.oeRequestHelp {
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.secondarytypes.datatypes
9   import lu.uni.lassy.excalibur.group09.spec.concepts.primarytypes.datatypes
10
11 Operation Model {
12
13   operation: lu.uni.lassy.excalibur.group09.spec.environment.actFiremenCoordinator.
14     outactFiremenCoordinator.oeRequestHelp(AetTeamType:etTeamType, ARequestedNumber:ptInteger):
15       ptBoolean{
16   // include below the specification information (pre,post or ocl or prolog)
17   }
18 }
```

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(AdtName:ptString, AetHumanType:etHumanType, AdtPhoneNumber:
31                 dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) : ptBoolean
32             operation oeMovePinOnMap (AdtGeoPos:dtGeoPos) : ptBoolean
33         }
34     }
35
36     actor actCommunicationCompany role rnactCommunicationCompany cardinality [1...*] {
37
38         attribute mode: etComCompanyMode
39         operation init() : ptBoolean
40
41         input interface inactCommunicationCompany {
42             operation ieRequestCrisisEventLocation(AdtPhoneNumber:dtPhoneNumber) : ptBoolean
43         }
44
45         output interface outactCommunicationCompany {
46             operation oeReceiveCrisisEventLocation(AdtGeoPos:dtGeoPos) : ptBoolean
47         }
48     }
49
50     actor actAbstractDispatchCoordinator role rnactAbstractDispatchCoordinator cardinality [1...*] {
51
52         operation init() : ptBoolean
53
54         input interface inactAbstractDispatchCoordinator {
55             operation ieReceiveNewCrisisEvent(AdtCrisisID:dtCrisisID, AdtComment:dtComment) : ptBoolean
56             operation ieReceiveCrisisEventInformation(AdtName:ptString, AetHumanType:etHumanType,
57                 AdtPhoneNumber:dtPhoneNumber, AdtMapWithPin:dtMapWithPin, AdtComment:dtComment) : ptBoolean
58             operation ieMessageAbstractDispatchCoordinator(AdtComment: dtComment) : ptBoolean
59             operation ieReceiveMap(AdtMapWithPin: dtMapWithPin) : ptBoolean
60         }
61
62         output interface outactAbstractDispatchCoordinator {
63             operation oeGetCrisisEventInformation(AdtGeoPos:dtGeoPos) : ptBoolean

```

```

62     operation oeMessage(AdtComment:dtComment) : ptBoolean
63     operation oeUpdateDispatchStatus(AetDispatchStatus:etDispatchStatus): ptBoolean
64     operation oeRefreshMap(AdtGeoPos:dtGeoPos) : ptBoolean
65     operation oeCloseCrisisEvent(): ptBoolean
66   }
67 }
68
69 actor actFiremenCoordinator role rnactFiremenCoordinator cardinality [1..*] extends
    actAbstractDispatchCoordinator {
70
71   operation init() : ptBoolean
72
73   input interface inactFiremenCoordinator {
74   }
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
    actAbstractDispatchCoordinator {
83
84   attribute modeFM: etFiremenMode
85   operation init() : ptBoolean
86
87   input interface inactPoliceCoordinator {
88   }
89
90   output interface outactPoliceCoordinator {
91   }
92 }
93
94 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.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(rndtMapWithPin) [1..1]
26
27   association assDispatchedCoordinatorctMapWithPin
28     ctDispatchedCoordinator(rnctDispatchedCoordinator) [1..1]
29     ctMapWithPin(rndtMapWithPin) [1..1]
30
31   association assactComCompanyctMapWithPin
32     actCommunicationCompany(rnactCommunicationCompany) [1..1]
33     ctMapWithPin(rndtMapWithPin) [1..*]
34
35   association assactCentralCoordinatorctMapWithPin
36     actCentralCoordinator(rnactCentralCoordinator) [1..1]
37     ctMapWithPin(rndtMapWithPin) [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.
2   ctCrisisEvent.minGeoPos {
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 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.
    getAllPins():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/concepts/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/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: ptString
32 attribute type: etHumanType
33
34 operation init( Aid:dtPhoneNumber,
35     Aname:ptString,
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 getAllPins() : 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["Ambulance", "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.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-datatatypes.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   }
46 }
```

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 {
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     Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
22       ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
23     }
24     Ted executed instanceof subfunction oeGetCrisisEventInformation() {
25       ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
26         with the pins","The Witness can't stay at the accident's location for long.") returned to
27         Ted
28     }
29     Ted executed instanceof subfunction oeRefreshMap("Latitude=80.57, Longitude=50.23") {
30       ieReceiveMap("A string for the image with the pins") returned to Ted
31     }
32     Ted executed instanceof subfunction oeMessage("AdtComment=I will arrive in 30 minutes") {
33       ieMessageCentralCoordinator("I will arrive in 30 minutes") returned to Camille
34       ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Fabio
35       ieMessageAbstractDispatchCoordinator("I will arrive in 30 minutes") returned to Ted
36     }
37     Ted executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
38       ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Ted
39     }
40     Fabio executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
41       ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Fabio
42     }
43     Fabio executed instanceof subfunction oeAddRequestHelp() {
44     }
45     Fabio executed instanceof subfunction oeRequestHelp("AenTeamType=Police", "RequestedNumber=1")
46       {
47       ieReceiveNewCrisisEvent("1","You have received a new Crisis Event Dispatch Order!") returned
48         to Polo
49     }
50     Polo executed instanceof subfunction oeGetCrisisEventInformation() {
51       ieReceiveCrisisEventInformation("1","Walter","Witness","691123456","A string for the image
52         with the pins","The Witness can't stay at the accident's location for long.") returned to
53         Polo
54     }
55     Polo executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=InTransit") {
56       ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Polo
57     }
58     Ted executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
59       ieMessageAbstractDispatchCoordinator("Dispatch Status Updated.") returned to Ted
60     }
61
62
63

```

```

64      }
65
66      Polo executed instanceof subfunction oeUpdateDispatchStatus("AenDispatchStatus=Arrived") {
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
      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(AdtName:ptString, AetHumanType: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
132 use case system subfunction oeGetCrisisEventInformation(AdtGeoPos:dtGeoPos) {
133   actor actAbstractDispatchCoordinator[primary,active]
134   returned messages{
135     ieReceiveCrisisEventInformation (AdtCrisisID, AdtName, AetHumanType, AdtPhoneNumber,
136       AdtMapWithPin, AdtComment) returned to actAbstractDispatchCoordinator
137   }
138 }
139
140 use case system subfunction oeMessage(AdtComment:dtComment) {
141   actor actAbstractDispatchCoordinator[primary,active]
142   actor actCentralCoordinator[secondary, passive]
143   actor actAbstractDispatchCoordinator[secondary, multiple]
144   returned messages{
145     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
146     ieMessageCentralCoordinator(AdtComment) returned to actCentralCoordinator
147   }
148 }
149
150 use case system subfunction oeUpdateDispatchStatus(AetDispatchStatus:etDispatchStatus) {
151   actor actAbstractDispatchCoordinator[primary,active]
152   returned messages{
153     ieMessageAbstractDispatchCoordinator(AdtComment) returned to actAbstractDispatchCoordinator
154   }
155 }
156
157 use case system subfunction oeRefreshMap(AdtGeoPos:dtGeoPos) {
158   actor actAbstractDispatchCoordinator[primary,active]
159   returned messages{
160     ieReceiveMap(AdtMapWithPin) returned to actAbstractDispatchCoordinator
161   }
162 }
163
164 use case system subfunction oeAddRequestHelp() {
165   actor actFiremenCoordinator[primary,active]
166 }
167
168 use case system subfunction oeRequestHelp(AetTeamType: etTeamType, RequestedNumber:ptInteger) {
169   actor actFiremenCoordinator[primary,active]
170   actor actAbstractDispatchCoordinator[secondary,passive]
171   returned messages{
172     ieReceiveNewCrisisEvent(AdtCrisisID, AdtMessage) returned to actAbstractDispatchCoordinator
173   }
174 }
175
176 use case system subfunction oeCloseCrisisEvent() {
177   actor actAbstractDispatchCoordinator[primary,active]
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)